ADAPTATION FUND

REQUEST FOR PROJECT/PROGRAMME
FUNDING FROM THE ADAPTATION FUND

The annexed form should be completed and transmitted to the Adaptation Fund Board Secretariat by email or fax.

Please type in the responses using the template provided. The instructions attached to the form provide guidance to filling out the template.

Please note that a project/programme must be fully prepared (i.e., fully appraised for feasibility) when the request is submitted. The final project/programme document resulting from the appraisal process should be attached to this request for funding.

Complete documentation should be sent to:

The Adaptation Fund Board Secretariat
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Email: afbsec@adaptation-fund.org

ADAPTATION FUND

PROJECT/PROGRAMME PROPOSAL TO THE ADAPTATION FUND

PART I: PROJECT/PROGRAMME INFORMATION

CATEGORY:	ORDINARY PROJECT
COUNTRY:	NIGER
PROJECT TITLE:	ENHANCING RESILIENCE OF AGRICULTURE TO CLIMATE CHANGE TO SUPPORT FOOD SECURITY IN NIGER, THROUGH MODERN IRRIGATION TECHNIQUES
TYPE OF INSTITUTION FOR IMPLEMENTATION:	REGIONAL
INSTITUTION FOR IMPLEMENTATION:	WEST AFRICAN DEVELOPMENT BANK (BOAD)
INSTITUTION (S) OF EXECUTION:	MINISTRY OF AGRICULTURE
AMOUNT OF FINANCING REQUESTED: (EQUIVALENT IN DOLLARS)	**USD 9 911 000**

CONTEXT AND GENERAL FRAMEWORK OF THE PROJECT/PROGRAM:

Provide brief information on the problem the proposed project/programme is aiming to solve. Outline the economic social, development and environmental context in which the project would operate.

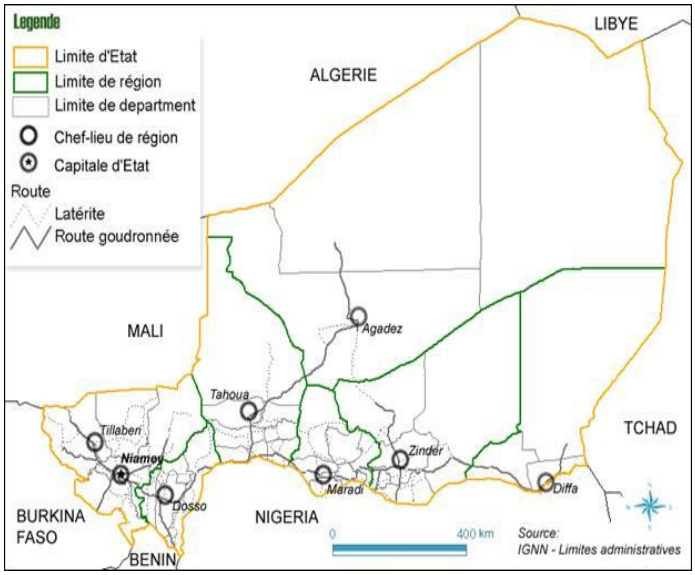


Figure 1. Administrative Regions of Niger
(Source : Vierri, T., 2004)

Sahelian and landlocked country with the closest point to the sea located approximately at 600 km, Niger covers an area of 1.267.000 km² and lies between longitudes 0 ° 16' and 16 ° East and latitudes 11 ° 1' and 23 ° 17' North. 3/4 of the country are occupied by deserts of which the Ténéré which is among the most famous deserts in the world.

Between 1988 and 2010, Niger's population has nearly doubled from 7, 256,626 to 15,203,822 inhabitants (NSI, 2010) of which 80% are rural. With an average rate of 3.45% between 1990 and 1999, one of the world's highest, the average population growth greatly exceeds the rate of agricultural growth in the country, estimated at 2.2% in recent years.
The average population density is low (6.5 inhabitants / km^2), but this value masks

significant disparities, most of the population (about 75%) being concentrated on 12% of the territory, in the south of the axis Niamey-Zinder, creating a large population pressure on an agro-pastoral environment deemed fragile. The country's economy remains dominated by the agricultural sector which participates in the GDP for approximately 40% and employs 90% of the working population. Agriculture is the main economic activity of the country; it provides some 16% of the exports.

Although relatively diversified, it remains dependent on internal and external isolation and is penalized by high population growth, more austere ecological environment, limited resources, widespread poverty and the high exposure of the country to the negative impacts of variability and of climate change.

ISSUES RELATED TO CLIMATE CHANGE AND FOOD INSECURITY IN NIGER

The variability and climate change are major constraints for the development of Niger, since they have a direct impact on food security of the country, especially in rural areas. The food crises in Niger are in fact the result of deficits in grain production because of constant and repeated rainfall deficits combined with environmental factors, and human parasites.

The country is characterized by high variability both with regard the spatial and temporal climatic parameters as well as rainfall. This has recently led to rainfall deficits resulting from recurrent droughts. Over the past forty years, the country has had seven droughts that have had an impact on agro-pastoral production. This has severely affected the food security and socio-economic life of the country.

With significant food deficits, Niger cannot provide adequate food for its population. It is heavily dependent on grain imports and food aid. In 2005 and more recently in 2010, the population has faced a serious food crisis, following a decline of about 13% of agricultural production in 2009 due to drought in 2004 and 2009 (malnutrition has affected about 32% of the population).

The thorough analysis of the climatic situation and that of natural resources (land, water, soil, vegetation) reveals that since the 1973 drought (which was obviously strong), the environmental degradation has accelerated to an unprecedented rate. This degradation has caused not only the reduction of the productive potential of "natural resources capital", but also the disintegration of secular systems of production and management of natural environment. The consequences of this evolution are dramatic. The finding being established that "land no longer feeds man". There is food insecurity, the decrease in revenues, what explains a high rate of poverty in Niger.

Information gathered in 2012 on the prevalence of malnutrition and the proportion of people affected at the regional and departmental levels of food insecurity are indicative of the fragile situation of the country, in terms of nutrition.

Prevalence of malnutrition

The SMART nutritional survey of June-July 2012 shows that the nutritional status of children under 5 years remains a concern. The global acute malnutrition rate among children of 6 to 59 months rose from 12.3% in June 2011 to 14.8% in June 2012[1]. This rate is very close to the emergency threshold of 15% set by WHO. This threshold is exceeded for four particular areas: Diffa (16.7%), Tillabery (16.6%), Maradi (16.2%) and Zinder (15.9%).

The severe acute malnutrition rate has experienced a larger increase since it has increased from 1.9% in June 2011 to 3.0% in June 2012. This means that the situation is almost back to the level of prevalence

[1]In accordance with WHO recommendations, the 2012 SMART survey takes into account all children from 0 to 59 months unlike previous years where only children from 6-59 months were considered. Thus, a comparison with previous years remains indicative because having a bias.In accordance with WHO recommendations, the 2012 SMART survey takes into account all children 0 to 59 months unlike previous years where only children 6-59 months were considered. Thus, a comparison with previous years remains indicative because having a bias.

observed in June 2010 (3.2%), consecutive to poor harvests of the 2009 season. The regions of Agadez (1.8%) and Dosso (1.9%) are close to the 2% when the threshold is surpassed for all other regions except Niamey region. Diffa, Tillabery and Zinder have, in turn, a prevalence varying between 3.2% and 4.3%, a prevalence by far higher than the emergency threshold of 2% recommended by WHO.

According to the WHO classification on malnutrition, Diffa (44.7%), Tahoua (41.5%), Maradi (50.9%) and Zinder (49%) are in a critical situation (Chronicle Malnutrition > 40%). The regions of Tillabery (34.1%), Dosso (39.1%) and Agadez (30.3%), with prevalence between 30 and 40% find themselves in situation considered serious.

By gender, acute malnutrition affects more girls (21.0%) than boys (17.6%) of the same age for the moderate form as the severe form

Population in food insecurity

- *At regional level*

Under the aegis of the national system of prevention and management of disasters and food crises (DNPGCCA), an estimate of vulnerable populations in various regions of Niger was made in 2012. The results indicate that the high proportion of vulnerable populations is Tillabéry (27%). Tahoua and Zinder follow with 19% of vulnerables, each. Dosso and Maradi regions follow the peloton with 14% and 11% of vulnerable estimated population. Agadez and Diffa have low proportions of vulnerable estimated people (4% and 5%). The Niamey region has the lowest proportion of vulnerables. It should be noted that the majority of the vulnerable population are affected by food insecurity both in post-harvest (41%) and in lean period (62%).

The results show, in addition, that on a total of 2, 736,645 vulnerable populations in post-harvest, 764,742 people are food insecure, or about 28% of the vulnerables. In total, 34% of the vulnerable people are severely food insecure (SFI) against 66% moderately food insecure (MFI). The food insecurity map is presented below.

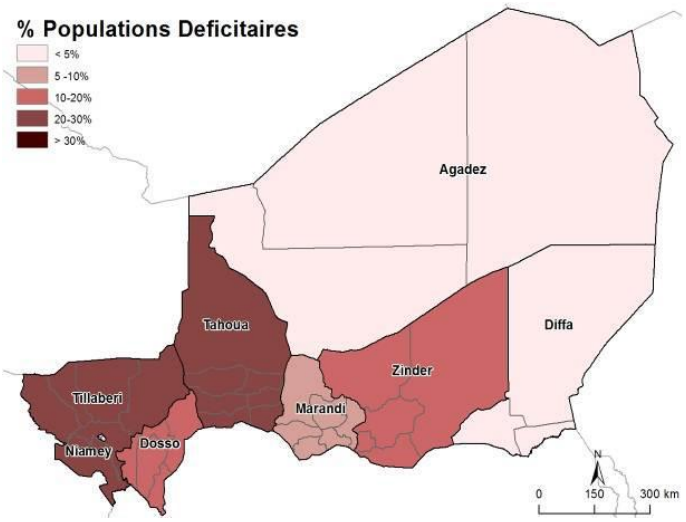


Figure 2: Food insecurity map of Niger

It is important to note that despite the small proportion of vulnerable people registered for Agadez region, compared to other regions, the estimates show that about 30% of the villages in the region are in deficit

situation. In addition, the proportions of these vulnerable populations in food insecurity increase, compared to the post-harvest period. People in SFI is about 46% against 54% in MFI.

- *At the departmental level*

At the national level, almost no department is spared by food insecurity. Some experience it repeatedly and others, according to the aspect of the campaign. A historical analysis of the vulnerability note of Early Alert System (EAS) allows grouping departments into two categories according to their level of vulnerability:

1. Departments with recurrent vulnerability (16 departments are involved): Ouallam, Tillabery, and Fillingué Tera (Tillabery region) Tchintabaraden, Abalak, Keita, Bouza, Illela (Tahoua region) Dakoro (Maradi region) Tanout (Zinder Region) N'Guigmi, Maïné Soroa, Diffa (Diffa Region) Tchirozérine, Arlit (Agadez Region)
2. Conjuncturally vulnerable departments (18 departments are involved): Tahoua, and Birni Konni Madaoua (Tahoua Region), Guidan Roumdji Madarounfa Aguié, Mayahi, Tessaoua (Maradi Region), Say and Kollo (Tillabery Region), Dosso, Loga, Doutchi and Gaya (Dosso Region) Matameye Mirriah, Magaria, Goure (Zinder Region).

Vulnerability to food insecurity by gender

According to the strategy of Reduction of poverty of Niger, 2002-2015, 63% of the population would fall below the poverty line and 34 per cent below the threshold of extreme poverty. However, the situation is variable according to the area, gender and the socio-professional category. Thus, the incidence of poverty in the urban areas is 52% compared to 66% in rural areas. In rural areas, the least affected households by poverty are those whose head of household is employed, small trader or retired but these three categories represent only 5% of the population of this area. The groups most affected by poverty in rural areas are those directed by a house wife or an inactive. In both groups, the incidence of poverty is 75%.

Analysis of vulnerability to food insecurity by gender of head of household in rural areas shows that people living in households headed by women are the most vulnerable to food insecurity. Indeed, severe food insecurity affects 3.4% of people living in households headed by a woman against 2.4% of people living in households headed by men. As for moderate food insecurity it relates to 12.3% of people living in households headed by men and 20.4% of people living in households headed by women. There is food insecurity affecting fewer people living in households headed by a man[2].

The results of the same survey showed that in rural areas, food insecurity (moderate and severe) concerns much more people living in households headed by widows/widowers (24.6%) and divorced (26%).

[2] Report of the joint investigation on vulnerability to household food insecurity in Niger, December 2014-January 2015P. 23-24

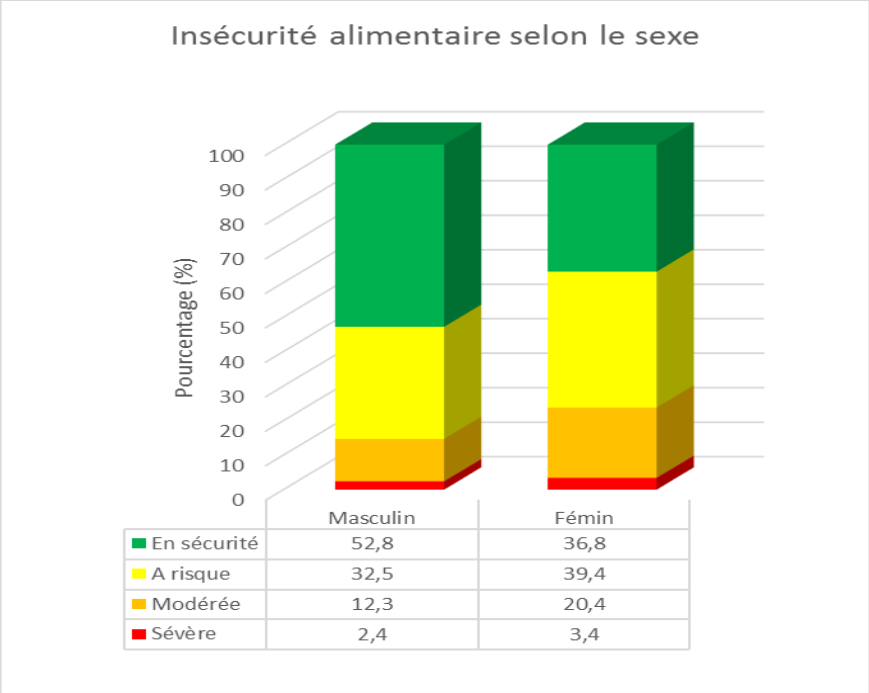


Figure 3: Food insecurity by gender of head of household

Causes of vulnerability to food and nutrition insecurity

Population projections considered the passage of the number of rural from 9 million in 2001 to over 13 million in 2015, and those of climate expect an increase in the minimum daily temperature in the shade for up to 3.5 ° C in some stations at the 2020-2049 horizon. This suggests an even darker future, a permanent food insecurity and increase of poverty, if the observed climate trends continue.

The high vulnerability of Niger to climate change may seriously jeopardize its future. Despite significant efforts by the government and its partners to overcome this problem, it is clear that the results remain weak; evidenced by the food crisis which hit the country between 2009 and 2010, which were aggravated by the recent floods. Moreover, this situation contributes to the resurgence of inappropriate agricultural and pastoral practices, including the misuse of wildfires, agricultural colonization of "buffer zones", reduction of fallow as part of a more extensive agriculture.

Variability/climate change and trends

The country's climate is tropical semi-arid, characterized by two main seasons: a dry season from October to May and a rainy season from June to September. In addition to the fact that they are unequally distributed throughout the year, the average annual rainfall is unequally distributed across the country. Very low in the North, and more abundant in the South, they all help to define four agro-climatic zones:

- The Sahel Sudan, which represents about 1% of the total area of the country, receives 600 to 800 mm in average annual rainfall. The area is suitable for crop and livestock production.
- The Sahel region, which covers 10% of the country receives 300 to 600 mm of rain in a year on average, is suitable for agro-pastoralism
- The Sahel in Sub Saharan Africa, which represents 12% of the territory's surface receives 150 mm and 300 mm in average annual rainfall, is favorable for pastoralism.
- The Sahara, which covers 77% of the country receives less than 150 mm in average annual rainfall, is practiced irrigated agriculture and nomadic pastoralism.

In the Sahara, which covers 77% of the country receives less than 150 mm of rain in an average year, we practice irrigated agriculture and nomadic pastoralism. The vast majority of the population lives in the two Sahelian and Sudano-Sahelian zones (approximately 75%). It practices largely an agricultural production system (mainly rain fed, but also irrigated crops in the valley of the River Niger and Dallols) and agro-pastoralism. The rest of the population (over 20%) practices various forms of agro-pastoralism (with pastoral dominance) in the Sahel-Saharan Africa (more than 20%), and nomadic pastoralism in both Sahelo Saharan and Saharan zones.

According to studies in the framework of PANA, changes in average temperature differences compared to the annual average for the period 1961-2007 indicates an upward trend since 1993 in terms of maximum (Figure 3), and since 1986 in terms of minima.

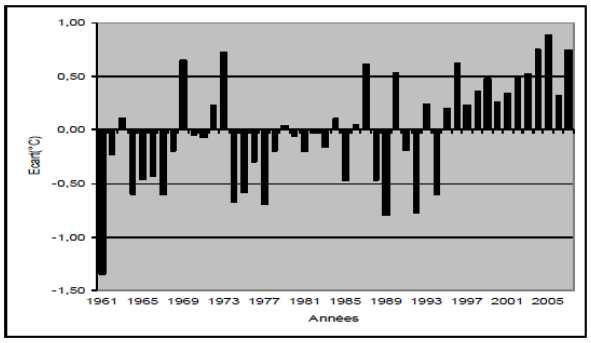


Figure 4: Evolution of discrepancies in the annual maximum temperature in the shade compared to the average over the period 1961- 2007 in Niger
Source : National Meteorology Directorate, 2008

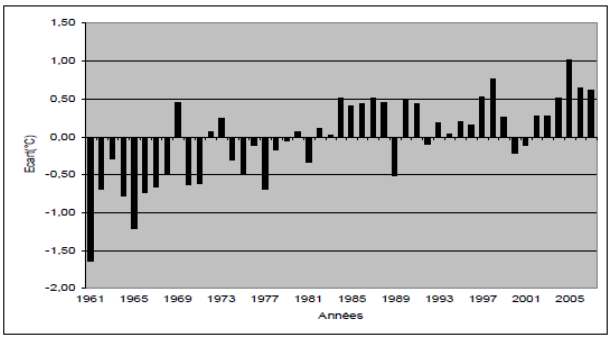


Figure 5: Evolution discrepancies of annual minimum temperature in the shade compared to the average over the period 1961- 2007 in Niger
Source: National Meteorology Directorate, 2008.

Projections indicate an increase in the average maximum temperature up to 2.5 ° C by 2020-2049. It is observed in all stations that this increase in maximum daily temperature is less pronounced in the months of June, July, August and September corresponding to the rainy season. The minimum daily temperatures have also increased up to 3.5 ° C on some stations.

As for rainfall, studies based on data from 59 stations from 1961 to 2004 show a downward trend over the past three decades. The evolution of the deviations from the average over the period 1961-2007 (Figure 5) shows a net increase in the frequency of years of losses since 1970, with seven years of severe drought and a decline in three episodes (1969-1974) (1981-1988) and (1995-1999).

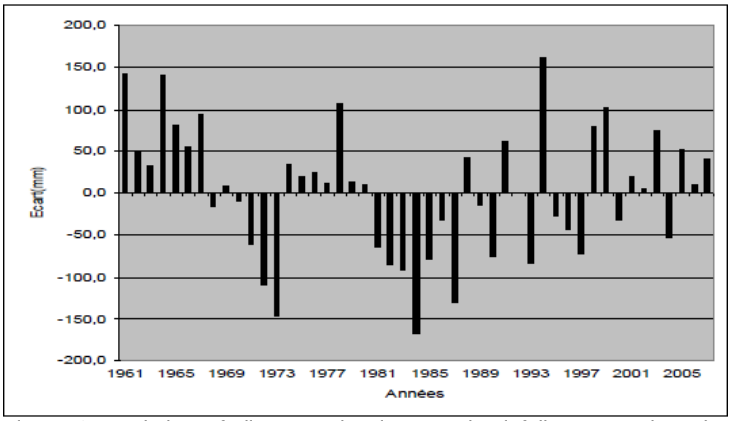


Figure 6: Evolution of discrepancies in annual rainfall compared to the average over the period 1961- 2007 in Niger
Source : National Meteorology Directorate, 2008

In the context of the current climate, there is a tendency to decrease in rainfall and increase in temperature, leading to the shortening of the rainy season (in the Sahara), a shortening of the rainy season (especially in the Sahel); severe flooding (especially in the Sudano-Sahelian), and in all areas combined, an accentuation of climate variability (spatial and temporal), and the unusual frequency of violent sandstorms (from lithometeors).

Climate change projection

In terms of climate projections, there are currently two dissenting opinions. While the first opinion predicts a gradual desiccation of the whole Sahel region over the next decades, the second opinion suggests that the constant humidification process should lead to an increase in vegetation cover in the sub-Saharan region.[2]

However, according to a recent study by the AGRHYMET regional center, the progressive drying of the Western Sahelian zone must be distinguished from the humidification of the eastern Sahel[3].

Given the strong correlation between summer temperatures and rainfall, we can expect a decline in rainfall concomitant with an increase in temperature on the horizon 2020-2049[4].

Important climate projections concern an increase in average maximum of about 2.3 ° C temperatures (scenario B2) and up to 2.6 ° C (scenario A2) over the period 2020 to 2049 and a slight increase in rainfall with the intensification of heavy rains and possible consequences[5].

Impact of climate change on agriculture and water resources

The principal direct and indirect impacts expected (2025) of the variability and climate change on development have been identified mainly in the PANA (2006) and confirmed in the Second National Communication (DCN 2009). On agriculture and water resources, it is noted**:**
Agriculture: in the future, it will be difficult for agricultural production to ensure food security, given the fact that there is a clear gap between the food needs of a growing population and the probable agricultural production. According to the joint investigation report on vulnerability to food insecurity of households in Niger (December 2014-January 2015), more than 45% of the Niger population have their source of income based only on agriculture. In this context, it is far from estimate the severity of the impact of climate change in the future in Niger in terms of food insecurity and the survival of the populations especially poor.

Water Resources: climatic factors have an impact on: lower flows, increased erosion, changes in the hydrological regime of the Niger River and its tributaries, the lower volume of water impoundments and dams as well as the decrease in groundwater recharge, increasing the magnitude and frequency of flooding and the deterioration of water quality, etc.

Unfortunately, demographic projections which estimate the rise of people living in the country from 9 million in 2001 to more than 13 million in 2015, and the climatic ones that foresee a minimal daily temperature rise under shelter going up by 3.5° C in some stations by 2020-2049, give signs of a yet darker future. It is likely that the ongoing food insecurity and increased poverty will compromise the country's future if the observed climate trends persist.

OPTION TO IMPROVE RESILIENCE OF AGRICULTURE TO CLIMATE CHANGE AND SUPPORT FOOD SECURITY IN NIGER

In the framework of the participatory assessment of vulnerability and adaptation to priority needs, the intensification of irrigated agriculture has been identified as the most common adaptation option within the eight (8) regions in terms of food security.

However, water resource vulnerability presented above poses significant challenges for the control of irrigation water. Thus, irrigation considered as an alternative to mitigate the effects of climate variability and climate change is also facing problems with drawing system.

In general, irrigation in Niger is done using motorized or electric pumps. With regard to one or the other method, the challenges/constraints identified are mainly related to higher operating costs (fuel costs).

Indeed, for small irrigation, challenges/constraints identified include: (i) water drawing recovery due to the depth of the well, lowering of the water table (recharge is difficult because of reduced rainfall), or drying of surface water (pond ...) as the dry season progresses, evaporation, and (ii) operation of pumps, the cost of which is high (hourly consumption ranges from 0.75 to 1 liter with an average daily operation of 6 to 10 hours).

Producers reported a drop in groundwater levels which has a direct impact on fuel consumption of moto pumps. In general, the share of the cost of water for irrigation engine is between 40% and 60% of total expenditure.

Fuel and lubricants costs and repair are the main expenses to operate a pump.
Fuel and lubricants costs and repair are the main expenses for operating a pump. However, these costs should be as low as possible so that the producer has the necessary liquidity to meet these expenses. But these constraints/difficulties prevent to mobilize the required amount of water for the needs of the crop (some pumps generators are off).

Moreover, the predictions of water resources vulnerability does not seem favorable to the practice and development of irrigated agriculture as the main option for adapting to climate change, where solutions are mainly: (i) the implementation of good management and control of water, and (ii) the reduction of energy costs while making it accessible everywhere on the site. From this point of view, innovative technologies related to irrigation (as drip) based on solar solutions seem to be solutions that we can adopt.

It is in this context that this project is proposed. It aims to the development of peri-urban and village gardens to provide markets with products in all seasons. This will involve establishing a water-efficient irrigation system (drip-drip ...), from solar energy.

PROJECT AREA AND BENEFICIARY POPULATION

Selection criteria of the project intervention area

The project is a pilot operation that can only intervene on a part of the national territory. The project intervention area is selected based on the following criteria:

- *Vulnerability in terms of biophysical risks:* selected departments are in a structural food deficit situation due to climatic hazards ;
- *Difficulty of access to water:* this criterion guides the project in areas where surface water are not sustainable, water tables are relatively deep (30 to 50 m) with speeds of at least 30 m^3 /h;

- *Experience in irrigation:* this criterion is measured by the amount of land developed. It allows to target intervention areas ;
- Possibility of synergy and complementarity with other projects: This criterion allows for the mapping of ongoing projects in the regions and the activities they drive. Based on this mapping, the departments that will be selected for the PARR-CC are those in which there are fewer projects involved in the field of innovative irrigation and energy technologies.

Vulnerability in terms of biophysical risks

In Niger, rainfall remains low and varies, in general, and varies according to a negative gradient from the South (800 mm maximum) to the North where rains are often exceptional phenomena. The consequences of climate disruption on the environment remain significant and result in overall lower level of the water table, reduction or modification of floristic useful grasslands, a considerable reduction in acreage in the North and their development towards the South at the expense of grasslands.

Negative changes in biomass, cause recurring grain and fodder deficits whose consequences result in famine situations as was the case in 1974 and 1984 or acute crises as in 1997, 2005 and 2010.

The northern areas (north Tillabery, Dosso Nord, Nord Tahoua, Maradi North, North Zinder, Diffa and Agadez) are more exposed to biophysical risks.

The level of exposure to biophysical risks can be assessed using the following criteria:

- Low rainfall amounts observed in the department;
- Unfavorable edaphic factors;
- Availability of biomass (fodder crop production);
- Degree of exposure to food insecurity due to the physical conditions.

The following distribution of departments exposed to biophysical risks derives from the above listed criteria. Thus, 27 departments are heavily exposed, 23 are moderately exposed and 9 slightly exposed.

Table 1: Exposure of departments to biophysical risks

Level of exposure to Biophysics risk	Region							Total
	Agadez	Diffa	Dosso	Maradi	Tahoua	Tillabery	Zinder	
heavily exposed	Arlit, Tchirozerine, Iférouan, Aderbissinat, Ingall	Nguigmi, N'gourti, Mainé - Soroa, Diffa	Loga	Dakor, Bermo, Mayahi	Tchintabaraden, Abalak, Tahoua, Illéla, Bagaroua	Ouallam, Banibangou, Tillabery, Ayerou, Filingué, Abala	Tanout, Belbedji Gouré, Tasker	27
moderately exposed		Bosso	Doutchi, Dosso, Boboye, Falmey	Téssaoua, Aguié, Gazaoua, Guidan - Roumdji	Bouza, Madaoua, Keita, Malbaza, Tassara, Tillia	Téra, Bankilar, Kollo, Gotheye	Matamey, Takiéta, Mirriah, Damgarantakkayya	23
slightly exposed	Bilma		Gaya, Dioundiou, Tibiri	Madarounfa	Konni	Say	Magaria, Doungass	9

Source: Yabilan Maman, Niger: Analysis of food security and vulnerability (CFSVA), collection and analysis of secondary data, July 2005 p.84 with consideration of the new administrative division.

Considering departments that are heavily exposed to biophysical risks, Table 1 shows that 27 departments may be retained in 7 regions.

However, in transposing these departments on isohyet map of Niger, one finds that they are all located above isohyet 450 mm. Among these departments:

- 14 are located above isohyet 250 mm (production system of pastoral dominance) which are presented in Table 2. These departments are located in pastoral areas of the country where irrigation potential and water mobilization infrastructure is very low with the exception of Aïr.

Table 2: Departments located above the isohète 250 mm

Regions	Departments
Agadez	Arlit, Tchirozerine, Iférouane, Aderbissinat, Ingall
Diffa	Nguigmi, N'gourti,
Dosso	-
Maradi	Dakoro, Bermo,
Tahoua	-
Tillabéry	Abala, Banibangou,
Zinder	Tanout, Belbéji, Tasker,

- 13 are located between isohyets 450 mm and 250 mm which are presented in Table 3. These departments are in the agro pastoral zone with rainfall between 250 and 450 mm. This area also abounds with enormous potential in terms of water mobilization infrastructure and of irrigation. In addition, it is an area of vulnerability varying from moderate to high.

Table 3: Departments located between isohyets 250 mmm and 450 mm

Régions	Departments
Agadez	-
Diffa	Maïné Soroa, Diffa
Dosso	Loga
Maradi	Mayahi
Tahoua	Tahoua, Tchintabaraden, Abalak, Illéla, bagaroua
Tillabéry	Ayérou , Filingué, Ouallam,
Zinder	Gouré

Thus, from the standpoint of vulnerability to biophysical risks, the following 18 departments may be retained:

- Agadez Region: Arlit, Tchirozerine, Iférouane, Aderbissinat, Ingall
- Diffa Region : Maïné Soroa, Diffa
- Dosso Region: Loga
- Maradi Region: Mayahi
- Tahoua Region: Tahoua, Tchintabaraden, Abalak, Illéla, Bagaroua
- Tillabéry Region: Ayérou, Filingué, Ouallam
- Zinder Region: Gouré

Difficulties of access to irrigation water

The rainfall regime in Niger is characterized by a large interannual variability with sometimes significant rainfall deficits, particularly in the regions of Tillabery, Tahoua and Agadez where this trend is most pronounced in the last two decades.

Renewable groundwater resources would be between 2.5 and 4.4 km^3/year (Aquastat). Map 1 shows that the recharging groundwater level in Niger is estimated at between 0 and 5 mm/year for the majority of the country and from 76 to 100 mm/year for the band in the far South, the maximum being at the border with Nigeria in Maradi and Zinder. The average recharging index for the country is between 6 and 20 mm/year

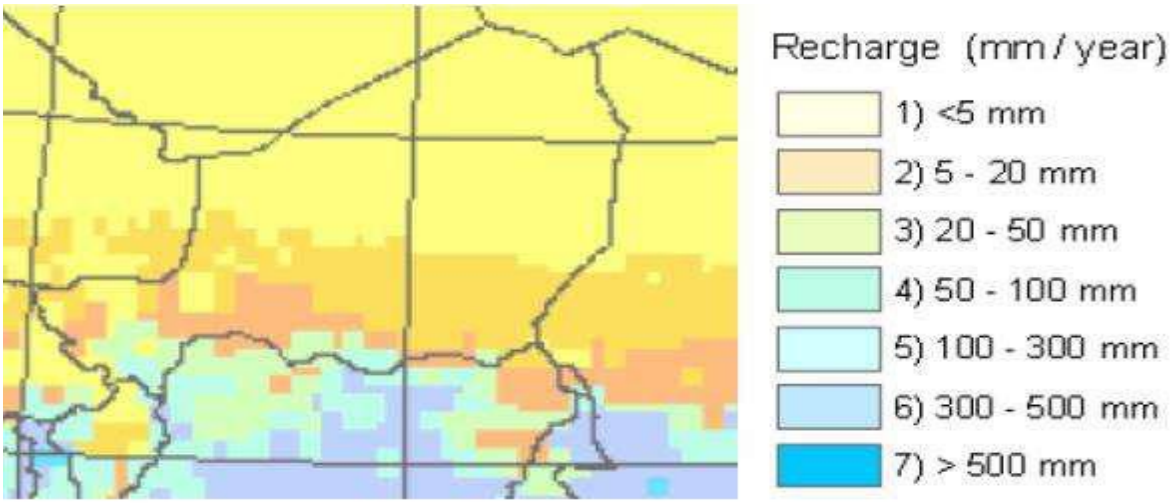


Figure 7: Index Map of average recharge of water tables

This map confirms the area identified by the first two criteria. Indeed, the southern regions of Agadez, northern Tillabery, Tahoua, Diffa, Zinder and Maradi North have recharging aquifers whose index is less than 20 mm/year.

Experience on irrigation.

This criterion which allows to target intervention areas is measured by the proportions of areas developed. The reference year taken is 2011-2012 following the implementation of the emergency program of irrigated crops. Areas developed are shown in Table 4

Table 4: Proportion of areas developed in 2012

Regions	Areas developed	%
Agadez	3901	4
Diffa	9621	10
Dosso	15656	17
Maradi	10377	11
Tahoua	26665	28
Tillabéry	12610	13
Zinder	12940	14
Niamey	2158	2
TOTAL	93928	100

The table 4 shows that the areas developed are concentrated in the regions of Tahoua, Dosso, Zinder, Tillaberi, Maradi and Diffa. However, the regions of Agadez and Niamey have very good experience in irrigation. The low development rate is justified for Niamey by the low potential in land and for Agadez, the low population density of the region.

Opportunities for synergies and complementarities with other projects

Without being exhaustive, in terms of intervention, we note that the PMERSA funded by ADB, GASF and AECID, operate in the field of small-scale irrigation and water mobilization. The PASADEM and the PPI RUWANMU financed by IFAD operate in the Tahoua, Maradi and Zinder regions in the field of family farming, small-scale irrigation and the development of poles of economic development.

The ProDAF, financed by IFAD, will operate in these three regions for scaling experiences of PASADEM and PPI RUWANMU projects for family agriculture facing climate change. The PACRC, funded by the World Bank, operates throughout the country in order to support communities for climate resilience. The following table provides mapping of the projects.

Table 5: Synergies and complementarities with other projects

Departement	Projects (Donors/NGO)	Opportunities for synergy	Complementarities
Diffa	PAC (BM), PACRC (BM), PRODEX (BM)	PACRC	PACRC
Mainé Soroa	PAC (BM), PACRC (BM), PRODEX (BM)	PACRC	PACRC
Loga	PRODEX (BM), PAC (BM), PACRC (BM), PRMOVARE (BAD)	PACRC, PROMOVARE	PACRC, PROMOVARE
Mayahi	PRODEX (BM), PAC (BM), PACRC (BM)	PACRC	PACRC
Tahoua	PRODEX (BM), PAC (BM), PACRC (BM), PMERSA, PPI RUWANMU	PACRC	PACRC
Illéla	PRODEX (BM), PAC (BM), PACRC (BM), PMERSA (BAD), PGBVB (AFD)	PACRC	PACRC
Bagaroua	PRODEX (BM), PAC (BM), PACRC (BM), PAM, PROMOVARE (BAD)	PACRC, PROMOVARE	PACRC, PROMOVARE
Tchintabaraden	PRODEX (BM), PAC (BM), PACRC (BM), PROMOVARE (BAD)	PACRC, PROMOVARE	PACRC, PROMOVARE
Abalak	PRODEX (BM), PAC (BM), PACRC (BM), PROMOVARE (BAD)	PACRC, PROMOVARE	PACRC, PROMOVARE
Filingué	PRODEX (BM), PAC (BM), PACRC (BM), PROMOVARE (BAD)	PACRC, PROMOVARE	PACRC, PROMOVARE
Ouallam	PRODEX (BM), PAC (BM), PACRC (BM), PROMOVARE (BAD), PAM	PACRC, PROMOVARE	PACRC, PROMOVARE
Ayérou	PRODEX (BM), PAC (BM), PACRC (BM), PKRESMIN	PACRC	PACRC
Gouré	PRODEX (BM), PAC (BM),	PACRC	PACRC

	PACRC (BM)		
Arlit	ND	ND	ND
Tchirozérine	IRHAZER (AREVA),	ND	ND
Aderbissinat	UNDP/GEF project[3]	UNDP/GEF project	UNDP/GEF project
Tondikiwindi	UNDP/GEF project	UNDP/GEF project	UNDP/GEF project
Ingall	IRHAZER (AREVA),	ND	ND
Iférouane	ND	ND	ND

Currently, four major programs/projects in the field of strengthening the resilience of populations to climate change in order to increase food security are ongoing. These are:

- Community Action Project for Climate Resilience (PACRC), funded by the World Bank approved in November 2011, which aims to improve the resilience of populations and production systems to climate change, to increase national food security. This project has national coverage,
- The project of mobilization and valorisation of water resources (PROMOVARE), funded by the African Development Bank, approved in September 2012 which aims to mobilize and develop water resources to improve the resilience of populations to climate change. PROMOVARE operates in the northern parts of the regions of Tillabery, Dosso, Tahoua and Agadez.
- Development of Climate Information Project (PDIC), funded by the ADB, operates on climate information as PROMOVARE
- The UNDP/GEF project "Building Climate-Resilience and Adaptive Capacity in the Agricultural Sector of Niger. The UNDP/GEF project operates in: Tillabery region (Tondikiwindi, Soudoure), Dosso region (Badoko), Tahoua region (Edouk), Agadez region (Aderbissinat), etc.This project aims to benefit to local communities by improving the reliability of water supply for agricultural production, especially for small farmers. More reliable water supplies will also improve agricultural yields, thus increasing average incomes and improving nutrition. Moreover, agricultural production will also be increased through the introduction of drought-adapted crops. In addition alternative livelihoods for rural communities will be introduced to enhance their resilience to climate change. The impact of droughts will be mitigated, to an extent, with the establishment of fodder banks. The following output are complementarities with the PRRA-CC: (i) Output 1.1. Disseminate seeds of tried and tested drought-resilient crop varieties; (ii) Output 1.2. Undertake farm trials of drought-resilient crop varieties that are not tried and tested; (iii) Output 1.3. Construct and manage cereal banks; (iv) Output 1.4. Construct and manage fodder banks; (v) Output 1.5. Construct and manage fertilizer/pesticide shops; (vi) Output 1.7. Expand the area under irrigation at a village level.

These four projects cover the regions of Tillabery, Dosso, Tahoua and Agadez and perform actions of development of irrigated agriculture; irrigation being itself an adaptation solution to climate change to ensure food security of populations.

PROMOVARE mobilizes waters and supports communities to manage the land for irrigated agriculture. PACRC also supports communities on the one hand, to improve yields of rainfed crops through the use of quality seeds and fertilizer in micro dose and, on the other hand, to develop irrigation. The UNDP/GEF project "Building Climate-Resilience and Adaptive Capacity in the Agricultural Sector of Niger support the reliability of water supply for agricultural production, especially for small farmers. More reliable water supplies will also improve agricultural yields, thus increasing average incomes and improving nutition.

The facilities offered are not necessarily of environmental preservation technologies. Indeed, it is obvious that in these project areas, the situation of water resources is such that it should be considered water- and energy saving technologies to ensure in the medium and long terms a rational use of resources

So, the PRRA-CC may develop synergy with PACRC and PROMOVARE in their joint intervention area. Provided that the PACRC has a national scope, the common area of intervention is that of PROMOVARE.

[3] Building Climate-Resilience and Adaptive Capacity in the Agricultural Sector of Niger

Thus, to develop better synergy and undertake actions of complementarities, the regions and departments that can be retained are:

- Agadez Region: Tchirozerine
- Dosso Region: Loga
- Tahoua Region: Tchintabaraden, Tahoua, Abalak, Illéla, Bagaroua
- Tillabéry Region: Filingué, Ouallam

Project intervention area

In definitive, on the basis of three criteria of selection, the PRRA-CC's intervention regions are: Agadez, Dosso, Tahoua, Tillabery and Niamey. The region of Niamey is selected for its significant potential suburban market gardens which has a strong contribution in meeting the vegetable needs of the city of Niamey. The suburban perimeters with a specific character of small farm, must be tested to study their behavior towards innovative technologies.

Taking into account the new administrative division of Niger, the departments that may be retained in the PRRA-CC are shown in the following table

Table 6: Intervention areas of the project

Regions	Departments	Municipalities	Population		
			Men	Women	Total
Agadez	Tchirozérine	Agadez	60571	57669	118240
		Dabaga	12022	11947	23969
		Tabelot	20115	18879	38994
		Tchirozérine	32746	30757	63503
Dosso	Loga	Falwel	28277	29287	57564
		Loga	40005	42395	82400
Tahoua	Abalak	Abalak	39458	35261	74719
		Tabalak	21097	21423	42520
	Bagaroua	Bagaroua	35336	36957	72293
	Illéla	Illéla	70174	72040	142214
	Tchintabaraden	Kao	31907	33290	65197
Tillabéry	Abala	Abala	37364	38457	75821
		Sanam	32393	36073	68466
	Banibangou	Banibangou	33011	33938	66949
	Filingué	Filingué	44645	47452	92097
		Kourfeye centre	33476	33379	66855
		Tondikandia	53542	55449	108991
	Ouallam	Dingazi	21970	22516	44486
		Ouallam	32923	35268	68191
		Simiri	50160	52897	103057
		Tondikiwindi	55458	56032	111490
Niamey	Niamey	Niamey1	104702	105318	210020
		Niamey 2	122436	124462	246898
		Niamey 3	82641	80534	163175
		Niamey 4	135250	139234	274484
		Niamey 5	66137	66134	132271
5	**11**	**26**	**1297816**	**1317048**	**2614864**

Figure 8 shows the project intervention areas. These areas are colored in red.

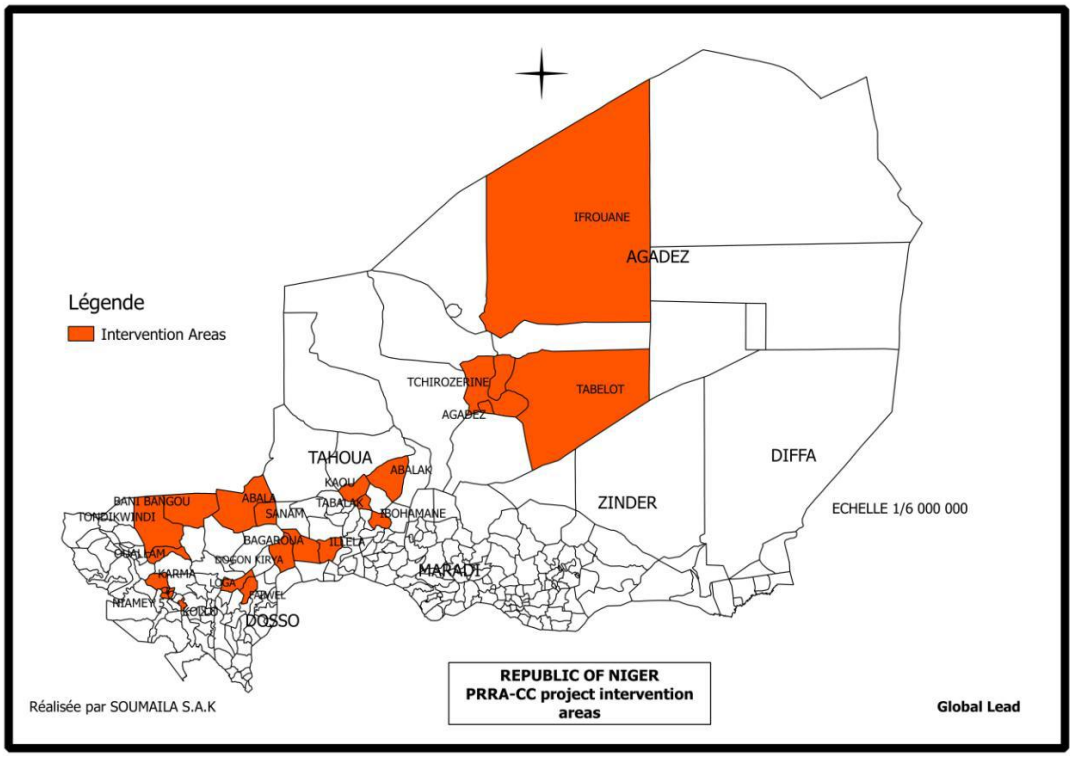


Figure 8 : Map of intervention area
Source: Global lead

The project's target population, is directly, the population of 200 villages attached to the project intervention sites. Indirectly, the population of the municipalities concerned will benefit from the dynamic created by the different activities.

Approximately 2.6 million people (49.6% men, 50.4% women with 18% of young people between 15 and 24 years), or 374,000 households are concerned by the implementation of the project. Directly, the PRRA-CC, focuses on about 200 pilots farmers under small-scale irrigation.

These farmers may be individuals (male, female and young), an organization of producers (group, cooperative or equivalent) or a legal entity engaged in irrigation. On units of 5 hectares, 20 households could settle on plots of 0.25 ha or 4,000 households or 28,000 people who could be direct beneficiaries.

The targeting of pilot farmers is done with the support of umbrella structures of organizations of producers through a call for proposal of sub-projects. To these pilot farmers can be linked, farmers committed and able to maintain their plots which are allocated to them for the exploitation of the facilities.

The added value of synergy and project compared to other initiatives in the country

This project will develop a holistic approach to solving the recurrent problems faced by poor rural communities in terms of resilience to climate change in the context of increasing food insecurity.

These problems are related to: (i) the availability and management of water resources for irrigation and (ii) the cost of water drawing, which is a major factor limiting the development of irrigation. Indeed, in a

country under energy dependency, operating expenses related to drawing water are important. In addition, electricity is not everywhere and the price of fuel continues to rise.

In this context, the approach proposed by this project, firstly, through the promotion of drip irrigation drip- (which consumes little water) is to provide the necessary amount of water needed for cultivation. It is a suitable solution because it limits the solicitation of groundwater and its time for recharge facing the problem of climate change resulting from reduced rainfall and its uneven distribution in time and space.

On the other hand, the diversification of the energy source that focuses on solar energy is a guarantee for the operation; it solves the thorny problem of fuel acquisition. The use of this energy source anticipates the risk of non-operating perimeters due to uncontrolled costs of fuel prices in increase.

This project is a pilot project aiming to strengthen the resilience of populations and the fight against what might be called "mal-adaptation." Indeed, if the problem of expenses related to fetch water is not addressed in together with the management of water resources in a country where the cost of energy (electricity and fuel) is prohibitive for producers, kits and irrigation systems cannot be used effectively. In addition, the project will seek synergy with other ongoing projects in the country and benefit from their approaches.

The proposed project will be implemented under the supervision of the Ministry of Agriculture and Livestock, which will provide strategic coordination of all ongoing activities related to irrigation, in order to avoid duplication, but simply to support the synergy and complementarity between all the activities of selected areas

The synergies with other initiatives are described at the page 52.

National production on irrigated perimeters

At the national level, several varieties of crops are practiced by the farmers on irrigated perimeters. It comes to cereals, vegetables, roots and tubers, pulses, spices and stimulant fruits, sugar plants[4].

The total area sown with vegetables at the national level is estimated at 48 118.58 ha (or 41.50% of the areas highlighted), with a production of 1480 530T (or 52% of total production). The main crops of vegetables are mainly onion, tomato, cabbage, lettuce, squash, watermelon, moringa, okra, melon and carrot[5].

The root and tuber group occupies 13 240.34 ha or 11.42% of the total area planted with production estimated at 29 4149 T. The main crops in this group are mainly: cassava, sweet potato, potato[6].
The group of cereals composed of Wheat, Corn and rice covers an area of 23 958.09 ha or 20.66% of the total area with a production estimated at 67 141 T[7].

[4] See Report on National production on irrigated perimeters: “Résultats définitifs de l’enquête sur les productions horticoles 2013/2014. Ministère de l’Agriculture du Niger. Février 2015.

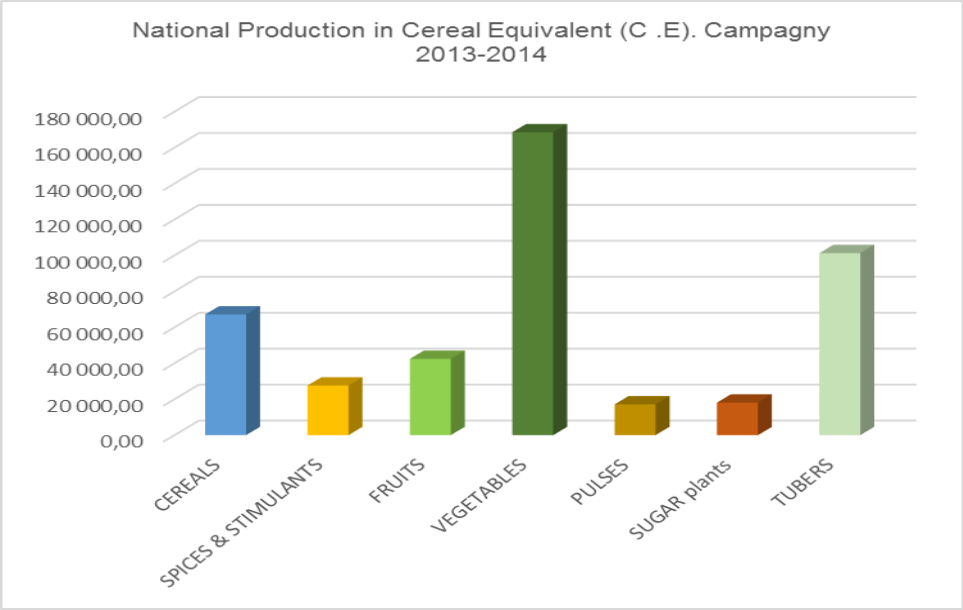
[5] The Onion is the main crop with an area of 20,507 ha. It is produced in all regions of the country with the Tahoua region leading. The tomato is the second culture with an area of 8 738.72 ha. It is grown mainly in regions of: Maradi, Dosso and Tahoua. The Cabbage is grown on an area of 7 838.43 ha. It is mainly fund in the Tahoua, Tillabery and Zinder regions. Its production is estimated at 218 790 T. The Lettuce occupies an area of 4 077.75 ha with a production of about 90 227 T. It is much practiced in the regions of Maradi, Tahoua and Niamey. The Squash is produced on an area of 2550.66 ha. Its production is estimated at 53 345.17 T. It is practiced throughout the country mainly in Tahoua, Dosso and Zinder. Other crops such as watermelon, moringa, okra, melon and carrot occupy the areas around 2400 ha.

[6] The Cassava is produced on an area of 6 650.74 hectares, of which more than half is exploited in three regions: Dosso (1793 ha), Diffa (1593 ha) and Tahoua (71 ha). The production is estimated at 133,099 T. The Sweet potato is produced on an area of 3700 ha. It is grown mainly in two regions and occupies over half the planted area: Tahoua with 28% of the total area, followed by Tillabéry with 24.38%. Its production estimated at 81 291 T. The potato is produced in all regions of the country over an area of 28 89 ha with production of around 79 760 T. Thus, Tahoua region with a production of 25 543.84 T ranks first at national level.

The spices and stimulants group includes, chilli and pepper and covers an area of 11 999.05 ha representing 10.35% of the total area with an estimated production of 276,324 tons[8].

Legumes are produced on an area of 9907.23 ha or 8.54% of the total area with an estimated production of 20 063 T. The main crops are: dolique, cowpea.[9]

The Production in tones in cereal equivalent of each sector at the national level on irrigated perimeters is presented in the following graph.



In terms of production, vegetables are ranked first with a production height of 168 542.97 tons of cereal equivalent. The production of tubers comes in second with 101 282.48 tons of cereal equivalent. These two sectors contribute strongly to the fight against food insecurity in the country. The cereal production comes in third with about 67 141.36 tons of cereal equivalent. The production of cereals due shows poor performance under irrigated cultivation. The fruit production occupies the fourth position with 42 435.8 tons of cereal equivalent. Spices, sugar plants and legumes, respectively occupy the 5th, 6th and 7th position in national production.

Types of cultures developed in the areas of intervention of the project

In the project areas, we can distinguish several types of crops on irrigated land. As part of this analysis 5 main fields of crops including: (i) vegetables; (ii) roots and tubers; (iii) pulses; (iv) on cereals; and (v) the spices and stimulants, are presented.

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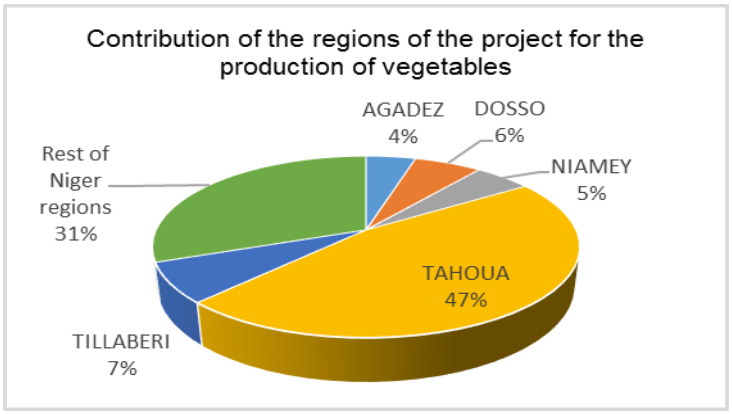
[7] The Corn is produced in all regions of Niger, mainly: Maradi on 4052 ha, Tahoua 3586 ha, Diffa with 3502 ha. Its production is estimated at: 49 962 T. Concerning the rice, this is the rice produced on hydro-agricultural landscaping[7] of Tillaberi, Dosso and Niamey. The areas are estimated in the range of 2 121 ha with a production of about 15 039 T. the Wheat is mainly produced in the regions of Agadez, Diffa, Maradi and Tahoua on an estimated area of 717 ha, of which 345.28 in Agadez; 260 ha in Tahoua; Diffa and Maradi each with about 18 ha. Its production is in the order of 1802 T.

[8] The Pepper is produced on an area of 10,215 ha. It is produced mainly in the regions of Diffa 6555 ha, Maradi 1471 ha and Zinder 1265 ha. Its production is estimated at 233 156 tons. The Chili is produced in all regions over an area of 1784 ha. The most productive region is Tahoua with 1071 ha. The production of this speculation is estimated at 43169 T.

[9] Dolique is produced on an area of 5467 ha mainly in Tahoua with 3228 ha in area and Maradi with 2179 ha. Its production is estimated at 10 624 T. The Cowpea is produced on an area of 4440 ha. The main production areas are mainly Diffa with 1570 ha, Maradi (762 ha), Zinder (625 ha). Its production is estimated at 6743 T. Other legumes such as peas and green beans are also produced in small areas, respectively in Agadez (pea) and Tillaberi (green beans).

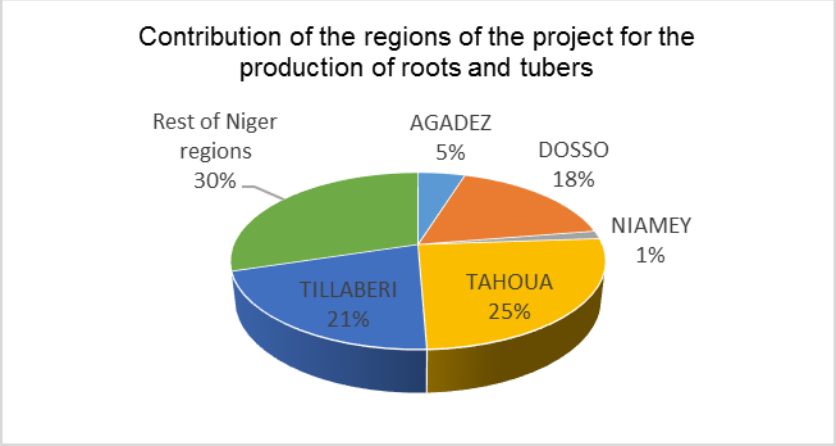
A. Vegetables

In the intervention regions of the PRRA-CC, the main crops of vegetables are onion, tomato, cabbage, lettuce, squash, watermelon, moringa, okra, melon and carrot. In these regions, the contribution to the production (69% of the national production) in tons of cereal equivalent is illustrated in the following graph:



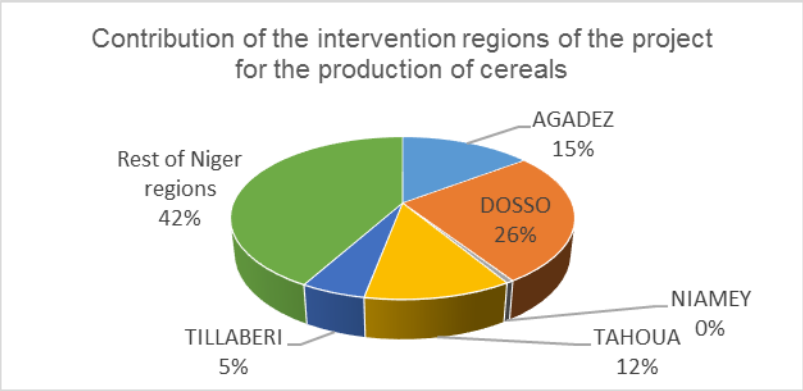
B. Roots and tubers :

In the intervention regions of the PRRA-CC, the main crops of roots and tubers developed on the irrigated perimeters are mainly: cassava, sweet potato, potato. The contribution of national production of the project intervention areas in tons up to 70% in cereal equivalent. The percentage of each region is illustrated in the following graph.



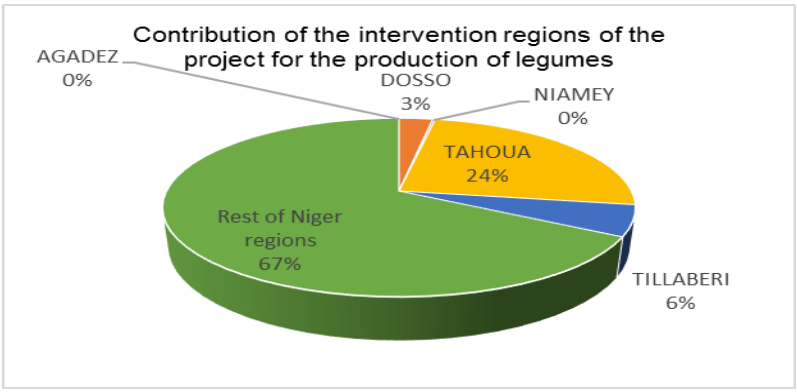
C. Cereals

In the intervention regions of the PRRA-CC, the main crops of cereals developed on the irrigated perimeters are corn, rice, wheat, etc. In these regions, the contribution to the production (58% of the national production) in tons of cereal equivalent is illustrated in the following graph:



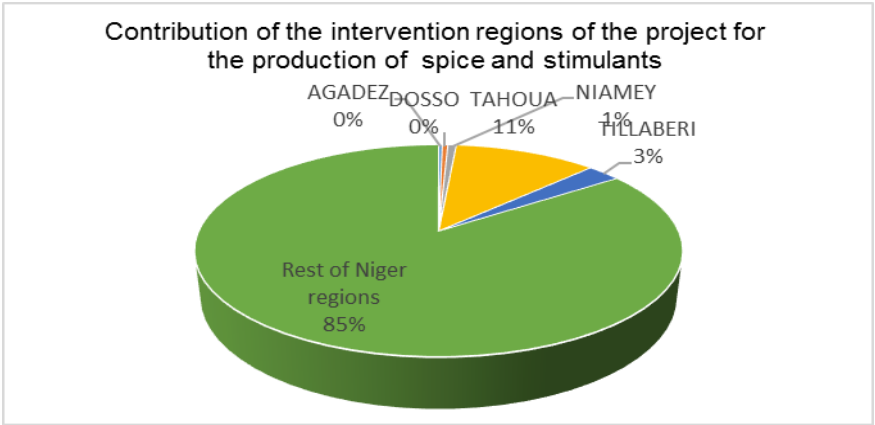
D. Legumes

The main crops of legumes developed on the irrigated perimeters in the intervention regions of the PRRA-CC are namely dolique, cowpea, etc. In these regions, the contribution to the production (33% of the national production) in tons of cereal equivalent is illustrated in the following graph:



E. Spices and stimulants:

The main crops of legumes developed on the irrigated perimeters in the intervention regions of the PRRA-CC are namely chili and pepper. In these regions, the contribution to the production (33% of the national production) in tons of cereal equivalent is illustrated in the following graph:



The production and yield by crop type and areas of intervention of the project are presented in the following table:

Note: Area in ha; Yield in T/ha, Production in T/ha

Table 7: Production and yield by crop type and areas of intervention of the project

SPECULATION		AGADEZ	DOSSO	NIAMEY	TAHOUA	TILLABERI
	Area	83,84	496,71	553,81	891,59	355,80
	Yield	19,13	17,36	15,28	18,58	17,64
LETTUCE	Production	1603,71	8624,30	8463,26	16562,33	6277,38
	Area	1070,65	763,54	617,52	1733,49	1262,94
	Yield	29,83	18,88	17,03	23,44	27,90
CABBAGE	Production	31939,81	14415,33	10516,37	40630,22	35239,96
	Area	495,87	419,88	1841,23	1818,06	530,44
	Yield	21,63	19,27	18,47	22,23	20,36
TOMATO	Production	10727,13	8092,99	33999,26	40416,53	10798,79
	Area	473,65	1389,29	885,56	13539,15	1447,45
	Yield	35,21	25,32	20,64	40,72	26,76
ONION	Production	16677,57	35178,90	18274,16	551337,36	38731,94
	Area	51,55	67,41	605,22	233,18	50,95
	Yield	31,29	17,79	16,00	17,19	16,15
CARROT	Production	1613,00	1199,55	9683,13	4008,49	822,77
	Area	36,60	47,98	88,01	360,68	390,75
	Yield	19,93	17,11	14,22	17,87	13,50
PEPPER	Production	729,57	820,79	1251,85	6444,97	5275,78
	Area	345,28	0,00	0,00	260,30	0,00
	Yield	3,22			1,49	
WHEAT	Production	1111,55	0,00		387,95	
	Superficie	2942,59	1265,49	286,98	3586,08	1038,60
	Yield	2,98	1,76	1,05	1,97	3,27
CORN	Production	8757,08	2233,36	301,33	7057,47	3392,37
	Area	0,75	273,12	139,49	519,28	550,62
	Yield	2,50	1,55	0,27	1,09	1,58
COWPEA	Production	1,88	424,10	37,13	566,10	870,72
	Area	435,55	189,44	128,46	1044,99	636,24
	Yield	32,70	18,61	18,67	24,44	35,33
POTATO	Production	14243,65	3526,17	2398,33	25543,84	22476,09
	Area		601,87	30,06	1019,81	902,03
	Yield		18,13	13,00	24,17	27,37
SWEET POTATO	Production		10909,88	390,64	24645,45	24691,42
	Area		1792,98	101,82	1071,32	558,10
	Yield		20,79	14,95	23,10	25,34
CASSAVA	Production		37275,71	1522,16	24750,19	14140,27
	Area	16,25	51,12	74,08	1071,32	143,70
	Yield	4,17	7,97	8,25	23,10	14,42
CHILLI	Production	67,78	407,24	610,97	24750,19	2072,09
	Area		131,41	167,55	15,90	15,07
	Yield		19,57	15,97	27,38	18,06
AUBERGINE	Production		2571,82	2675,79	435,32	272,20

SPECULATION		AGADEZ	DOSSO	NIAMEY	TAHOUA	TILLABERI
	Area	37,25	553,77	16,70	667,72	368,21
	Yield	28,79	21,71	16,86	20,65	22,92
SQUASH	Production	1072,42	12024,09	281,61	13785,74	8440,05
	Area			20,79		3,50
	Yield			16,84		18,90
COURGETTE	Production			350,18		66,15
	Area		2079,17	23,16		0,00
	Yield		7,17	3,70		
RICE	Production		14912,38	85,70		0,00
	Area		83,85		398,89	13,30
	Yield		9,13		16,82	6,00
OKRA	Production		765,14		6710,19	79,83
	Area		33,45		3227,70	9,08
	Yield		1,49		1,15	11,00
DOLIQUE	Production		49,69		3695,89	99,88
	Area		23,53		23,43	2,24
	Yield		31,96		26,85	18,40
JAXATU	Production		752,03		629,10	41,22
	Area	132,50	169,95	12,41	166,33	87,05
	Yield	7,83	35,70	3,33	38,94	37,71
MORINGA	Production	1037,50	6066,68	41,35	6476,90	3282,45
	Area	3,57	64,39	15,18	36,75	26,18
	Yield	23,45	20,15	12,10	15,85	18,59
MELON	Production	83,72	1297,75	183,66	582,51	486,80
	Area				145,00	32,00
	Yield				25,32	28,09
CUCUMBER	Production				3671,40	899,00
	Area	103,27			37,30	
	Yield	15,35			12,38	
GARLIC	Production	1585,40			461,87	
	Area	61,72				
	Yield	3,90				
CORRIANDRE	Production	240,71				
	Area	9,05	21,86		17,35	19,70
	Yield	20,04	20,47		28,75	20,96
WATERMELON	Production	181,35	447,44		498,81	412,98
	Area		2085,02		31,29	
	Yield		32,85		31,67	
SUGAR CANE	Production		68483,95		990,86	
	Area		11,00			
	Yield		0,75			
PEANUT	Production		8,25			
	Area					64,12
	Yield					11,64
TOBACCO	Production					746,41
SORGHUM	Area		243,43		339,00	23,50

SPECULATION		AGADEZ	DOSSO	NIAMEY	TAHOUA	TILLABERI
	Yield		1,41		1,11	2,30
	Production		343,91		375,84	54,03
PEA	Area	5,50				
	Yield	2,00				
	Production	11,00				
CALEBASSIER	Area					36,00
	Yield					25,675
	Production					924,30
/	Area	6305,44	12859,66	5608,01	32255,91	8567,57
	Production	90612,39	230831,42	91066,88	805415,51	180594,87

Types of crops that can be promoted in the context of the project

Given the yields of different cultures presented in the previous table and the main objective of the project which is to fight against food insecurity, it is recommended in the context of implementation of the PRRA-CC to promote: vegetables (onion, tomato, cabbage, lettuce, squash, watermelon, moringa, okra,etc.) and roots and tubers (cassava, sweet potato, potato, etc.). With regard to cereals, rice culture will be promoted in light of its important part in the diet of the population of Niger. Fruit production will also be promoted under the Output 2.1.2.

OBJECTIVES OF THE PROJECT / PROGRAM :

List the main project objectives.

The main objective is to strengthen the resilience of agriculture to climate change to support food security in Niger, through the promotion of modern irrigation techniques.

Specific objectives:

1. Strengthen the capacity of stakeholders on resilient irrigation systems to climate change and disseminate lessons learned during the project execution ;
2. Support the development of efficient technologies for sustainable management of water resources, conserve soil of irrigated areas and reduce energy costs associated with pumping of irrigation water;
3. Support the diversification of livelihoods to improve the incomes of farmers.

These objectives are in line with those set by the Adaptation[10] Fund aiming to "reduce the vulnerability and increase adaptive capacity to respond to climate change impacts, including variability at local and national level."

The project is a pilot operation at the national level in different regions of the country and is articulated around the following components: (i) Enhancing stakeholders' technical and institutional capacities and dissemination of lessons learned during the project execution; (ii) Confortation and development of irrigated areas; and (iii) Support to the conservation of agricultural products and diversification of livelihoods of target populations.

[10] Project Level Results Framework and Baseline Guidance Document" (AFB/EFC.4/3), proposed by the AF Ethics and Finance Committee in its 4th Meeting (Bonn, March 16, 2011)

We must recall that in the case of Niger, the question of agricultural production faced with the adverse impacts of climate change is due among others to insufficient water availability and difficulties in pumping the same water in areas where water is available.

The adaptation measures therefore concern in the case of this project the responses to the water economy (drip and the California network) and the means which allow to make this water available regardless of climate disorders (solar pumps).

In order to provide a sustainable solution to the issue of low agricultural production and food insecurity, the Adaptation Fund and BOAD are solicited to finance the necessary equipment. The resources of the Adaptation Fund are more oriented towards the acquisition of water-saving equipment while those of BOAD will be used to purchase equipment to facilitate water drawing. Both funds are not only complementary but also necessary for the achievement of project objectives.

COMPONENTS AND FINANCING OF THE PROJECT / PROGRAM :

Table 8: Component, expected results and impacts and financing

Project components	Concrete expected results	Expected impacts	Amount (US $) Adaptation Fund	Amount (US$) BOAD	Amount (US$) Niger State
1. Enhancing stakeholders' technical and institutional capacities and dissemination of lessons learned during the project execution	1.1.1. Support to the formulation of project documents (PCN, Public Consultation, feasibility study, E&S management framework, (ESMF), Pest and Pesticides management Plan (PPGP), Full project, etc.) 1.1.2. Support for the realization of detailed preliminary project (APD), environemental and social impact assessment or Impact Notice of sub-project, etc.) 1.1.3. Support to the technical control of the amenagement 1.1.4. Support to the review and validation of sub-project ESIA reports or Impact notice and environmental monitoring	1.1. Project proposals and environmental studies validated and the funding approved by the board of Adaptation Fund and BOAD	00	1 278 000	390 000
	1.2.1. Capacity building of local development services agents of Ministry of Agriculture on climate change and its impacts on food security 1.2.2. Training of Government technical agents in the use of the tools to monitor the changes in the status of natural resources 1.2.3. Strengthening of the technical capacities of the actors in the implementation of the environmental and social safeguard measures	1.2. The capacities of decentralized technical services of the State are strengthened	64 000	78 600	25 670
	1.3.1. Sensitization and training of grassroots	1.3. The capacities of farmers' groups	**532 000**	**180 000**	**269 800**

Project components	Concrete expected results	Expected impacts	Amount (US $) Adaptation Fund	Amount (US$) BOAD	Amount (US$) Niger State
	communities on threats related to climate change and on adaptation and resilience measures related to food security 1.3.2. Training of producers to agricultural practices that preserve sustainably soil and water resources 1.3.3. Training of local technicians in installation and repair of modern irrigation systems (drip kits, Californian network) and photovoltaic equipment 1.3.4. Training of producers and health centres on the application of pesticides, toxicological management of pesticides and obsolete products and packaging 1.3.5. Enhancing Community Development Plans with adaptation to climate change measures	and other stakeholders to understand and adopt modern irrigation techniques to climate change are strengthened			
	1.4.1. Production of fact sheets on lessons learned 1.4.2. Sharing of project results and lessons learned and integration of new approaches at local, regional and national scales 1.4.3. Meeting for government technical staff, beneficiaries and other stakeholders to improve the strategies that can scale up the resilience of vulnerable populations with the use of modern irrigation techniques 1.4.4. Development of a large-scale project proposal integrating the results of lessons learned	1.4. The lessons learned are used to strengthen the resilience of agriculture by irrigation through modern techniques to a larger scale	**135 000**	**380 000**	**92 700**

Project components	Concrete expected results	Expected impacts	Amount (US $) Adaptation Fund	Amount (US$) BOAD	Amount (US$) Niger State
2. Confortation and development of irrigated areas	2.1.1. Development of peri-urban areas and villagers market gardeners 2.1.2. Protection and improvement of the exploited land	2.1. Water management is strengthened and soil and water resources conservation are implemented	7 224 000	**7 069 000**	**2 573 000**
	2.2.1. Strengthening of existing perimeters by solar pumping stations 2.2.2. New perimeters equipped with solar system	2.2. Energy bills related to water pumping are reduced	**00**	7 800 000	1 404 000
3. Support for the diversification of livelihoods and improvement the of farmers' incomes	3.1.1. Organization of groups for the acquisition of improved agriculture inputs	3.1. Support to the access to quality agricultural inputs	60 000	140 000	36 000
	3.2.1. Support for the development of off-farm income generating activities 3.2.2. Support for the improvement of the income of farmers through better conservation of agricultural products	3.2. Support to the development of off-farm income generating activities	100 000	708 000	145 360
Sub-total			8 115 000	17 633 000	4 933 200
Execution cost of the project / program (9.36%)			760 000	1 251 000	400 000
Physical contingencies (1%) and contingency price increase (2%)			268 000	570 000	160 000
Total cost of the project / program (Adaptation Fund)			9 143 000		
Management costs of the project cycle requested by the implementing institution (8.4 %)			768 000		
Financing Plan	**Adaptation Fund**		**9 911 000**		
	BOAD			**19 454 000**	
	Niger State				**5 495 500**
Total project cost			**34 860 500**		

The project will be financed by Adaptation fund and BOAD but also by the Government. Please, see page 120 for the financing plan.

Projected Calendar:

Indicate the dates of the following milestones for the proposed project/programme

Table 9: Provisional schedule of the project

Milestones	**Expected Dates**
Approval of the project by the Board of Adaptation Funds	Mars 2016
Approval of the project by the Board of BOAD	Juin 2016
Start of Project/Programme Implementation	October 2016
Mid-term Review (if planned)	April 2018
Project/Programme Closing	October 2021
Terminal Evaluation	April 2021

PART II: PROJECT / PROGRAMME JUSTIFICATION

A. Describe the project / programme components, particularly focusing on the concrete adaptation activities of the project, and how these activities contribute to climate resilience. For the case of a programme, show how the combination of individual projects will contribute to the overall increase in resilience.

COMPONENT 1. ENHANCING STAKEHOLDERS' TECHNICAL AND INSTITUTIONAL CAPACITIES AND DISSEMINATION OF LESSONS LEARNED DURING THE PROJECT EXECUTION

This component aims to train and equip all stakeholders of irrigation on the issues of climate change, integrated water resources management, water management on farms, energy, tools of Strategy of Small Irrigation in Niger (SPIN), etc. To this end, the tools of strategic capacity building of small irrigation actors Plan will be exploited and completed to train the decentralized technical staff, officers and municipal authorities as well as pilot farmers.

The development of this component satisfies the requirement according to which increasing people's resilience to climate change through the control of water for agriculture calls for strengthening the capacity of stakeholders in water management and energy used for pumping.

Indeed, the challenges faced by all stakeholders involved in irrigated agriculture in the context described above in Niger are enormous: pumping and management of water resources, storage, pipeline and irrigation of managed areas. In addition, we must take into account the aspects related to the storage of agricultural products.

Dealing with these challenges requires the acquisition of basic skills in this area by the beneficiaries. But new production techniques resilient to climate change seem unfamiliar to people. When promoted, they must be transferred to recipients on the basis of learning and special training enabling them to take ownership of the said technologies. Furthermore, the implementation of such a project must be ensured with all the efficiency and effectiveness required by the actors who will be mobilized for this purpose.

It is in this sense that lies this component which will contribute firstly to improve the capacities and skills of decentralized technical services of the State (Ministries responsible for the mobilization of agricultural water (agricultural engineering), agriculture, livestock, water resources, environment, grassroots development ...) to analyze the effects and threats of climate change, in order to enable them to mobilize and help communities to undertake their own analysis of the impacts of climate change and to adopt effective technologies which will be identified.

Various forms of support will be provided and training will be delivered accordingly. As for coaching, a team of experts, private consultants and decentralized services of ministries involved will be used.

Moreover, this component of the project will support the capacity building of communities in order to enable them to prepare detailed adaptation plans - including harmonized plans for livestock, land, water management and the overall use of natural resources that will be integrated into their local development plans

This will contribute to the expected impact number three of the 3N Initiative "improvement of the resilience of vulnerable groups to climate change." This is an important recommendation that has been identified as a guarantee of success for the implementation of adaptation measures in Niger as part of PANA[11] (CNEDD, 2005).

[11] CNEDD : Synthesis adaptation measures, September 2005

It is therefore planned two levels for capacity building of different actors, including: (i) the level of the technical supervision through decentralized technical services; and (ii) the level of direct beneficiaries (agricultural groups, umbrella organizations, NGOs, etc.) who work in the agricultural irrigation sector.

Outcome 1.1. Support for the realization of studies, the control and the supervision of works

This support concerns: (i) the formulation of project documents (feasibility study, CGES, PGP, PCN, Full Project Document, Consultation of the public, national approvals of the project); (ii) the realization of technical studies (APD, the ESIA of the sub-projects, tender...); (iii) the control and supervision of work and (iv) the validation of ESIA reports of the sub-projects, supervision and environmental and social monitoring.

Output 1.1.1. Support to the formulation of project documents

Technical services involved in the implementation of the project will benefit from support of a cabinet for: (i) the development of the Project Concept Note (PCN); (ii) the implementation of feasibility studies; (iii) the development of the environmental and social project management framework; (iv) the development of the pesticide management plan; the development of the Full Project. The cabinet will also lead consultations of the public required to get national approvals necessary for the project. It will develop better documentation, while strengthening the capacity of technical services in the elaboration of the aforementioned documents.

Output 1.1.2. Support for the realization of detailed preliminary projects, studies or notice of environmental and social impact of sub-projects

There is support in the design of sub-projects, the studies of studies of preliminary detailed project (DPA), studies of environmental and social impact of sub-projects and tender documents. Thus, producer groups will benefit from technical support in the montage of the sub-projects of which they are initiators.This support will be in accordance with the guidelines of the strategy of small Irrigation in Niger (SPIN). Indeed, according to the SPIN, the needs (sub-projects) must be translated in the form of formal requests, with or without the support of Private support Council Services (SPAC) on the basis of the demand expressed by the farmer[12]. As such, the studies of the detailed preliminary project as well as studies or notice of environmental and social impact will be conducted by the SPAC having competence in the field[13]. Studies and notice of impact on the environment will take into account the systematic identification of the environmental and social risks and their management. The Project management unit will support the beneficiaries for the choice of the SPAC helping to prepare by region or municipality, after a call for applications, a list of SPAC which have the required technical capabilities to conduct such studies. The beneficiaries on the basis of a shortlist of 3 to 6 SPAC of their region or municipality may after analysis of the proposals of these award the contract to the SPAC with the best bid.

Output 1.1.3. Support to the technical control of the amenagement

The control and supervision of the development and operation works of 5 ha units in the intervention areas will be made by the Office of control that has the skills in the field.

The benefits include thereon: (i) the drafting of the DAO, the launch of the consultation for the acquisition of hardware and equipment; (ii) receipt in factories and on the sites, of materials and equipment of power stations, lines and connections accessories; (iii) the technical, administrative and financial performance of the work monitoring; (iv) the validation of tests for the commissioning and provisional approvals of the structures and works.

[12] See Strategy of Small Irrigation of Niger (SPIN) P.41.
[13] See Strategy of Small Irrigation of Niger (SPIN) P.42.

Irrigation and solar kits that will be put in place, will undergo a technical inspection which will be directed by a cabinet specialized in the field. This activity is to ensure that all the kits are installed in accordance with the required standards and allows to guarantee the quality of solar and irrigation installations.

Output 1.1.4. Review and approval of notice of environmental and social impact or ESIA of the sub-projects, supervision and environmental monitoring of sub-projects

The reports of environmental and social impact studies of sub-projects or of notice of environmental and social impact will be prepared by the beneficiaries through the SPAC. These reports will be submitted to the Office of environmental assessments and study of Impact (BEEEI) for review and validation to ensure taking account of all key parameters including requirements of environmental and social of the Adaptation Fund and BOAD as well as their compliance with the standards of the country. The environmental and Social Management Plan (ESMP) and the Pest and pesticides Management Plan (PPMP°. agreed for each subproject will be subject of a supervision and environmental and social monitoring. The environmental and social supervision has for primary objective to control the proper performance of the activities and works for the duration of the project, and this, with regard to the respect of environmental and social measures that are proposed, laws and regulations governing environmental assessments in Niger, the guiding principles of the Adaptation Fund and the environmental policies of BOAD. The Environmental supervision will be ensured by the BEEEI in collaboration with the implementing agencies and their dismemberments. To enable the agencies to carry out the supervision program, their capacity in the field will be strengthened. The monitoring will focus on the essential components including: the state of water resources, water quantity and quality of water; chemical fertility of the soil, soil science and soil degradation; the physical properties of soils, the behaviour and the use of the soils, the evolution of flora and fauna, from the biodiversity, the typology of the facilities; the evolution of techniques and agricultural technical performance, hygiene and health (water-borne diseases, poisoning, pollution, noise, etc.), working conditions, etc.

The BEEEI is the body in charge of environmental issues at the national level. The BEEEI in its mission will be supported by competent structures for specific questions. The plant protection Directorate will make joint missions with the BEEEI for the management of pests and pesticides in the framework of the project. These structures will be supported by decentralized structures in the intervention areas. It is through these activities to ensure the effective implementation of the measures of environmental and social management of the project as a whole. Periodic reports of implementation the PGES and PGPP of sub-projects will be produced. A mid-term evaluation and final evaluation wil be conducted to measure performance of environnemental and social dispositive of the project.

Outcome 1.2. The capacities of decentralized technical services of the state are strengthened

This will involve: (i) strengthening the capacity of local development service of the Ministry of Agriculture agents on climate change and its impacts on food security; and (ii) training of agents of technical services of the State in the use of tools for monitoring changes in natural resources.

Output 1.2.1. Capacity building of local development services agents of Ministry of Agriculture on climate change and its impacts on food security.

The capacities of agents of Agricultural Engineering, Agriculture and Livestock will be strengthened to enable them to analyze the effects of climate change in combination with food security, livelihoods and vulnerability indicators. They will also be trained on their roles in the implementation of the action plan of the national small irrigation strategy, in particular with regard to the promotion of modern pumping and water saving techniques.
The training will address the need to harmonize the methods and irrigation approaches in different localities, to strengthen coordination between the different actors, and improve results. The project will help strengthen the approaches taking into account the characteristics of the different agro-ecological

zones, density and spatial distribution of the population (including in terms of poverty levels) and the State's capacity to respond at regional and local levels.

All this will enable the Ministry of Agriculture agents to better monitor local development, mobilize and support groups, cooperatives and other farmers and breeders for efficient and sustainable agricultural production. These trainings will be conducted through workshops that bring together the various categories of executives. Trainings and sensitization will be organized at local and national levels. The workshops will be organized for 38 departmental and regional executives of Agricultural Engineering, Agriculture, Livestock and Environment.

It is two agents per department concerned for the 14 and 2 agents per region for the 5 concerned. These workshops will be held in the capitals of intervention areas in order to enhance the knowledge of agents on the link between food security and climate change.

Output 1.2.2. Training of Government technical agents in the use of the tools to monitor the changes in the status of natural resources

The Small scale irrigation strategy (SPIN) provides for the strengthening of the capacity of technical services of the State support of small Irrigation (including the General Directorate of Agriculture (DGA), the General Directorate of Génie Rural (DGGR), the Directorate General for the Protection of Plants (DGVP) and their decentralized services) (confers, product 5 of the specific objective 2 - P5ES2 – of the SPIN) and noted the need to set up a geographical information system of small scale irrigation (SI-GIS) based on a data bank reliable for monitoring the evolution of the use of the irrigable potential and the State of its development (page 68 of the SPIN).

Under the project, the capacity of local staff of the hydraulic services, génie rural, agriculture and the environment services, as recommended by the SPIN, will be strengthened at the level of the areas of intervention of the project to optimize the monitoring of the evolution of changes in the status of natural resources to have a good database for national geographic information system.

This will allow:

- The production of a reliable database on the impact of actions on people's resilience to climate change ;
- The monitoring and analysis of the development of water resources;
- The establishment and operationalization of a platform for exchange of environmental information for actors and local institutions; and
- The reduction of data for case studies, notably on best practices for adaptation to climate change.

Thirty eight (38) departmental and regional technical staff, all supervisory State agents will be trained through workshops. These trainings will be organized during the first and second year of the project. Indeed, the achievement of targets set by the 3N Initiative, and by the plans and strategies related thereto namely the SPIN requires technical capacity to collect, analyze and use relevant information and updates, including at local level.

This is especially important for those local services of the State which must communicate with communities, mobilize and provide them with experts in sustainable management of natural resources and environmental conservation.

Output 1.2.3. Strengthening of the technical capacities of the Government actors in the implementation of the environmental and social safeguard measures

To ensure seamless integration of the environment in the implementation of the project, it is necessary to strengthen the technical and institutional capacity of the State services including the Office of the environmental assessments and studies of Impacts (BEEEI). The project will support rural development sector in the preparation of procedures of good agricultural practice to accompany the implementation of activities (environment-friendly cultivation techniques, optimal use of pesticides and fertilizers, etc.). It should also help the establishment of a database of environmental and social data within the Ministry of Agriculture, to better understand environmental issues and constraints in the realization of its agricultural activities. This database should allow to establish a repository for better assessing the impacts and the efforts made in the management of rural development. The implementation of agricultural activities must be done with health and social accompanying measures. This will require the strengthening of the capacities of stakeholders in public health in the areas of intervention.

An environmental monitoring program will be established and will focus on ongoing monitoring, the supervision, the mid-term evaluation and the annual assessment. This monitoring will require health and physicochemical analyses.

According to, the SPIN, to foster the emergence of projects technically efficient, economically viable and environmentally sustainable, it is necessary to strengthen the system of support and consulting. Given the orientation of the public service, the development of private support-Council (SPAC) services is supported and should eventually result in the establishment of at least two (2) SPAC by Department. Indeed, given the inadequacy of public technical staff, it is expected in the SPIN the establishment of sufficient numbers of competent SPAC that will ensure the link (collection of needs, development of applications and files, implementation of certain field activities) between the producers and the regional Committee of the small-scale irrigation (CR - PI).

In this sense the SPAC will be part of actors to benefit from capacity-building for this project

<u>Outcome 1.3.</u> The capacities of farmers' groups and other stakeholders to understand and adopt modern irrigation techniques to climate change are strengthened

This result will be achieved through: (i) sensitization and training of grassroots communities on threats related to climate change and adaptation and resilience measures related to food security; (ii) the training of farmers to agricultural practices that preserve sustainably of soil and water resources; (iii) the training of local technicians in installation and repair of modern irrigation systems (drip kits, Californian network ..) and photovoltaic systems; (iv) the development of climate change adaptation plans integrated into local development plans and the signing of an agreement with the target communities ensuring efficient use of soil and water.

Output 1.3.1. Sensitization and training of grassroots communities on threats related to climate change and on adaptation and resilience measures related to food security

The trained State's technical services will develop and implement a public awareness campaign in order to inform communities, in general, and farmers/pilot farmers groups in particular, about threats of climate change and possible adaptation options.

They will work with selected pilot farmers in local communities through participatory workshops, paying particular attention to the threats that climate change poses to production systems, water management and food security and nutrition. A gender approach will be integrated in all awareness campaigns and training. A good representation of women and youth among pilot farmers to be trained will be provided. These training sessions will be animated in the capitals of departments by executives of the public

technical services who are trained for this purpose.

In addition, groupings of agricultural producers will be sensitized and trained on environmental management of sub-projects to ensure performance in the achievement of the expected results and sustainability of the project as a whole. Sensitization and training campaigns will be carried out by NGOs and other local environmental associations. NGOs and active associations in the agricultural promotion, with expertise in the environmental field, will be retained to perform these services. Training and sensitization themes will focus on: (i) the environmental and social issues in relation to the development of small-scale irrigation; (ii) the environmental management and agricultural good practices; (iii) the safety, health and hygiene in the realization of agricultural activities.

Output 1.3.2. Training of producers to agricultural practices that preserve sustainably soil and water resources

It is noted that success of an intensification of crops in an irrigated system is based on the mastery of varietal performance, the careful management of irrigation, water and soil, the effective management of perimeters and the mastery of different cultivation techniques.
But, various observations showed that the introduction of new technologies has had limited impact on the perimeters because the attention was often focused on only one of the important aspects of production. Moreover, the cooperative management system let itself seriously penetrated with various interferences, which is the basis for many management challenges of Irrigation schemes and Cooperatives. So, the project will hold for the benefit of farmers selected practical workshops on various topics as follow:

- the control of seeds;
- the conduct of nurseries;
- the operation and management of a group;
- the missions of a water management committee;
- the management of pumping stations;
- the management of soil quality

Manuals/guides of good practices to adopt during the cycle for managing pesticides (Indication of labels, transportation and handling, storage, maintenance of equipment, Preparation of the mixture, Application of porridge, bottom of tanks or containers, end of application, management of packaging) will be developed and made available to producer groups.

Output 1.3.3. The training of local technicians in installation and repair of modern irrigation systems (drip kits, Californian network) and photovoltaic equipment

The project aims to promote innovative irrigation systems and development of farms. Therefore specific irrigation technologies with strong irrigation yields are proposed, including the drip system with 95% efficiency, and the full California network with 85% efficiency.
These systems are associated with a solar pumping of irrigation water. Given the technological specificity, despite the good experience of the target group, the maintenance of facilities is not guaranteed.
To ensure the sustainability of the facilities, the project plans to train and equip local craftsmen that will offer producers assembly, disassembly, maintenance, servicing services and repair of facilities. The project will support, in this context, the emergence of 14 craftsmen in the intervention departments. With the expansion of facilities in the project area, a market expected to be created around these local operators.

The training will take place during the first three years of the project. The participating craftsmen will benefit from toolkits and training manuals that will allow them to transmit their knowledge to other craftsmen in return.

Output 1.3.4: Training of producers and health centres on the application of pesticides, toxicological management of pesticides and obsolete products and packaging

Training sessions will be held in the five regions targeted by the project (Tillaberi, Niamey, Dosso, Tahoua and Agadez), for capacity building: of producers on the rational application of pesticides; Health centres on the toxicological management; and national services responsible for the destruction of obsolete pesticides and pesticide packaging.

- Strengthening the capacities of farmers on the application of pesticides

It's a training focused on: (i) information on the risks and health and safety advice. (ii) basic knowledge on handling and risk management procedures; (iii) the wearing of protection and security equipment; (iv) the risks associated with the transport of pesticides; (v) procedures for handling, loading and unloading; (vi) the storage of pesticides in farm; (vii) the management of packaging and used pesticides; (viii) the management of cases of accidental application of pesticides; (ix) the outline of the process of treatment and operation; (x) health and safety in relation to operations; (xi) the emergency measures and emergency pesticides poisoning; (xii) the maintenance of the equipment.
These trainings will be conducted by the national plant protection services with the support of the BEEEI.

- Strengthening the capacity of health centers on toxicological management

The actors of the health centers will be trained on the toxicological management to better intervene in cases of poisoning due to pesticides. The training will focus on good knowledge: (i) of the national laws and regulations on pesticides; (ii) the techniques for diagnosis of the effects of ingestion of toxic products; (iii) the treatment in case of intoxication.
These trainings will be conducted by the national plant protection services with the support of the BEEEI.

- Strengthening the capacities of the national services responsible for the destruction of obsolete pesticides and pesticide packaging

Obsolete pesticides and the packaging of pesticides, constituting risk material for the environment and human health, financial and technical support will be given to the structure in charge of their management to collect and effectively treat these obsolete products and packaging of pesticides. These actions will be conducted by the national services responsible for the destruction of obsolete pesticides and the packaging of pesticides under the control of the phytosanitary services and the BEEEI.

Output 1.3.5: Enhancing Community Development Plans with adaptation to climate change measures

Various ongoing projects in Niger have started the acclimatization of Community Development Plans (PDC). This project will support the process in its area of intervention. Depending on the needs expressed by local communities, 12 Community Development Plans could be enhanced with adaptation to climate change measures. For example, the activities programmed in the component 3 aim to achieve this objective.

Outcome 1.4: The lessons learned are used to strengthen the resilience of agriculture by irrigation through modern techniques to a larger scale

The effects of climate changes affect, to a large scale, sectors and constitute a serious impediment to the development of Niger. This project has been developed based on research conducted by Global Lead on the field, the results of the various consultations and also lessons learned from already implemented

projects in Niger (see Appendix 4).

The project will be one of the very first to be implemented with modern techniques in small-scale irrigation in the framework of the strategy for small irrigation adopted in April 2015. Interesting results and new lessons are expected from the implementation of the project regarding modern techniques used and measures to adapt to climate change. Reflections must be engaged on the project weaknesses in order to propose new solutions to be disseminated with the benefits of the project.

This project is a pilot project at national level. Lessons learned will be used to propose to the financing of the Government, Donors and populations a large-scale project that can help people to better adapt to the adverse impacts of climate change.

To this end, the following actions will be undertaken: (i) Meeting for government technical staff, beneficiaries and other stakeholders involved in the improvement of strategies to strengthen the resilience of vulnerable populations through the use of modern techniques of irrigation; (ii) Preparation and implementation of a large-scale project integrating the results of lessons learned.

Output 1.4.1: Production of fact sheets on lessons learned

This will be the production and dissemination of materials and documentaries on lessons learned and best practices tested in the framework of the project on adaptation, decreased levels of groundwater, management of aridity in the agro ecosystems of selected sites, etc.

To this end, the project will develop several fact sheets on technologies and practices implemented at the cruise phase of the project in the third year. This will provide:

- a sheet on drip irrigation system ;
- a sheet on California system ;
- a sheet on preparation and use of compost ;
- a sheet on solar pumping ;
- a summary sheet taking into account the combination of technologies
- a sheet on the funding systems suitable for irrigation with modern techniques;
- a sheet on the input financing;
- a sheet on the acquisition and use of pesticides;
- a sheet on the difficulty of project management ;
- a sheet on the standardization of equipment and products used in this type of project;
- a sheet on the optimal profitability of activities of irrigation projects with modern techniques
- etc.

Output 1.4.2: Sharing of project results and lessons learned and integration of new approaches at local, regional and national scales

This activity aims to promote the integration of adaptation to climate change impacts on food production in local and regional planning. This objective will be achieved through a set of complementary activities, including:

- A non-technical training courses for officials and parliamentarians on the concept of climate change and food security, the analysis conducted for Niger, and knowledge generated in the framework of the project
- Presentations to ministers and senior government officials;
- Site visits by competent officials;
- Events organized for the beneficiaries to enable them to present their experiences to other potential beneficiaries;
- Annual workshops involving community, departmental, regional and national actors (the project) to discuss opportunities and constraints, share experiences and foster learning action;

- Inclusion of reports in the online database of the Ministries of Agriculture and Environment; dissemination of information on lessons learned and experiences shared through programs on public and private media (national and international TV, community, national, and international radio stations).

Output 1.4.3. Meeting for government technical staff, beneficiaries and other stakeholders involved in the improvement of strategies to scale up the resilience of vulnerable populations through the use of modern irrigation techniques

The lessons learned with the project can't be really integrated in the action plan of the Small Scale irrigation of the country if the stakeholders involved in the improvement of strategies and programs/projects design are not convinced by the outcomes and lessons learned in the implementation of the project. The decision for a wider adoption of modern irrigation techniques will be difficult. To facilitate the decision-making, the project will:

- Inform the technical personnel of the government (services involved in the mobilization and monitoring of water resources, agricultural services, livestock, extension of crop protection products, environment, land, micro finance, grassroots development, agricultural research, etc.) beneficiaries, umbrella of cooperatives and associations, microfinance associations, private involved in the sale and distribution of solar pumps, irrigation pipes, drilling companies, input shops associations, technical and financial partners and other stakeholders in the development of lessons learned
- Initiate an open discussion that will improve the fact sheets prepared on lessons learned
- Organize proofreading of the action plan of the National Small Scale Irrigation Strategy (SPIN), and other texts to enhance the use of modern techniques of irrigation as a means of resilience of vulnerable populations to climate change, food insecurity and poverty.

Output 1.4.4: Development of a large-scale project integrating the results of lessons learned

From the 1990s, growth of investments in Small Irrigation allowed installation of approximately 500 ha/year of new irrigable land. The analyses conducted in the context of the implementation of the strategy of the small-scale irrigation in Niger (SPIN)[14] have concluded the extension of the simple techniques and controllable by the villagers, such as pedals pumps, small moto pumps that reduce the painfulness of irrigation, the introduction of the solar pumping, extension kits of Drip system and the Californian networks system. It is also requested to improve the cropping practices in offering to farmers, packages with the use of seed of short cycle, the winter gardening, the rotation crops.

With its action plan, the SPIN predicts to boost the irrigation sub-sector with an increase of 5 600 ha of irrigated perimeters annually or 56 000 ha by 2025. For the Niger, the pilot project on "Enhancing resilience of agriculture to climate change to support food security in Niger, through modern irrigation techniques" should help to draw lessons that will better guide the small-scale irrigation with the solar pump, drip system and the California network. So, to contribute to the objectives of the SPIN, a large scale project will be developed to reach the majority of vulnerable populations able to use modern irrigation techniques. This large scale project proposal will build on the lessons learned from the execution of the present project. The solutions proposed by the lessons learned will be taken into account in the preparation of the large scale project.

[14] Stratégie de la Petite Irrigation au Niger

COMPONENT 2. CONFORTATION AND DEVELOPMENT OF IRRIGATED AREAS

This component aims to promote irrigation with innovative technologies such as drip, the Californian network and water drawing, pumping based on solar energy as measures for adaptation and strengthening resilience of poor farming communities in Niger to the adverse impacts of climate change and energy crises in the fight against food insecurity.
In Niger, 90% of the population is rural and derives most of its resources in agricultural activities. Agriculture is mainly rain-fed because only 1.86% of arable land is irrigated. However, rainfed agriculture has become random due to the scarcity of rainfall, its poor distribution and land degradation

So for a successful agricultural season, an irrigated agriculture is used. Between the two modes of production, rainfed and irrigated, the difference in crop yield goes from simple to triple or even quadruple. Better, irrigation allows several crop seasons per year, regardless of the rainy seasons.

Unfortunately, the usually practiced irrigation techniques are water and energy consuming. Thus, water sources (ground water, ponds, and rivers) are stretched while their recharge becomes problematic with regards to the scarcity of rains and consumption.

In the current context of increased climate variability and climate change, achieving Goal No.1 of the Millennium Development Goal, which is reduce extreme poverty and hunger necessarily requires good management of water for agriculture.

So, it the control of water has become a major objective at African and sub-regional scales with PDDAA/NEPAD, ECOWAP and PAU The 2005, 2010 food crisis and those that lie ahead for the coming years, reinforce the consciousness of the Niger authorities and populations for irrigation. It is for this reason that the project aims, through this component, at the promotion of efficient techniques of irrigation in terms of water and energy.

In the framework of this component, it is expected the construction of about 1000 ha of small irrigated perimeters in each unit of 5 hectares or 200 units. To achieve this, it will require: *(i) to strengthen the management of water and implement conservation of soil and water resources activities; and (ii) to reduce energy bills related to water pumping.*

For information, and taking into account the potential irrigable land, it is held 150 ha in Agadez, 250 ha in Dosso, 200 ha in Tahoua, 300 ha in Tillabery and 100 ha in Niamey[15].

In the past years, there are mainly the theft of panels that have led to the closure of several mini water supplies. To avoid these cases of vandalism, the agreement which will be signed with the beneficiary groups will include a requirement to secure the site and the installed equipment.

Outcome 2.1: Water management is strengthened and soil and water resources conservation are implemented

The project aims at strengthening management of water resources through the deployment of appropriate irrigation systems. Experience has shown that when the technology is controllable by the producer, the latter has, in addition, the control of decisions related to his initial investment and his production cycle, the performance of irrigation, formal or informal, is best.

The performance of small-scale irrigation development in the fight against poverty and food insecurity have been proven in the past by PIP2 and PPIP programs in Niger and the FAO Food Security projects by the development of small-scale irrigation funded by various multilateral sources (FAO, IFAD, EU).

[15]These distributions reflect the potential irrigable land in each region. However, during project implementation, the PMU in consultation with the municipalities could readjust those areas to achieve the overall objective.

In terms of techniques, like in most of these initiatives, the drip irrigation system and the Californian network seem most appropriate to introduce. The promotion of techniques with little water consumption bringing the amount of water required to the need for culture is indeed adapted to limit the solicitation of groundwater whose recharge is problematic with regards to climate change consecutive to decrease in rainfall and its poor distribution in time and space.

These techniques have the following advantages: (i) water-saving due to the contribution of the amount of water needed for the plant unlike furrow irrigation/flood where the water is brought at will, depending on its availability without measurement. A saving greater than 2/3 of the amount of water can be observed (the drip network has an efficiency of 95%, and full California network, 85% of efficiency), which reduces the solicitation/collection of ground water/water source; (ii) the guarantee of the closure of the crops cycle even in years of poor rainfall; (iii) the correct formulation of the fertilizer that has a direct effect on the environment due to its solubility avoiding the development of armor (due to the formation of crusts between the interstices of plants); (iv) energy savings due to the reduction in the required amount of water; and (v) control of the weed, which frees women's time to engage in other economic and social activities.

Two activities will be developed to ensure that this impact is achieved, namely: (i) development of peri-urban areas and villagers market gardeners; and (ii) protection and improvement of the exploited land.

Output 2.1.1.: Development of peri-urban and villagers market gardeners

The irrigated perimeters development approach in the framework of the project will draw inspiration from that proposed by the Strategy of Small Irrigation in Niger (SPIN, April 2015). The said approach recommends that the needs of farmers as "promoters" are brought in the form of formal requests.

These requests will be addressed to the project via the president of the Regional Committee of small irrigation. The process further involves obtaining an understanding of the community proposed activities. So the requests will receive a notice[16] at municipal level to certify the origin of administrative activities

The satisfaction of the request will go through a technical and economic analysis of profitability of the requested investment. The goal of profitability will be seen in relation to the types of solicited contributions on the basis of a technical simplified environmental study. The choice of technologies required must be based on the criterion of cost/effectiveness, adapted to the potential of water resources, agro-soil conditions, capacity and availability of workforce and financial capacity of the farmer.

The investments of the sub-projects will have to offer, above all, support actions in favor of sustainable management of land and water resources which are the production bases. Design types of eligible facilities at the small-scale irrigation of module 5 ha and the corresponding type of support are presented below:

[16]**Notice**: The application is brought to the attention of the mayor without necessarily undergoing a visa, and the application can pursue administrative procedures. Unlike the visa that affixes a signature on the request to make it valid.

Table 10: Types of eligibilities facilities

Items	PRRA-CC	Farmers	Type of support
Forages <50 m	x		Grant 100%
Reservoir		x	Additional studies must demonstrate the need. Grant 0%
Drip network (Pipe + accessories) or Californian network	x		Grant100%
Preparation and land plowing	x		Grant 100%
Site Protection (fence + plantation)	x	x	• Plantation Grant100% • Fence grant 0% (Supported by the farmert[17])
Control and supervision of works	x		Grant 100%
Monitoring and supervision of works	x		Grant 100%

Output 2.1.2.: Protection and improvement of the exploited soils

Besides the limitation of the surface water samples, the interventions allowing to mitigate the decline in the groundwater level imply the establishment of close measures to protect production sites.

So, the project proposes to promote, according to the needs on beneficiaries' sites, the activities of restoration of degraded land to promote water infiltration into the soil and the recharge of groundwater, through agroforestry practices, half-moons ... which have proven their value in the past. In addition, the delimitation of protection areas of reforested ponds and the protection of perimeters through the reinforced wire fence by forest species are all planned actions that contribute to the preservation of ponds and market gardeners perimeters.

The intervention developed sites will be protected and agroforestry will be developed. 1500 hectares of which 1000 hectares of developed sites and 500 ha of immediate surroundings will be concerned by protection actions and agro forestry. The envisaged actions are anti erosive treatments (stonycord, half-moons, thresholds and dry stone walls), the planting of trees with nutritional or medicinal value as moringa and composting for the restoration of soil fertility. These actions are simple and will help to limit the silting of the sites, in order to delay or change the dynamics of water erosion that may threaten the sites. The organic manure will be promoted on the developed sites by an incentive mechanism for composting through the support to the realization of manure pits in each site.

<u>Outcome 2.2</u>: Energy bills related to water pumping are reduced

The diversification of energy source that favors solar power is a guarantee for the exploitation of all the developed areas and solves the thorny problem of acquisition and transport of fuel, major constraint to the optimal exploitation of developed areas.

The use of this energy source anticipates the risk of non-exploitation of perimeters because of uncontrolled costs of fuel prices constantly increasing. Solar energy is suitable to ensure a continuous operation of the pumping equipment.

This energy has the following advantages: (i) Niger has it in abundance with effective time of 10 hours per day; (ii) it removes the expensive transportation of fuel due to the size of the country; (iii) maintenance and operating costs are almost zero; (iv) the supply of energy is permanent, the crop cycles are driven forward and power supply breaks due to fuel disruptions and/or failure of the motor pump unit are zero, which guarantees the agricultural campaign; (v) the release of greenhouse gases is avoided. Overall,

[17]Any project requiring a fence may be financed only when the farmer has fenced or give proof of his commitment to carry out with his own means the fence of the site to exploit.
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solar equipment, besides the economic benefits they provide, contribute to reducing the emission of gases involved in global warming.
The project implementation will contribute to a currency economy by the reduction of oil imports.

The reduction of energy bills related to water pumping will be effective by: (i) strengthening of existing perimeters by solar pumping stations; and (ii) the equipment of new perimeters with solar system.

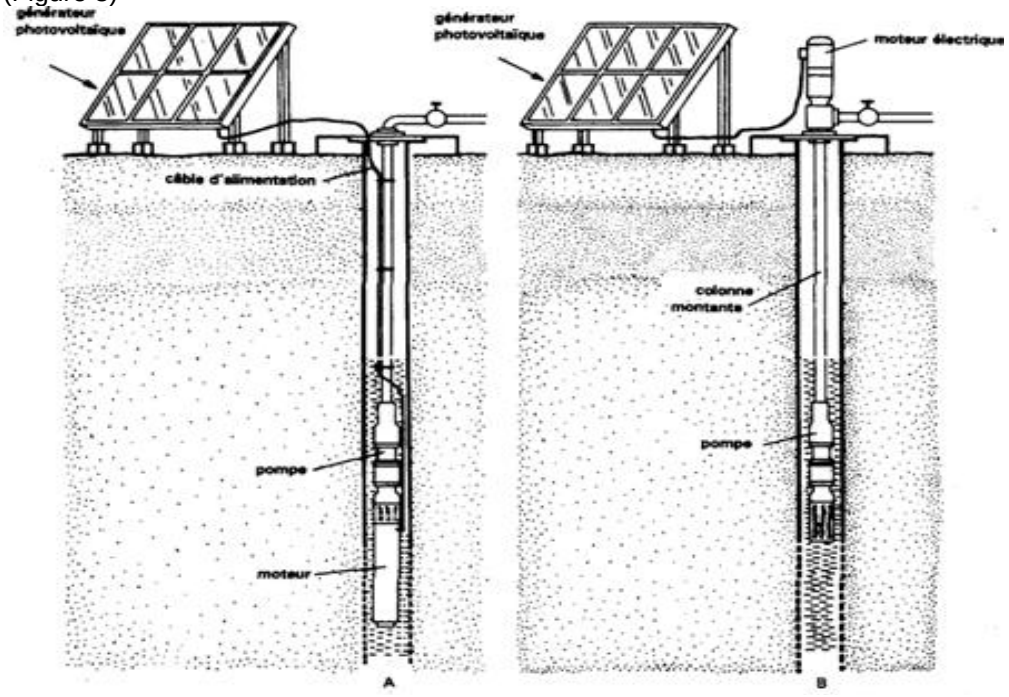
Output 2.2.1.: Strengthening of existing perimeters by solar pumping stations

The project consists of strengthening old perimeters which used fossil energy motor pumps in solar pumping stations and the rehabilitation of market gardeners and grain perimeters in peri-urban and villages equipped with solar energy-based efficient irrigation system (drip system ...).

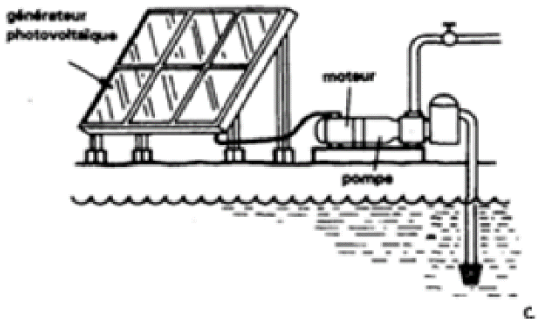
This sub-component is complementary to 2.1.1 subcomponent. The project will strengthen existing perimeters pumping station with solar power, equipment of small rehabilitated or developed perimeters.

Output 2.2.2.: New perimeters equipped with solar system

The system set up will be consisted of, as an indication, solar panels, inverter, controller and connection accessories for pumping. Depending on whether the water is shallow or deep, three common types of photovoltaic solar generator pumping systems have been identified: (i) the submerged solar pump; (ii) the solar pump with motor on the surface; and (iii) the system of engine and pump installed on the surface (Figure 8)



A. submerged motor pump unit
B. solar pump with motor on the surface



C. engine and pump installed on the surface

The appropriate type of Installation in order to perform will be determined by the characteristics of the site. The project plans to equip 200 units of 5 hectares corresponding to adjustments made in the sub-component 2.2.1.

The following items are eligible in the application and are part of the sub-project file.

Table 11: Items eligible in the application of project

Items	PRRA-CC	Farmers	Observations
Solar panels and accessories	x		Grant 100%
Electric pumps or solar pumps + accessories	x		Grant 100%
Control and supervision of works	x		Grant 100%
Monitoring and supervision of works	x		Grant 100%

COMPONENT3: SUPPORT TO DIVERSIFICATION OF LIVELIHOODS AND IMPROVEMENT OF FARMERS INCOME

This component will allow to provide support to beneficiaries for: (i) the access to quality agricultural inputs; and (ii) the development of off-farm income generating activities.

Outcome 3.1: Support to the access to quality agricultural inputs

The access to and appropriate use of good quality inputs (improved seeds, fertilizers, pesticides) help develop agricultural production to increase revenue. The input shops (IS) can be a good supply system; but the experience of many projects which have promoted them (ex.: the Inputs and IARBIC projects) has shown that without appropriate monitoring by the STD and without a sufficient level of organization and capacities of Producers organization (OP), the IS cannot function optimally.

Other inputs access issues to consider consist of: (i) too high fertilizer price and the existence of a single supply circuit (through the CAIMA); (ii) the lack of information for framers on local opportunities of supply in improved seeds. The group therefore needs support for the acquisition of good quality inputs.

Output 3.1.1.: Organization of groups for the acquisition of improved agricultural inputs

In collaboration with the delegates of cooperatives umbrellas and public and private agencies responsible for the importation and marketing of inputs, a fact sheet that will indicate the quality of inputs, standards of use, best prices, and shops compliant with the national standards, etc. will be established.

At the first agriculture campaign, the project will support famers groups, involved in the project, who didn't

have sufficient resources to buy improved seeds, quality fertilizers and pesticides on the base of the fact sheet recommendations.

Outcome 3.2.: Support to the development of off-farm income generating activities

The project will support income-generating activities in the villages linked to the sites of intervention to enable farmers to diversify their livelihoods in order to increase their resilience to the impacts of climate change. It will provide support for: (i) the development of off-farm income generating activities; and (ii) the improvement of the income of farmers through better conservation of agricultural products.

Output 3.2.1. Support to the development of off-farm income generating activities

At the sites' level, the project provides for the establishment of agro-processing units. The production obtained at the sites will serve as raw material for these small agro-processing units. Which allows to create new jobs to groups settled around these sites and increase their income.

The project will encourage the creation or revitalization of women's and young people organizations for transformation (example: nutrition flour for children, conservation of the tomato, etc.), and marketing (tomato, onion, etc.) through the establishment of mills and store for groups that request. These machines allow groupings, preferably female and young peoples, to undertake the processing and marketing of agricultural products. The project intends to support these groups to gain from the groupings and cooperatives contents first to start their activities and to train them in processing and marketing.

The funds destined for these activities will be funded at 75%. The beneficiaries will contribute to 25% as direct input in kind or cash according to the recommendations of the Small scale irrigation strategy of Niger adopted in April 2015. The SPIN provides that, if the famers groups are unable to make the 25% financial contribution to various development investments they can contribute by: (i) supplying construction materials (gravel, rubble, sand); (ii) physical participation in the work by the provision of labor under the leadership of the construction company; (iii) a total support of some work entirely entrusted to operators previously defined in the technical specifications under the responsibility of the office of control of work.

Output 3.2.2.: Support for improvement of the income of farmers through better conservation of agricultural products

Farmers are often faced with the loss of crops and consequently their income for reasons related to the conservation of the products. So, drying remains one of the less expensive options to conserve agricultural products.

In Niger, many improvements are made to traditional drying systems in order to keep products longer, improve their quality and thus provide extra income to farmers. The project aims to contribute to the dissemination of more efficient drying techniques than traditional drying, such as low-cost solar dryers, for household and semi-industrial use in beneficiary communities.

In rural areas where there are few opportunities to sell agricultural surpluses at good prices and where transport costs are high, the dried product can be a significant source of revenue and the promotion of solar drying would be a tool for economic development for these remote areas.

The Project provides for the establishment of 31 conservations stores, 31 solar dryers and 31 agricultural marketing kiosks.

In addition, the Project provides for the purchase of donkeys, oxen or camels for transport of agricultural products in the event that a powerful group would be isolated from well-made transportation routes and when a farmers group will make the request.

B. *Describe how the project / program provides economic, social and environmental benefits, particularly in the most vulnerable communities and vulnerable groups within communities, including gender considerations. Describe how the project / program will avoid or mitigate negative impacts, in the respect of the environment and social policy of the Adaptation Fund.*

The benefits expected from the implementation of this project are important and diverse for the communities.
They are related to:

- The sustainable management of water resources ;
- The reduction in consumption of fossil fuels;
- The reduction of greenhouse gas emissions;
- the improvement of soil quality;
- the best access to energy for irrigation;
- the reduction of energy bills;
- the improvement of production and farmers' income;
- job creation;
- the relief of women and children tasks;
- the improvement of women's groups incomes ;
- The promotion of sustainable agriculture and strengthening food security.

According to the SPIN, social requests from vulnerable populations for collective facilities including village sites of women or mixed, structural works such as spreading thresholds, thresholds of infiltration, mini dams, ponds, are subsidized for 100%. The costs of studies and development of records project, the equipment and materials for irrigation, equipment for the protection of sites, inputs, services, access to the credit of financing institutions through guarantee fund, bonus, or a system of compensation in the event of disaster are subsidized to 75% at the most up to 5,000,000 CFA Francs. Beyond that, no subsidy is granted. The present project is designed to take in account, the vulnerable populations according to the Small scale irrigation strategy adopted in April 2015.

Environmental benefits

Sustainable management of water resources

According to information obtained through studies of small-scale village irrigation (PIV), the net water needed to irrigate a hectare of cultivation is estimated at 45 m^3/ha/day. The irrigation period on Small Irrigation is measured on average 6 hours per day with an operation of 6 days a week.

The duration of a crop campaign is 4 months. Two crop campaigns are carried out annually on LI. With the current system of a yield of 56%, the gross water pumping needs at the source to irrigate a hectare of cultivation on both campaigns is 16,457 m3. The net water needed to irrigate one hectare during both crop campaigns is therefore 9216 m3.

Water savings with the various irrigation methods are summarized in the following table.

Table 12: Water savings with the various irrigation methods

Irrigation technique	By gravity	Semi-Californian	Californian	Drip system
Net water needs per ha per year (m3)	9 216	9 216	9 216	9 216
System Performance(%)	56%	63%	85%	95%
Gross need for pumping at source (m3/ha/year)	16 457	14 629	10 842	9 701
Water savings (m^3 / ha / year))	0	1 829	5 615	6 756
Annual water savings realized by the project(m^3)	0	1 828 571	5 614 790	6 756 090
Water savings realized over the 5 years life of the project(m^3)	0	9 142 857	28 073 950	33 780 451

The following table shows a yield of 95% for the drip system and 85% for the Californian system. Indeed, the project wants to promote one or another irrigation system according to the areas.

If the project opts only for the drip system, which has a yield rate of almost 39% more than the gravity system, the entire project intervention area, or 1000 ha, it would have permitted to preserve approximately 6,756,090 m^3 per year or 33,780,450 m^3 of water over the 5 year life of the project. This quantity of preserved water offers the opportunity for beneficiary farmers or to other farmers to have water to increase their crop areas. The water saved could be used for other economic and social purposes.

Reduction in the consumption of fossil fuels

In the practice, the farmers use pumps running on fossil fuel such as gasoline, as an energy source to operate the irrigation system on LI. According to available information, fuel consumption is between 0.75 and 1 liter per hour. With an operation of six hours a day, fuel consumption is estimated at a minimum of 5 liters per day per pump.

This is equivalent to a consumption of 918 liters per year (two agricultural campaigns). With a basic assumption to override the drip to approximately 1000 pumps at the rate of a pump per hectare the consumption of these pumps being 918 000 liters per year, the project would have permitted to save in 5 years , 4.59 million liters of petrol and 9.18 million liters in 10 years. The quantities of fuel saved are shown in the following figure:

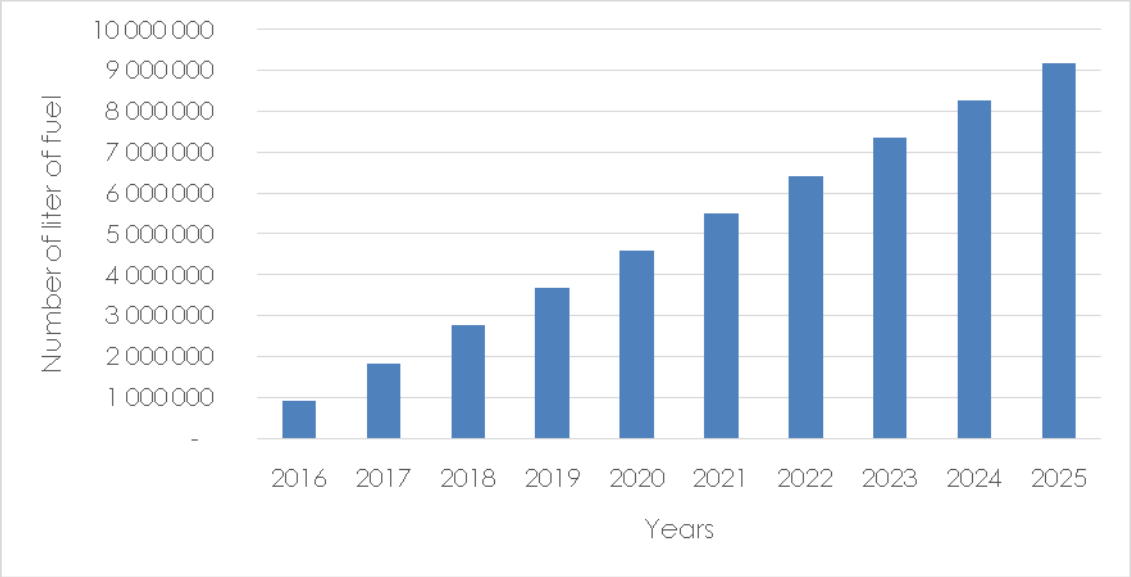


Figure 8: Evolution of fossil fuel consumption reductions for irrigation by the PRRA-CC

Reduction of GHG emissions

The project by reducing fossil fuel consumption reduces greenhouse gas emissions resulting from their combustion in motor pumps. Considering that the burning of a liter of petrol emits 2.65 Kg of CO2 into the atmosphere, the project, through the 918 000 liters of fuel not consumed, would have reduced emissions by about 2433 tons of CO_2. This is equivalent to 12 165 tons in 5 years or 24,330 in 10 years. Besides these avoided emissions may be valued on the carbon market.

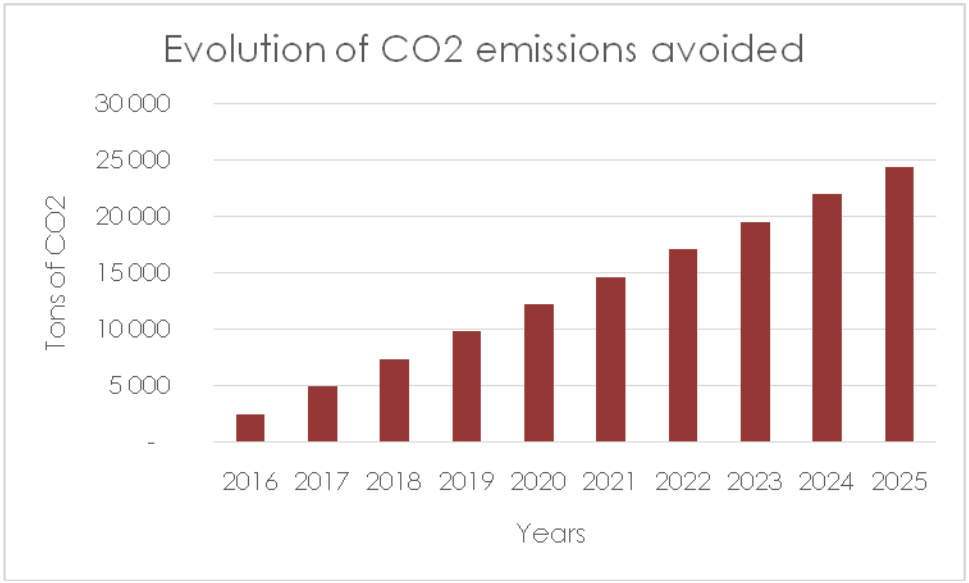


Figure 9: Evolution of CO_2 emissions avoided

Improving or maintaining the quality of soils

The project provides in its sub component 2.1, the implementation of soil conservation activities. Agroforestry and composting actions will be promoted through an incentive mechanism. These actions are likely to limit the silting of the sites, delay or change the dynamics of water erosion and improve soil quality. This will be beneficial for production.

Socio-economic benefits

Better access to energy for irrigation

The promotion of solar energy in the project will increase farmers' access to secure energy services. After water, energy is the second factor of agricultural production under irrigation system. Its precarity profoundly influences crop yields or simply limit the ability of agricultural farmers to develop crops. Indeed, the farmers using the generators must be able to have supplies of fuel permanently, fuel including gasoline and lubricant.

With an average consumption of 5 liters per day and a pump price of 540 FCFA, the farmers will have to spend about 2,700 FCFA of gasoline per day per hectare for irrigation. This is not easy for a number of farmers.

With the promotion of the use of solar energy, a national resource widely available for water pumping, the project will have allowed the farmers of perimeters selected to have a more secure energy access and of better quality.

Reductions in energy bills

With both energy sources currently used by farmers (fossil fuels such as gasoline and electric power) the energy bill represents respectively 40% and 32% (Karma site) production workloads.

The project implementation will enable the beneficiaries to significantly reduce this bill. The services offered in terms of energy are almost free, with the exception of provisions for maintenance and depreciation allowances for technical equipment and facilities. For example, the pumps used on the sites with a minimum life of 10 years, will be amortized over ten years.

Improvement of the production and farmers' incomes

Indeed, on the small irrigation, the project actions are likely to facilitate access to energy for pumping with the reduction of energy costs, access to and water saving, establishment of a drip system or a California system as appropriate. So, these developments will allow: (i) to reduce production losses related to the difficult access to energy which results in irregular irrigation; (ii) to contribute to the sound management and control of water.

Water and energy are the two major factors of agricultural production in the irrigated areas, the project by improving these factors contribute to increased crop yields. We note that low yields are explained by the fact that farmers cannot ensure regular and normal irrigation according to the need of the plant.

With the project, producers can increase the number of crop from a crop year at 2 or 3 per year. The following table shows the net income by campaign by culture. According to available data:

Table 13: Income by campaign by culture

Cultures	Net income per campaign per ha (FCFA)	Net income per campaign per ha (USD)
Tomato	9 523 500	19 047
Onion	3 645 000	7 290
potato	8 894 000	17 788
Cabbage	2 722 500	5 445
Carrot	815 000	1 630
Average	**5 120 000**	10 240

Considering a campaign of irrigated crops per year, as a usual practice in the most vulnerable communities, the project will allow producers to switch to two or three campaigns giving them the possibility of doubling or tripling their net income. That will be important added value of production and income.

Considering that farmers are several crops on the same piece, the average income could be 5.120.000 FCFA or 10,240 USD per year if these cultures consist of the above crops.

The graph below shows the trend of cumulation of income for efforts of two to three campaigns per year on 35 years of life for solar panels.

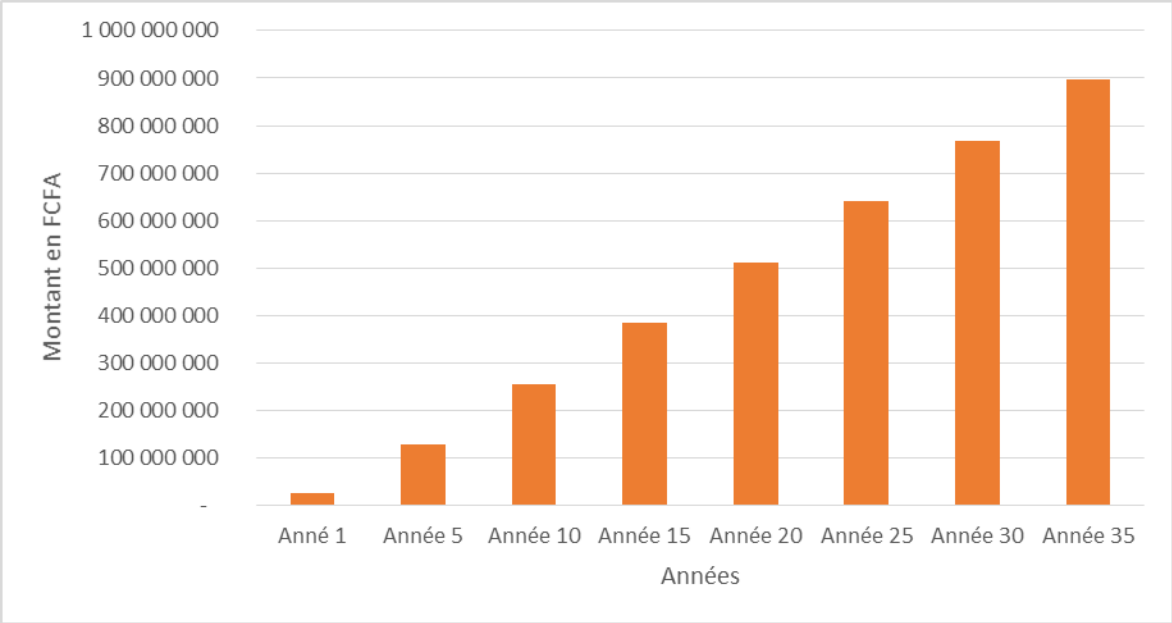


Figure 10: Accumulation of the added value of production per unit of 5 ha over 35 years

In addition, the water preserved could be an asset to the extension of irrigation schemes, which will increase the overall production.

This set of fact, will help to improve farmers' incomes and the country's food security. The savings made by farmers may be allocated to other economic activities source of income.

The following table shows the water savings that can be achieved by the irrigation system by taking as reference the gravity system.

Table 14: Water saving realized by the irrigation sites.

Irrigation technique	By gravity	Semi-Californian	Californian	Drip system system
System Performance	56%	63%	85%	95%
Water savings over the lifetime of the project ha / year (m3)	0	9 142 857	28 073 950	33 780 451
Possibility of extension of crops per year because the water is preserved (ha)	0	198	609	733
Extension of cultivation areas with water preserved on five years of the project	0	992	3 046	3 665

Benefits achievable by the state because of water saving with drip and California systems

The Drip system or California network system helps preserve water resources. Both systems have efficiencies of 95% and 85% respectively.

Considering that with the current system of irrigation, water-consuming, coupled with the phenomenon of climate change that results in narrowing of watercourses, significant evaporation, etc., Niger will be obliged to provide water for irrigation in the coming years. This represents a significant cost to the State of Niger.

Table 15: Projection of water economy through the project implementation

water saving in m3 per ha		Year 1	Year 5	Year 10	Year 15	Year 20	Year 25	Year 30	Year 35
Californian	1 Agriculture campaign per year	8 422	42 111	84 222	126 333	168 444	210 555	252 666	294 776
	2 Agriculture campaigns per year	16 844	84 222	168 444	252 666	336 887	421 109	505 331	589 553
	3 Agriculture campaigns per year	25 267	126 333	252 666	378 998	505 331	631 664	757 997	884 329
Drip system	1 Agriculture campaign per year	10 134	50 671	101 341	152 012	202 683	253 353	304 024	354 695
	2 Agriculture campaigns per year	20 268	101 341	202 683	304 024	405 365	506 707	608 048	709 389
	3 Agriculture campaigns per year	30 402	152 012	304 024	456 036	608 048	760 060	912 072	1 064 084

Water savings achievable in the project with the California system range from 8422 m3 per ha per year for a campaign to 294 776 m3 per ha after 35 years. For the drip system, these savings will increase from 10,134 m3 to 354,695 m3 per ha after 35 years.

In both cases, these savings will double to two campaigns per year and triple for three campaigns per year and will lead to a water reserve of 1,064,084 m3 for three campaigns per year over 35 years with the drip system (see table above)

In Niger, the cost of the cubic meter at the standpipe and for individual connections (up to 15 m3) is 121 FCFA (US $ 0.16), that of 16 to 40 cubic meters is 234 FCFA (0, 31 US dollar) and that of 41 to 75 cubic meters is 353 CFA (US $ 0.47). Beyond 75 cubic meters, the cost is 395 FCFA (US $ 0.52). For governments and industries, this price is respectively 314 and 320 CFA ($ 0.42 US).

Considering that 121 FCFA represent a social fee for the poor, one could consider that price of water in

village communities in case the state would decide to give a real cost of water in areas where the stress of water for human consumption and economic activities is known. Depending on different scenarios, if the project is implemented, it could allow the Niger economy to save 128 754 189 FCFA per ha for three campaigns over 35 years with the drip system and 107 003 859 FCFA ha for the California system.

This would be the cost to be paid by Niger to put water at the disposal of farmers for irrigation to ensure food security and agricultural production (see table below).

Table 16: Possibility of economies realizable on water preservation by project

		Year 1	Year 5	Year 10	Year 15	Year 20	Year 25	Year 30	Year 35
Californian	1 Agriculture campaign per year	1 019 084	5 095 422	10 190 844	15 286 266	20 381 687	25 477 109	30 572 531	35 667 953
	2 Agriculture campaigns per year	2 038 169	10 190 844	20 381 687	30 572 531	40 763 375	50 954 218	61 145 062	71 335 906
	3 Agriculture campaigns per year	3 057 253	15 286 266	30 572 531	45 858 797	61 145 062	76 431 328	91 717 593	107 003 859
Drip system	1 Agriculture campaign per year	1 226 230	6 131 152	12 262 304	18 393 456	24 524 608	30 655 759	36 786 911	42 918 063
	2 Agriculture campaigns per year	2 452 461	12 262 304	24 524 608	36 786 911	49 049 215	61 311 519	73 573 823	85 836 126
	3 Agriculture campaigns per year	3 678 691	18 393 456	36 786 911	55 180 367	73 573 823	91 967 278	110 360 734	128 754 189

Job creation

The implementation of the project will create direct jobs, consisting mainly of local manpower and indirect employment around the sites and supply and distribution channels of agricultural raw materials and semi-finished. To promote the use of local manpower, priority will be given to hiring local people. Women will be encouraged in the implementation of the project being paid the same salary as men. IGA which will be promoted by the project will constitute a potential source of employment.

Relief of women and children tasks

Women and children are often used for watering by hand so with their physical strength. The project implementation will reduce the physical contribution of farmers and will save time. This will free women and children and thus, enable them to undertake other economic activities. The project will release the children of chores who will be able to devote more time to their education for example.

Development of sustainable agriculture and food security

The project will contribute to agricultural development especially irrigated agriculture. According to the report "Our Common Future" by the Brundtland Commission, the sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet theirs. But with the current water-consuming irrigation system (very low irrigation efficiency) and based on fossil fuels whose reserves diminish and cannot be reconstituted over millions of years, the generations to come have no guarantee of their share of sufficient water resources to meet their needs as well as energy.

It is therefore necessary for Nigeriens, to develop approaches that avoid disaster for their offspring, to opt

for the use of renewable sources of energy which the country has largely on its soil and intelligent use of water resources the future of which does not provide a consistent availability.

To stimulate reflection going in the direction of sustainable development of irrigated agriculture sub-sector in Niger, comparative analyzes were conducted as part of the implementation of SPIN as scheduled, on the use of one or the other source of energy: fossil fuels (petrol) and renewable energy (solar).

Indeed, the SPIN predicts to boost the irrigation sub-sector with an increase of 5 600 ha of irrigated perimeters annually or 56 000 ha by 2025. It plans to equip by the same date, 80% of irrigate areas in pumping station with pumps or an increase of 3% per year. Considering that at present, 50% of irrigated areas are equipped with pumps in practice, this implies the equipment of 7100 ha of pumps per year.

Starting on that basis, analyzes show that if Niger adopts in 2016 for the solar system as a source of energy for pumping through the implementation of SPIN, it would have brought to Niger, both the State and households, an increase of 33.35 billion CFA francs by 2025, or 10 years, or 3.33 billion CFA francs per year. This is far above the current annual budget of irrigation sub-sector.

Considering that the achievements of the SPIN will be maintained even without increase in area as in the first 10 years, the projections made on 20-year minimum lifetime of solar panels, show that Niger would have realized a gain of 401, 75 billion CFA.

Although the cost of investment for solar installations is high in the first year, the system is profitable in the medium and long terms.

So, such a decision will bring many benefits to Niger with all related benefits derived from access to a safe source of energy and rational use of water, reduced greenhouse gas emissions, a valuation of emissions on the carbon market. This option, therefore, contributes to sustainable fight against food insecurity, poverty and ensure a better future for future generations.

Strengthening women and young people's capacities of actions

Strengthening capacities will be especially beneficial for women and young people, offering them a unique opportunity to participate in a lucrative business in the same way as men and improve their level of organization.

The market gardening, management of agricultural soils, production of organic manure, conservation of production for marketing, the economy of water and energy for pumping the water, planting and exploitation of commercial trees, etc. are all project activities that will reduce the vulnerability of women and youth.

Improvement of women's groups incomes

The project in its implementation planned support activities of women's groups in agricultural products processing, packaging and marketing. This activity will allow groups of beneficiary women to save money and improve their living conditions.

C. Explain how the proposed project is a cost-effective or provide a cost benefit analysis.

Several alternatives were analyzed during the project preparation. The results of these analyzes show that one of the main options for adaptation to climate change envisaged by the number of young people living in rural areas is migration (rural-urban migration or emigration) in search of a permanent or temporary job.

Indeed, given the decline in rainfall, its bad distribution in time and space and also the decline in soil fertility, rainfall crops have become random and productions remain uncertain and insufficient from year to year to cover the growing needs of families. This situation extends the lean period.

To pass this critical stage of the year, families are massively appealing to "exodants" who now have to leave early to exodus and stay longer in order to have income. However, poverty is also increasing in urban areas and employment and income opportunities are increasingly rare.

In addition, the opportunities to emigrate and find work abroad is increasingly limited (particularly due to economic difficulties of European countries) and often operate illegally, putting the lives of these migrants in danger. Moreover, this situation deprives the country of a valuable workforce.

For the populations that remain at home, the development of agriculture and particularly innovative irrigation technologies seems to be the best option for adaptation in the light of experience feedback of several irrigation projects developed in the country in the past. This project, conceived on the lessons learned from these past experiences, presents cost-effective for several reasons:

The project will use an approach based on community mobilization, sensitization and training. This approach involves the population in the management of natural resources (especially water resources), satisfaction of social needs, and the promotion of income-generating activities that generally contribute to improving food security and well-being. Community participation is a relevant approach when well executed and will be the most effective way to get large scale results in the country.

The project provides to support small-scale irrigation and thus, it will help increase people's incomes. Like previous projects of promotion of private irrigation in the country such as the PIP2 where incomes per hectare were at least ten times those of the mille cultivated hectare in rainfed system, significant impacts on the yields of irrigated crops are expected. The beneficiaries may reap substantial gains solely through small-scale irrigation activities, which will ensure their food security during the off-season. It is also expected a significant impact in terms of remuneration of the working day, following the decrease in expenses, the increase in yields and incomes of farmers.

The improvement of irrigation efficiency involves a reduction in the time spent on irrigation and a reduction in charges related to the pumping. Also, the choice of a technique such as the drip system is cost-effective.

The Drip system allows to improve the distribution (irrigation lines) and the application of water to the plot (flow per emitter less than 1 liter / hour), particularly by reducing the amount of water supplied to the plant.

Its efficiency is 90% to 95% against 40-50% for the surface irrigation and 70% to 80% for the sprinkling. The practice shows that the irrigation water needs in the real system of Drip system is 4400 m 3 / ha against a need of 10 000 to 14 000m3 / ha for other types of irrigation. It is a very effective technique, but unfortunately a little too expensive for farmers, but very economical to operate.

Originally, the Drip system irrigation kit was designed to allow the poorest producers, to purchase on equity, the most suitable kit to their means, but the high cost of purchase is nevertheless the first barrier to the diffusion of this technology.

The profitability of the complete system for Drip system irrigation increases with augmentation of the number of kits that can be powered from a single drilling and pump

In addition, a single reservoir may supply several kits Drip system of 500 m². The project will therefore help to develop alternatives that reduce the cost of Drip system irrigation kits, first barrier to diffusion, while maintaining the production quality and offering a range of kits that can meet the expectations of producers: adjustable kits based on the type of crop (arboriculture, market gardening), capillary enabling a precise irrigation to the plant, flat sheath.

Regarding the aspect of "reduction of energy bills related to irrigation," tests on the use of agro-fuel (jatropha oil) were led by EWW (DIPAC).

The experimentation of short duration has not allow to determine on several campaigns the reliability of the motor pump modified for operation with jatropha oil. In addition, the problem of supply in jatropha seeds must be resolved because it is a major constraint. Finally, the price of a liter of agro-fuel was close to the price of diesel.

In this context, the solar pump turns out, in terms of cost / benefit, to be the best alternative energy source to operate electric submersible electric pumps. This technique is rarely used because of its high initial cost, about 2 million F.CFA/ha (ICRISAT 2009).

However, the annual pumping cost for a solar system is four times less than the cost of a motor pump 250,000 F.CFA/ha for solar pump and 1, 000,000 F.CFA for pump. The lifetime of solar equipment (10 years on average for electric pumps and 35 years for photovoltaic solar panels) and the absence of operation costs explain this discrepancy[18].

A comparative analysis between the pumping of water with solar energy and the pumping from motor pumps indicates that for a module of (05) hectares the initial investment is 19.5 million CFA francs for the solar system (solar field and electric pumps) against 1 million FCFA for the motor pumps.

Over a period of 10, 20 and 35 years the operation costs of the solar pumping system were respectively. 7, 582,500 FCFA; 15, 165,000 FCFA and 22, 762,500 FCFA. These costs are 31, 264,600 FCFA 62, 529,200 FCFA and 109,426,100 FCFA for the irrigation with the motor pump over the same periods.

Ultimately, the solar system (initial investment plus operation costs) is 42, 262,500 FCFA on the 35 years of life against 110, 426,100 FCFA, or a profitability of around 60% with the solar system.

The project is part of sustainability and enables producers to finance themselves from the economic gains made in the project through access to water to ensure regular irrigation, the availability of a safe source of energy for pumping and especially the increase in crop year.

Indeed, Niger, most market gardeners begin their activity on a crop year. With the project, which does not require a great physical mobilization of producers, the number of crop may be increased to two (02) or three (03) agricultural seasons per year according to producers.

Within the framework of this analysis on the sustainability of the project activities or the financial ability of groups to ensure the replacement of production equipment including the irrigation system, the solar pump and the solar field, it was considered the increase of a crop year. The added value of the production was calculated considering that on average the producers realize a net profit of 5.12 million FCFA[19] per ha per crop year.

On the basis of data received from the Ministry, the average profit of a group on a 5ha unit after two campaigns per year would be 51.2 million FCFA for crops mentioned above.

[18]The validity of this comparison does not apply beyond the depth limit (7 meters) of the motor pump pumping.
[19] The average was calculated by considering the five crops for which the information on the operating accounts were available

This margin will be of 256 million FCFA for 5 ha in 5 years. With these margins, any group could easily replace its Drip system piping system which costs 25, 730,450 FCFA every 5 years and its electric pump which costs 7.5 million FCFA every 10 years.
It is therefore important that the beneficiaries strictly follow the advice of the technicians of agriculture and rural engineering that will be involved in the project to ensure by themselves the sustainability of their exploitation.

D. Show how the project / program meets the national and local sustainable development strategies, including, if appropriate, national and local development plans, strategies for poverty reduction, national communications, action programs for adaptation to climate change or other instrument, if any

This project of strengthening resilience of agriculture to climate change to support food security in Niger, through modern irrigation techniques falls within the framework of policies, strategies, development programs and plans related to the fight against food insecurity, the fight against poverty, the development of the agricultural sector in general and small irrigation sub-sector in particular.

The document on "Guiding principles of Rural Development Policy for Niger" adopted by Ordinance No. 92-030 of July 8, 1992. The five priorities of the new guidelines in this document are the management of natural resources, the organization of the rural world, the empowerment of the people combined with the changing role of the state, food security, intensification and diversification of production and financing of rural world.

"The National Food Security Full Program", 1992, which objectives are: adequate availability of food in quantity and quality, supply stability and access guaranteed for all to basic foods.

- *"The Economic Recovery Programme (PRE)" adopted by Law No. 97-024 of July 8, 1997, the recovery of the agricultural sector as a key driver of economic growth figure, with the fight against poverty, in the number of the two priorities Priority Actions Programme.*

"Economic Growth Strategy and the Fight against Poverty" developed in 1998 defines the operational measures to be considered on the basis of the broad guidelines of the Rural Sector Recovery Programme within the framework of sustainable growth of Agriculture. These measures affect both institutional aspects as the strategies to implement. The main proposed institutional measures are:

- The creation of a single government department responsible for the issue of rural development,
- The decentralization of the administration of the rural sector with increased responsibilities and means of action as well as a transfer of skilled human resources;
- The redefinition of the roles of the various ministries involved in rural development issues on enforcement and monitoring and evaluation of programs and projects;
- The regular and adequate funding for agricultural research, extension and training

In early 2001, Niger has launched the process of developing a Poverty Reduction Strategy (SRP), based on a participatory and iterative approach. This strategy was adopted in January 2002 by the Government of Niger and is supported by all of its development partners. It provides a unifying framework for all sectoral policies at national level and the single reference document regarding economic and social development. However, the evaluations of programs and projects implemented in the sector, however, show a lack of efficiency and significant gaps in the distribution of roles between public and private actors and coordination between the State of Niger and its development partners and between the latters. To address these concerns, Niger has initiated the development of a Rural Development Strategy (RDS), to give operational content to the PRS in this sector.

- "Rural Development Strategy" adopted by Decree No. 2003-310 / PRN / MRA of 14 November 2003, aims at establishing a framework and ensuring consistency for all interventions in the field of rural development through a participatory, progressive and iterative process involving administration officials, representatives of producer organizations and the private sector, NGOs and development partners. The overall objective of this SDR is to reduce the incidence of rural poverty from 66% to 52% by 2015, creating the conditions for sustainable development guaranteeing food security of the population and sustainable management of natural resources.

- The SDR is reinforced by the National Strategy for Development of Irrigation and Water Runoff Collection (SNDI/CER) validated in June 2005. The overall objective of thie SNDI/CER is to contribute to the reduction of the impact of rural poverty by improving the contribution of irrigated agriculture in accordance with the guidelines of the SDR.

In addition to all these strategies, Niger has adopted a National Strategy for Microfinance.

Initiative 3 N for Food and Nutrition Security and Sustainable Agricultural Development: The project is in line with the objectives of the Initiative 'the Nigeriens nourish the Nigeriens' 3N Initiative, which aims at strengthening national food production capacities, supply and resilience to food crises and disasters. Axis 1 of the I3N which constitutes the backbone of irrigated agriculture, in general, and small-scale irrigation, in particular. It encourages the investment of substantial resources for: (i) the rehabilitation and construction of large and small irrigation schemes, collective and individual, with total or partial control of water for rice cultivation, horticulture and fodder production also along the Niger River, the dallols, of Goulbis and Koramas and in the great plains of the Irhazer, oasis and oasis basins; (ii) the widespread use of techniques and technologies, innovative and adapted to the ecological and socio-economic realities of Niger through direct and consistent support to farms, particularly in areas where ecological conditions are favorable and loans actors invest in the development of food and commercial sectors[20]

The Strategy of Small Irrigation of Niger: The project is rooted in the Strategy of Small Scale Irrigation of Niger (SPIN), adopted in April 2015, which represents the unique setting of harmonization and programmer of small irrigation sub-sector grouping all the actions in response to expressions of demand of strengthening the productive device of farmers[21].

So, the project wants to contribute to sustainable food security by strengthening the resilience of agriculture to climate change in Niger, through the promotion of innovative irrigation techniques.

In these areas of intervention, the SPIN covers all activities relating to the development of small-scale irrigation in Niger ie the facilities, the upstream and downstream of production support. Also, this project operates, through these various components on the development and irrigated perimeters confortation, support for farmers through a farmer advisory support and capacity building of actors of Small Irrigation in Niger.

In terms of results, the project will help achieve specific impacts 1 and 2 of SPIN that are: (i) ES1: The resources of land and water are sustainably managed for small-scale irrigation; (Ii) ES2: Irrigators highlight the irrigation potential optimally.

Sustainable Development Strategy and Inclusive Growth (SDDCI) 2035 Vision: The strategy promoted by the Ministry of Planning, Land Management and Community Development has launched a forward thinking leading to: (i) build a knowledge base on changing economic, social and cultural dynamics; (ii) encourage the participation of development actors to analyze and change policies; and (iii) define a strategy and action plan in the short, medium and long terms. The project, through the implementation of

20See annex 1, an extract of the I3N
21See annex 2, an extract of the I3N

innovative technology and by encouraging the participation of grassroots communities and other stakeholders in the development of small-scale irrigation, is therefore part of this strategy.

The National Action Plan for Climate Change Adaptation (PANA) was developed in the implementation framework of the UN Framework Convention on Climate Change (UNFCCC) that Niger has signed and ratified respectively 11 June 1992 and 25 July 1995. The PANA development objective is to contribute to mitigate the adverse impacts of climate change on the most vulnerable populations in the context of sustainable development and fight against poverty in Niger.

The PANA has priority activities to be undertaken for agriculture and water resources to meet the needs and urgent and immediate concern for the adaptation of populations to the adverse impacts of climate change. The sensitivity of surface water and groundwater to climate variability has been shown on some rivers and aquifers of the country where small-scale irrigation is practiced.

Of the 20 relevant adaptation options for adaptation provided in the PANA, many are related to the development of irrigation, in general, and small-scale irrigation, in particular, including diversification and intensification of irrigated crops (Form N 4). In addition to the development of solar technology to replace the use of fossil fuels emitting greenhouse gases (GHG) and the irrigation technique of Drip system or California water saving network, the project contributes to the achievement of the objective of PANA.

E. Describe how the project / program meets relevant national technical standards, where appropriate, such as environmental assessment standards, building codes, etc., and complies with environmental and social policy of the Adaptation Fund

The National technical standards required by the Government of Niger, including environmental impact studies, laws and regulations related to water, land management as well as guidelines for the agriculture and irrigation codes have been taken into account.

The National technical standards required by the Government of Niger, including environmental impact studies, laws and regulations related to water, land management as well as guidelines for the agriculture and irrigation codes have been taken into account.

In compliance with these particular environmental standards, an Environmental and Social Management Framework (ESMF) and pests and pesticides management Plan (PPMP) were developed in accordance with the law under the environment, adopted December 29, 1998 which establishes the general legal framework and basic principles for the management of the Environment in Niger. Both studies identified the impacts and the environmental and social risks of the project and resulted in the proposal of mitigation measures.

In addition, any proposal in which BOAD participates for financing is evaluated technically and environmentally, before any approval. Thus, during the evaluation, experts and stakeholders ensure that the project was designed to the standard required at national, BOAD and international level.

The ESMF and PPMP were designed according to the requirements of safeguard of environmental and social standards as well as the integration of gender policy of the West African Development Bank and the environmental and social policy of the Adaptation Fund.

The tender documents for the acquisition of the plates and solar pumps require equipment manufactured according to the best international standards.

However, solar equipment to be purchased under the project will be ordered from suppliers recognized internationally and whose products have been approved and compliant with standards.

F. Indicate whether the project / program is already financed by other sources

To date, tree major programs in the field of building climate resilience of the population in order to increase food security are ongoing in the country namely:

- Community Action for Climate Resilience Project (CAPCR), approved in November 2011, with the objective to improve the resilience of populations and production systems to climate change, in order to increase national food security and
- PROMOVARE , approved in September 2012, by the ADB
- UNDP/GEF project "Building Climate-Resilience and Adaptive Capacity in the Agricultural Sector of Niger, approved in 2009

This project does not overlap with these. The project will be implemented in different sites under the supervision of the Ministry of Agriculture and Livestock, which will provide strategic coordination of all ongoing activities related to irrigation, in order to avoid duplication, but simply to support the synergy and complementarities between all activities in the selected areas.

So, these projects may have synergy with the present project. They have the common goal of improving the resilience of people and agricultural production systems to climate variability and climate change. The activities take place in different localities. Ultimately, all these projects are complementary.

Table 17: Synergies with other initiatives

	Possible synergies with Promovare of ADB, CAPCR of the World Bank and Building Climate-Resilience and Adaptive Capacity in the Agricultural Sector of Niger of UNDP/GEF			
AF Project activities	Improvement of technical and institutional capacity of stakeholders	Development of irrigated areas	Support for diversification of livelihoods and improvement of farmers' income	Project management
Improvement of capacities of decentralized technical services for the analysis of the effects of climate change on food security and support to the activities of rural poor people	X			
Strengthening community capacity to learn and adopt agricultural practices and modern irrigation techniques to climate change.	X		X	X
Replication of the lessons learned from the project at the national level and their dissemination worldwide	X			
Strengthening of the sustainable management of water resources and soil conservation		X		X
Reduction of energy costs for irrigation through the promotion of solar photovoltaic system				

Improvement of the income of farmers through better conservation of agricultural products and improving nutrition			X	X

In fact, according to the management strategy, the potential beneficiaries have to submit their projects to Selection Committee of municipal projects. It is the local committee that sends the selected projects to the national coordination structure. When beneficiaries of this project will be in the same area with the World Bank and those of ADB financing, they follow the same procedures to avoid duplication. The discrimination criteria will provide eligible projects to the adaptation fund. For example, these criteria might be the high cost paid by the beneficiary water drawing, the recipient's failure to buy fuel to ensure the cost of water drawing, irregularity in the availability of fuel for petrol pumps. In this case, the coordination unit of this project can control the complementarities of the proposed project prior to financing.

G. *Where appropriate, indicate whether the project includes a training component and knowledge management to take stock of lessons learned and reapply them.*

The project includes a training component and knowledge management (see 1.4 Impact of Component 1). This component aims at strengthening the capacities of actors and learning activities of the type Workshop/training exchanges and sharing of experience on farming techniques, programming of production, farm management, market research, processing of products and by-products. Besides monitoring evaluation and capitalization activities are planned under the implementation of the project. Replication of good practice makes no doubt given the many advantages under review and the income procured to direct beneficiaries. Indeed, a similar operation was conducted in Senegal in the Matam region funded by BOAD and it is subject to replication in the area at level of private. In addition, it will be subject to a widespread dissemination through a national-scale program in active instruction at BOAD for its evaluation.

The project (PRRA-CC) monitoring and evaluation system will contribute significantly to technology performance management and traceability of transactions that have achieved the outcomes and decisions useful to action.

The results (outputs, outcomes and impacts) and lessons learned from the implementation are: i) capitalized and archived electronically and physically in a documentation center and ii) shared/disseminated in various forms adapted to different target audiences (maps, technical notes , movies, sharing workshops, study reports, website, open door days, research papers.

All communication material on the project will bear the logo of Niger, BOAD and the adaptation fund.

H. Describe the consultation process, including the list of stakeholders consulted during the preparation of the project, with particular reference to vulnerable groups, including gender considerations, in accordance with the environmental and social policy of the Adaptation Fund

Public consultation during the preparation of the project, were conducted in accordance with the requirements of the Adaptation Fund and those of the BOAD (see in appendix 7 a part of the list of people consulted).

The main objective of this approach of information, communication and participation of stakeholders was to create a climate of mutually beneficial exchanges, favorable to an open dialogue with the aim of: (i) ownership of the project by beneficiaries at the stage of preparation and planning; (ii) the consideration of

the concerns of all stakeholders including vulnerable populations (women, youth, children, etc.) in the design and implementation of the project; (iii) exchanges on financing and project sustainability; (iv) identification of environmental and social impacts and risks and appropriate mitigation, compensation and environmental and social cooperation

The study was conducted based on a participative methodological approach which based, firstly, on field trips, and partly on interviews with all stakeholders and beneficiaries of the project. These include: local politicians, administrative authorities, technical services, local communities, etc. (see list of people met in Annex 7). These public consultations were held in the regions covered by the project (Tillaberi, Niamey, Dosso, Tahoua and Agadez).

During these series of consultations, the gender element was very present. Given that in Niger, women and children are generally regarded as vulnerable groups. The public consultation has particularly targeted female or mixed producer groups.

As well, interviews were conducted with female producer groups in different areas of intervention to incorporate their concerns into the design and implementation of the project. Annex 7 reflects a broad consultation of women's groups and mixed groups.

The two examples of following municipalities show the consideration of gender in the series of public consultation

Table 18: Example of the municipalities of Dogon kiria and Loga demonstrating taking account of its kind in the public consultation

Municipalities	Name of group	Number of mem	Number of women	Total members
Dogon kiria	Zaman Lahia	01	29	30
	Nassara	08	35	43
	Dadin Zutchia	00	27	27
	Talabanni	00	25	25
	Mutachi da Kamu	12	09	21
	Maraba Da Kiria	00	25	25
	Niya Tourka	00	17	17
Loga	Kandé Gomni	00	10	10
	Amana	00	10	10
	Wadata	00	15	15
	Tangani	08	13	21
	Yneyijéy2	0	15	15
	Soudji	00	20	20
	Farha	00	21	21
Total of the two municipalities	14 producers groups	29	263	292

In the municipality of Dogon kirina, over 7 producer groups consulted, there are four (04) women's groups and three (03) mixed groups the majority of women. In these 7 groups (female and mixed), 188 producers were consulted including 167 women (or 88.83%) and 21 men (or 11.17%). In the municipality of Loga over also 7 producer groups consulted, 6 groups are female and 1 group is mixed. These 7 groups gather 104 producers including 96 women or approximately 92.3% (see annex 7a for details).

At the level of decision-making including during the meetings of consultation of administrative officials in the various areas of intervention, women took part and producer groups were represented (see annex 7b.)

A literature review was conducted. Interviews with resource persons working in different ministries and structures involved as well as manufacturers and sellers of solar and irrigation equipment in the country were made. Field visits (potential sites and sites in exploitation) and interviews with the beneficiaries of perimeters in exploitation were made. This helped to establish in a participatory manner the context of project development, problems to solve, the types of adapted solutions, etc. and the consideration of the problems of vulnerable populations.
For what concerns, particular, the consultation of the beneficiary public on the field, a two-step approach was adopted:

Step 1: Information on content of the project: In the first stage, beneficiaries were widely informed on the objectives and activities of the project. These meetings were conducted in each area of intervention of the project by representatives of technical services (agriculture, environment, rural engineering, hydraulics, Easements, regional representations of Agriculture rooms and representatives of farmers' organizations, etc.) and representatives of local authorities (municipalities).

Step 2: During the second stage of consultation, sessions with stakeholders were organized at local level. Thus, public meetings with local communities were organized in some major centers of groups. The approach in these consultations was also to: (i) present the project (rationale, objectives, planned activities, expected outcomes of the project, (ii) collect the views, concerns and suggestions made by beneficiaries. the animation technique used has allowed to orient the discussions towards the expression of expectations and concerns that the proposed activities could eventually raise.

It is through this approach that the concerns and expectations of the people interviewed, have mainly concerned: the difficulty in water supply, pest attacks, silting and flooding of irrigated areas by watershed, deepening tablecloths, the appearance of certain diseases due to phytosanitary treatment (use of unlicensed products such as DDT and "pia pia"), contamination of groundwater with the use of fertilizers, lack of access routes for the flow of market garden products. The responses of these concerns, in the proposal, have been given to the public consulted (see table below).

Table 19: Taken into account the concerns raised by producers during the public consultation series

Concerns raised by people in the public consultation	Steps taken or planned under the project
Difficulty in water supply and Deepening tablecloths	The project is dimensioned so as to facilitate access to irrigation water and rational management of it. The project has provided the drilling and setting up a Drip system or Californian network, two system effective and efficient in irrigation. Each unit of 5 ha will be equipped with a kit, consisting of a borehole, a photovoltaic solar field for drainage, a Drip system or California network.
Silting and flooding of irrigated areas by watershed	The project has planned in its component 2 including Output 2.1.2 the promotion of agroforestry and the haie-vive, a system that not only improves the soil but limit erosion and flooding by facilitating the infiltration
Pest attacks and appearance of certain diseases due to phytosanitary treatment (use of unlicensed products such as DDT and "pia pia"),	To combat pests and ensure better use of pesticides, Pests and Pesticides Management Plan (PPMP) was developed in the context of the preparation of the proposal. This plan is designed to reduce, at least, potential adverse impacts of the use of pesticides on human health and the environment and promote the adoption of environmentally friendly integrated pest control methods. Sensitization and development of good practice sheets are provided in the pest and pesticide management Plan for better used of the pesticides during its life cycle.
Contamination of groundwater with the use of fertilizers	To reduce or eliminate the impacts to the use unchecked fertilizer as a source of pollution of groundwater and surface waters, an Environmental and social management framework (ESMF) and Pest and Pesticides Management Plan (PPMP) mentioned above, were developed. These plans proposes the mitigation measures for the impacts of the project of which the contamination of groundwater.
Lack of access routes for the flow of market garden products.	In its 3 component, the project provides for purchase of donkeys, oxen or camels for transport to a powerful group would be isolated from well-made transportation routes and where the group will make the request.

Public consultations were carried out in 21 towns throughout the project intervention areas. The following pictures illustrate these public consultations. The following images illustrate the presence of women in the consultations.

Public consultation in Agadez region

Public consultation in Tillabery region

Three workshops were organized to enable stakeholders of the project, at national, regional, departmental, municipal and local levels, to ensure the consideration of their concerns in feasibility studies, environmental and social impact assessment, pest and pesticide management.

In accordance with Niger law, the requirements of BOAD and the Adaptation Fund, all economic, social, environmental research reports and BOAD policy will be made available through appropriate channels for consultation at any time by stakeholders who wish it.

Validation workshop of Environmental and Social Management Framework.

Validation workshop of Pests and Pesticides Management Plan

Validation workshop of the Full project

During the preparation of the project, the series of public consultations were held at the departments and villages' level and their concerns were taken into account in the development of the Full Project as well as in other documents of the project. Several groups were consulted which the majority are the women's groups as well as young people.

Validation workshops of documents including, environmental and social management framework (ESMF), pest and pesticide management Plan (PPMP) and the Full Project, were technical workshops seeking the expertise of technical services of the various ministries and civil society. These workshops brought together representatives of the project intervention areas, representatives of local elected authorities, representatives of Universities and agricultural research, technical services (Genie rural, hydraulics, Environment, Forest, Agriculture, Finance, Plants protection, hydro-agricultural landscaping, Rural conflicts management, Rural land management …) the representatives of National council of sustainable development, representatives of ESIA office, etc. In total, 65 various representatives took part in the workshops.

Microfinance Institutions have not participated in the technical validation workshops. Indeed, in the submission of the PCN to Adaptation Fund in 2012, the acquisition of equipment for irrigation by beneficiaries should be made by their own means. With the adoption in April 2015 of the Small scale Irrigation Strategy of Niger (SPIN), the acquisition of irrigation facilities is granted up to 100% by the State for vulnerable populations and women. Thus, the acquisition of equipment will no longer be borne by beneficiaries. The intervention of microfinance Institutions is not necessarily required as described in the context of the Concept Note.

I. Justify the amount of funding requested, based on the full cost of the adaptation.

Faced with climate uncertainty and fragility of ecosystems that characterize Niger, irrigation and crop improvement through the use of rainwater collection techniques appear to be the most important factors to throw the foundations for economic and social development.

The mobilization and control of water to meet the needs of irrigation and livestock become an imperative in order to improve food security and incomes of the population. The government recognizes that the development of the country depends largely on its ability to better manage all of its natural resources, by promoting a more global approach, more oriented towards the stakeholders, particularly in rural areas.

"The vision of Niger on the development of irrigation is to increase the contribution of irrigation to agriculture GDP to 28% in 2015 and thus contribute to the agenda of the country's food security. This calls for the expansion of irrigation infrastructure with the possibility of introducing public-private partnership in the development of the management.

Different studies of runoff water mobilization in several regions (Dosso, Tillabery, Diffa, Maradi, Zinder, Tahoua, etc.) highlighted a potential term, but under-exploited in terms of ground and surface flow and have proposed to improve these waters by promoting the creation of new hydro-agricultural infrastructure (wells, boreholes, irrigation of vegetable gardens, etc.).

However, in such a country as energy dependency, the operation expenses related to the development of water are very important (up to 60% of revenues are for energy supply). Indeed, the cost of establishing water remains too high for poor farmers, and is therefore an important factor restricting the development of irrigation.

Baseline situation

Without the proposed project, a key priority of the Government in its efforts to support food security will not be achieved in targeted areas. Unsustainable coping strategies will continue and migration to urban areas too. The economic opportunities will be lost. More people will permanently leave the area. Indeed, the current situation is characterized by, among others: recurrent droughts; high dependence on rainfall agriculture and livestock; vulnerability of production systems to climate-related risks; rapid growth of the population (nearly annual rate of 3.9%), which followed with a strong pressure on the environment; weakness of structures and specialized agencies; and forest degradation continues due to the energy needs of the population.

While on average food production meets 85% of domestic needs, almost half of the population is estimated to suffer from chronic food insecurity, and in drought period the country is heavily dependent on food aid, and there are hunger hotspots. Over 50% of the population is food insecure, with 22% of the population living in extreme chronically food insecurity.

Poor households, especially those headed by women, are most exposed to shocks and seasonal variations in production, in response to which they often resort to negative coping mechanisms such as selling livestock and premature seeds. Consequently, their vulnerability to future food insecurity increases.

In response to this situation of chronic food insecurity, the governments that have succeeded have developed a number of policies and strategies of which the lasts are: the strategic framework of the 3N Initiative and the Small scale Irrigation Strategy of Niger[22] (SPIN). Through the 3N Initiative, the authorities of the 7th Republic have the ambition to fight against chronic food insecurity. In the program one of the first axis is the growth and diversification of production. One of the government's priorities is

[22] Stratégie de la Petite Irrigation du Niger (SPIN)

the intensification and diversification of agricultural activities by providing rural farmers, the infrastructure needed to increase the level of production and incomes of the farming population with irrigation as a pillar. The objective is to increase the contribution of irrigated agriculture to the national agricultural production by 20% at present to 30% in 2015, the augmentation of areas and yields. To this end, it is planned to develop all forms of water management to bring the area under irrigation from 85,000 ha to 125,000 ha in 2015.In this context, it was noted that the current initiatives in the country cannot alone cover priority needs. According to the strategic framework "3N Initiative" (2012-2015), the estimated costs of subprograms and SPO2 SPO3 dedicated to creating and developing new areas of irrigated land and development of the family of the small-scale irrigation, individual or collective are estimated respectively at about $ 180 million and $ 400 million, a total of USD 580 million. However the budgets of ongoing initiatives in the country, including the Promovare funded by the African Development Bank and the World Bank CAPCR are estimated at $ 28 million and $ 63 million, totaling USD 91 million (only 16% of needs).

To scale up the efforts of the government, the Small scale Irrigation Strategy of Niger (SPIN) predicts to boost the irrigation sub-sector with an increase of 5 600 ha of irrigated perimeters annually.

Alternative adaptation solution

This project is part of: (i) the 3N initiative under its SP1 strategic program "growth and diversification of agrosylvo-pastoral production and fishing", which aims to promote a more holistic approach more oriented towards stakeholders, particularly in rural areas in support of food security in Niger; (ii) the specific effects of the SPIN namely ES1: Land and water resources are managed in a sustainable way for small-scale irrigation ES2: the irrigators highlight potential irrigable optimally. Moreover, the NAPA, in its priority actions, identifies irrigated agriculture as a sub-sector to be promoted.

In this context, the promotion of Drip system irrigation consumes little water, the amount of water required for cultivation (component 2.1) is adapted to limit the stress on the groundwater recharge which is problematic of climate change resulting from reduced rainfall and poor distribution in time and space.

The diversification of energy sources that promotes solar energy (2.2 component) is a guarantee for the operation of all the developed regions and solves the thorny problem of fuel acquisition major, obstacle to optimal use of developed areas. The use of this energy source anticipates the risk of areas of non-exploited perimeters due to hardly controllable fluctuations of prices of petroleum products. Solar energy is adapted for a continuous operation of the pumping equipment.

The supervision and close monitoring to establish institutional support and technical training and dissemination of technical packages (part 1) are all actions that contribute to the proper management of facilities to achieve the best results.

Delineation of protection areas of reforested basins, perimeter protection through the fence reinforced with forest species, micro-finance and income-generating activities. (Part 3) are all actions that contribute to sustainability of the project.

J. Describe how the sustainability of results of the project / program has been taken into account in the design of the project / program.

The project sustainability is based on the strong involvement of national stakeholders (ministries, civil society, private sector and beneficiaries) at all stages of its design. Its implementation involves the participation of central and regional departments, community organizations, beneficiaries, NGOs and the private sector. Each actor will contribute to a participatory approach where all activities will be conducted in close consultation with the beneficiaries. In this context, capacity building actions through technical and management training, coaching of beneficiaries and structuring of farmer organizations will be conducted by the project through technical services and specialized NGOs.

So, overall the sustainability of the project depends on the successful implementation of sustainability measures put forward by the project: (i) institutional support of beneficiaries by technical services and NGOs (ii) organizational, technical and management capacity building to beneficiary organizations before and during the achievements of the actions, (iii) training of rural planning in order to monitor the developments made (iv) the extension of the promotion of technologies (v) extension of products stored in dried form, (vi) microfinance and (vii) income-generating activities.

The sustainability of the expected results of the project is ensured by: i) the effective partnership with the local public institutions, rural civil society organizations (PO, etc.) and the private sector in the design and implementation of activities, ii) the insurance of economic and financial profitability of the equipment installed through the financed sub-projects.

K. Provide an overview of the environmental and social impacts and risks identified as relevant to the project / program.

Checklist of social and environmental principles	No further assessment required for compliance	The impacts and potential risks- further assessment and management needed for compliance
Compliance with the law	Project activities do not contravene any law in force in Niger or policies or guidelines for financial institutions. The project has complied with the country's legal framework for environmental protection and health of the population. The project was the subject of an environmental and social impact assessment after a screening process which classified it as Category B of BOAD projects. All operational policies triggered by the project were considered. Thus, an Environmental and Social Management Framework (ESMF) and a Management Plan of Pests and Pesticides (PPMP) were developed.	None
Access and Equity	The project in its intervention logic provides for a fair and equitable access for beneficiaries of the target areas in terms of means of production, including solar equipment, pumps, pipe lines of irrigation water, etc. Indeed, the project plans units of 5 hectares. Each unit will have a lot of production equipment called solar kit. The project will ensure that all facilities provided are consistent with national and international standards required and are adapted to each production area. Efforts are expected to make the project inclusive. Eligibility criteria are clear and transparent, are defined in concert with all stakeholders through public consultation and small irrigation strategy. The criteria for selection of project intervention areas are: (i) the difficulty of access to water in the area; (ii) vulnerability in terms of biophysical and climate risks; (iii) the experience in irrigation; (iv) the possibility of synergy	Very weak

	and complementarity with other projects. The eligibility criteria of development applications of beneficiaries are defined by small irrigation strategy. The 'normal' demand of a farmer shall contain the following two key elements that constitute the eligibility criteria: (i) a commitment to participation in the investment and maintenance of future development (works and equipment of irrigation); (ii) a guarantee of land space in which the investment is requested. The applicant must provide a land certificate issued by a competent authority exclusively COFO or lands service. The planning and implementation will therefore be participatory to ensure equal voice to all. The project activities target the vulnerable groups dependent on agriculture in the various selected areas. In this context, all producer groups which request it therefore has an equal opportunity to benefit from adaptation activities proposed by the project. This is also to ensure access to the project by all groups including vulnerable that the project foresees that farmers are formed into groups to gather all the assets to support their selection. The project also plans to put in place a communication system so that all groups of productions are informed of the project and its benefits. In addition, the project will undertake, to the extent possible, an evaluation of access and equity for vulnerable groups during the implementation phase by consultation means with communities. The project wants to implement units of 5 hectares and each unit will be equipped with a kit including a borehole, a photovoltaic solar field for the pumping, a drip system or California network. In principle, all these equipment are installed inside the 5 ha usable by the beneficiaries. They should therefore not impede access of other populations to natural resources. However, when these cases will be recorded on certain areas to exploit, the beneficiaries, according to the recommendations of the Environmental and Social Management Framework, will submit f environmental and social impact assessment report to the ESIA Office of Niger and to BOAD for a compliance review of their project to the national regulations in force, standards of environmental and social safeguard of BOAD and environmental and social principles of the Adaptation Fund.	
Marginalized and vulnerable groups	The project will have no negative impact on marginalized and / or vulnerable groups. Instead, the project will have significant positive impacts on these	None

	groups. Indeed, the project focuses on marginalized and vulnerable groups to improve their productivity and, then, improve their living conditions. The project as such, will have no negative impact on other marginalized and vulnerable groups. Within the framework of project, it is proposed to strengthen the irrigation system, to diversify agricultural production and reduce the vulnerability of farmers to the impacts of climate change. With this approach, the project will ensure better adaptation to changing climatic conditions without compromising on production and productivity. The activities will help create long-term assets for these groups. The project activities will also help to create livelihoods and incomes for farmers, including marginalized and vulnerable groups such as women, children, and etc. The project targets marginalized and vulnerable groups. Reason why subsidizing irrigation equipment is 100% in accordance with the small irrigation strategy in Niger. The selection criteria will be prepared and made available to the sub-project selection committee. These criteria take into account the vulnerable and marginalized groups, women and youth. In all cases, reports of environmental and social impact assessment to be submitted for review as part of the selection of sub-projects must comply with national regulations in force, environmental and social safeguard standards of BOAD and environmental and social principles of the Adaptation Fund.	
Human rights	Project interventions will not affect the freedom of people in the project areas. The project does not include any activity going against the traditions and customs of intervention areas. The project confirms the fundamental rights of intervention areas and target groups. The project does not violate fundamental rights of beneficiaries or non-beneficiaries. The entire development and implementation process is participatory and voluntary.	None
Gender equality and empowerment of women	Within the framework of the implementation of the project, activities are planned so that women can benefit directly from project benefits. The project proposes to support women to develop sustainable income generating activities and improve thereby their living conditions in the sense of empowerment. The project implementation will reduce the physical contribution of farmers and will allow saving time. This will free women who are always involved in these activities and enable them to undertake other economic activities. They will be encouraged in the implementation of the project through incentive measures.	Very weak

	Indeed, the project target population is, directly, the population of 200 villages considered in the project intervention sites. Indirectly, the population of the municipalities taken into account will benefit from the dynamic created by the various activities. Approximately 2.9 million people (49.6% men, 50.4% women with 18% of young people between 15 and 24 years), or 415,000 households are impacted by the implementation of the project. As the number of women is higher than that of men, women will benefit more of the project. The criteria for selection of the sub-project will be prepared by the Project management unit (PMU), and made available to selection committee. These criteria will take into account vulnerable and marginalized groups. The Niger population is approximately 50.6% of women[23]. In the definition of the selection criteria, the project management unit will ensure that at least 51% of the direct beneficiaries of the project are women. To do this, in the development of selection criteria, a bonus of 20 points will be reserved for women and young people in the projects submitted. A bonus of 11 points will be reserved for projects submitted by the groups having women inside. The 11 points are distributed as follows: - Up to 10% of women in a group: two (02) bonus points; - Up to 20% of women in a group: four (04) bonus points; - Up to 30% of women in a group: six (06) bonus points; - Up to 40% of women in a group: eight (08) bonus points; - Up to 50% of women in a group: ten (10) bonus points; - Over 50% of women in a group: eleven (11) bonus points. Given that some equipment of solar kits that will be diffused may have a service life of 35 years, groups who will be in their midst a high rate of young men and women (between 18 and 35 years) will be encouraged. It will be therefore reserved bonus of 09 points to projects submitted by such groups. The 09 points are distributed as follows: - Up to 20% of young people in a group: one (01) point bonus; - Up to 30% of young people in a group: three (03)	

[23] Presentation of preliminary results of the fourth (4th) general census of population and housing **(RGP/H) 2012.**

	bonus points; - Up to 40% of young people in a group: five (05) bonus point; - Up to 50% of young people in a group: seven (07) bonus points; - Up to 60% of young people in a group: nine (09) bonus points.	
Fundamental labor rights	In terms of working conditions, the project will be implemented in compliance with the requirements of the Labour Code in force in Niger. The said code applies to all project sites. The groups ensure themselves the exploitation of their own plots. However, the project will ensure that the working conditions are met. The project will also ensure the elimination of the worst working conditions and all forms of forced labor of children. Each unit of 5 ha will have at least a shelter. The presence and access to first aid kit (first aid kit) will be available on each unit of 5 hectares. And each group or producer is free to join any association according to its/his aspirations. No religious discrimination is expected in the framework of the project.	Very weak

Indigenous Peoples	Niger regroups 8 regions which includes Agadez. The Agadez region which is in the project area is recognized as the Tuareg region. When preparing the project document, these populations were consulted. They are not, in fact, counted, in Niger, as minority or indigenous peoples.	None
Involuntary Resettlement	The project activities, which will be conducted only on the irrigated perimeters will not therefore affect the livelihoods. Instead, the project aims to improve access to resources and reduce their vulnerability to climate change. Among the selection criteria for the project intervention sites, will be included criteria such as the absence of a possibility or a probability of involuntary resettlement due to project activities, no land problem.	None
Protection of natural habitats	The project will work on the adoption of water-saving irrigation techniques and develop the use of renewable energy sources including solar. All project activities will be carried out on areas already in exploitation by farmers. Despite the beneficial impacts associated with the project implementation such as limiting water loss,	The risks and impacts on natural habitats are, among others : Disruption of dynamics of ecosystem involved (valleys, oases, and dallols Niger River

	pollution by greenhouse gases, etc. the fact remains that the project may cause negative impacts on the biophysical environment even if these impacts are of medium or low importance. An environmental and social assessment has proven to be necessary. The risks on natural habitats were considered in the impact assessment. Specific impacts will be assessed from the environmental and social impact assessments of subprojects.	Basin) with the destruction of plant species; The destruction of the habitat of small animals (reptiles, rodents and other small birds) with the development work and extension of the market gardens sites ; the destruction of some wildlife species not targeted with phytosanitary treatments ; The risk of contamination of groundwater (less profound aquifers in the dallols, river basin and Oasis), which will cause a deterioration in the quality of groundwater, with the use of fertilizers ; etc. The listed impacts are not additional impacts the project would create. These are impacts that result from agricultural practices recognized in Niger. However, to limit the impacts and risks on the flora and fauna of areas of intervention, an Environmental and Social Management Framework (ESMF) and pests and pesticides management Plan (PPMP) were developed (see document CGES and PPMP) of the project
Conservation of biological diversity	The project provided in the sub-component C.2.1, the activities of development of varieties of plants that are more resistant to the climate in order to improve the local agroforestry system. The main objective is to promote agricultural biodiversity, to maintain and revive various species with nutritional, anti-erosive and soil ameliorative character.	Weak

	To do this, intervention sites will be protected and agroforestry will be developed there. About 1500 hectares of which 1000 hectares of developed sites and 500 ha of immediate surroundings will be affected by the actions of protection and agro forestry. The envisaged actions are anti erosive treatments (cord stony, half-moons, thresholds and dry stone walls), planting trees of nutritional or medicinal value as moringa and composting for the restoration of soil fertility. These activities will be carried out by farmer groups with the support of relevant structures. Therefore, the project helps to promote biodiversity. It is noteworthy that the project will not introduce exotic or invasive species of crops in the intervention areas. In Niger we can distinguish the W Park and the Biosphere Aïr Ténéré which are part of the reserves of biosphere. The project does not intervene in the departments where the W Park and Aïr-ténéré Reserve are.	
Climate Change	It takes into account the resilience of family production model on short and long term through the emphasis on sustainability at the economic level (increase of production and, by then, of income), social (improvement of living conditions , nutrition, etc.), environmental and climate (natural resource management, implementation of agricultural practices that reduce the impact of climate change on the production system and vice versa, arrangements allowing secure access to the household water and energy). The replacement of pumps operational with fossil energy by solar pumps can reduce 60,825 $TCO2^{e}$-greenhouse gas on 25 years of life of the solar kit.	None
Pollution prevention and resource efficiency	Through the use of renewable energy as an energy source of pumping, replacing the pumps running on fossil fuels, the project contributes to reducing emissions of greenhouse gases and therefore to the fight against air pollution However, water resources will be exposed to various forms of pollution associated with the use of fertilizers and pesticides. For this, the manure will be promoted on sites developed through an incentive mechanism for composting through support to the realization of manure pits at each site. The project seeks to promote the drip system and the California network, two system efficient in irrigation.	To limit water pollution from pesticide use by farmers, a pest and pesticide management plan has been developed (see document of pests and pesticides management plan. This document prescribes measures of mitigation of water pollution risks and health risks associated with pesticide use and requires good practices to adopt during pesticide use cycle.

Public Health	With the use of renewable energy to replace pumps running on fossil fuels, the project limits diseases related to the inhalation of smoke from them. However, the use of pesticides may cause adverse effects to the health of producers and the entire population. It is to reduce these effects that a pest and pesticide management plan was developed. An Environmental and Social Management Framework was also developed to eliminate the impacts of damage to health and human security. On the other hand, the increased production and availability of consumer products will contribute to the improvement of the status of nutritional health of populations.	Weak
Physical and cultural heritage	No adverse impacts on physical and cultural heritage of the people in the intervention areas were identified. A public consultation was conducted in the project areas. The project does not foresee the introduction of new forms of agricultural practices beyond the borders of the intervention areas. Moreover, most project activities will occur on perimeters in exploitation. The chances of damage to physical assets is very low. However, incidental findings are not excluded in the implementation of the project. In the project intervention departments, there are no tourist attractions or cultural heritage. However, these issues can be addressed if any site will be affected according to national procedures, the principles of the Adaptation Fund and the safeguard standards of BOAD.	Very weak
Lands and soil conservation	The project will have a positive impact on the landscape of the area of intervention through the establishment of agro forestry system and planting of commercial trees in nearby sites. As mentioned above, about 1500 hectares including 1000 hectares of developed sites and 500 ha of immediate surroundings will be affected by soil protection actions and agro forestry. The envisaged actions are anti erosive treatments (cord stony, half-moons, thresholds and dry stone walls), planting of tree species of nutritional or medicinal use and composting to restore soil fertility. These actions should help to limit the site silting, delay or change the dynamics of water erosion that may threaten sites.	Very weak

PART III: IMPLEMENTATION MODALITIES

A. Describe the implementation modalities of the project/program.

APPROACH OF THE PROJECT

The Project will intervene mainly on the promotion of small-scale irrigation.

The project's approach is based on the strategy guidelines of Small Irrigation in Niger adopted by the Government April 10, 2015. One of the principles is that any intervention is conditioned by a request of the farmer (individual or group) on the basis of a principle of participation (financial and/or physical) to the investment. Thus, the project proposes to provide producers of innovative irrigation facilities (drop by drop, other networks, solar). As the project is a pilot phase, all facilities corresponding to innovative irrigation systems is fully funded and in accordance with the action plan of SPIN at the specific impact 2.

The applications must contain the basic elements defined by the SPIN. The planning and programming mechanism that will still be in detail in the code of funding will include, in principle, the following steps:

Step 1: Information and sensitization on the Project approach

This step is the process of dissemination of information on investment opportunities among target populations, the intervention strategy, and formulation of applications by operators, technical and administrative pre-validation (mayor and SAC or SPAC). Every year (for three years), two calls for proposals will be launched for communities which can be involves in the project to encourage them to propose projects.

Step 2: Montage des dossiers, formulation des demandes:

This step relates to (i) the studies and the elaboration of the technical file, (ii) the formulation of requests and (iii) their registration by the municipality (municipality visa) before their transmission to the Regional Secretariat of the SPIN (SR-SPIN). The technical studies are conducted by the producer Organisations or Peasant organization (PO), through their skills if they have or support-consulting services (SPAC). According to the SPIN, the SPAC are: Economic interest groups (GIE), groups of Service Council (GSC), the Non-governmental organizations (NGOs)[24].

The requests made with the support of the SPAC are centralized at the level of the regional secretariat of the small Irrigation. These applications must previously obtain the endorsement of the Mayor. In order to accelerate the process, applications will be sent directly together with the project file including the detailed draft project and financial analysis. The Project management unit (PMU) will take steps at the beginning of the project in order to supply by region and town, where possible, NGOs and other credible service providers which may provide efficient support to beneficiaries on time.

Step 3: technical analysis and approval of sub-projects

According to the SPIN, a regional technical committee constituted by the regional technical services related to the project (rural engineering, agriculture, livestock, water, land services, environment, the Office of Environmental assessment and ESIA (BEEEI[25]) etc.), the focal point of the Project, will be set up for technical analysis of sub-projects submitted by municipalities, based on predefined criteria in the canvas transmitted by the PMU.

[24] See Strategy of Small Irrigation Niger (SPIN) page 35.
[25] Bureau d'Evaluation Environnementale et des Etudes d'Impact (BEEEI).

Once reviewed, the files are sent for approval to the Regional Committee of Small scale irrigation (CR-PI). Indeed, according to the SPIN, the requests, following centralisation at the level of the regional secretariat of the SPIN, are examined, approved and prioritized by a technical Sub-Committee of the CR - PI[26]. On the basis of hierarchical requests and funds allocated, the regional programming is decided by CR - PI and transcribed in the regional programme Budgets (BP) before transmission to the CR-PI[27].

The validation of the requests by CR - PI allows project developers to access aid through a grants mechanism [28]

The project management unit (PMU), the municipalities, the regional technical committee set up for technical analysis of sub-projects submitted, the Regional Selection Committee set up for the sub-projects approval will ensure the inclusion of marginalized populations, women, young peoples in compliance with the criterion provided in the canvas transmitted by the PMU.

Selection of the sub-projects

The criteria for selection of the sub-project will be prepared by the Project management unit (PMU), and made available to selection committee. These criteria will take into account vulnerable and marginalized groups.

The Niger population is approximately 50.6% of women. In the definition of the selection criteria, the project management unit will ensure that at least 51% of the direct beneficiaries of the project are women. To do this, in the development of selection criteria, a bonus of 20 points will be reserved for women and young people in the projects submitted.

A bonus of 11 points will be reserved for projects submitted by the groups having women inside. The 11 points are distributed as follows:

- Up to 10% of women in a group: two (02) bonus points;
- Up to 20% of women in a group: four (04) bonus points;
- Up to 30% of women in a group: six (06) bonus points;
- Up to 40% of women in a group: eight (08) bonus points;
- Up to 50% of women in a group: ten (10) bonus points;
- Over 50% of women in a group: eleven (11) bonus points.

Given that some equipment of solar kits that will be diffused may have a service life of 35 years, groups who will be in their midst a high rate of young men and women (between 18 and 35 years) will be encouraged. It will be therefore reserved bonus of 09 points to projects submitted by such groups. The 09 points are distributed as follows:

- Up to 20% of young people in a group: one (01) point bonus;
- Up to 30% of young people in a group: three (03) bonus points;

[26] The Regional Committee of Small Irrigation (CR-PI) is formed by the Governor, the President of the Regional Council, the Regional Secretary of the SPIN The regional coordinator of the I3N, the Regional Director of Agricultural Engineering, the Regional Director of the Agriculture, The Regional Director for Water, the Regional Director of the Environment, the Regional Director of Livestock, the Regional Director of Plan, the regional representative of the Land Commission, representatives of unions of producers engaged in small-scale irrigation , coordinators of projects / programs involved in PI, the representative of the Regional Chamber of Agriculture, the representative of the actors of related activities. SPIN P.59

[27] The Regional Committee of Small Irrigation (CR-PI) is formed by the Governor, the President of the Regional Council, the Regional Secretary of the SPIN The regional coordinator of the I3N, the Regional Director of Agricultural Engineering, the Regional Director of the Agriculture, The Regional Director for Water, the Regional Director of the Environment, the Regional Director of Livestock, the Regional Director of Plan, the regional representative of the Land Commission, representatives of unions of producers engaged in small-scale irrigation , coordinators of projects / programs involved in PI, the representative of the Regional Chamber of Agriculture, the representative of the actors of related activities. SPIN P.59

[28] See Strategy of Small Irrigation of Niger (SPIN) P.60.

- Up to 40% of young people in a group: five (05) bonus point;
- Up to 50% of young people in a group: seven (07) bonus points;
- Up to 60% of young people in a group: nine (09) bonus points.

Step 4: launching process, by the PMU, of tender documents of business

This process involves the preparation of Tender Documents and their launching. Given the specificity of equipment, acquisitions and ordering of the installation, work will be done by the PMU in the name and on behalf of farmers. During this stage, the PMU will select, in accordance with the regulations in force in Niger and procedures of donors, companies for the acquisition of equipment, development work and accompanying infrastructure. To ensure the quality of work and guarantee the operation of equipment, two offices of consulting engineers will be recruited by the project respectively for the regions of Niamey, Dosso and Tillabery and Agadez and Tahoua.

Within the framework of the project, the irrigation equipment (Drip system kit, California network, solar panels and accessories), the tillage of land, the planting protection and monitoring and supervision of works are funded totally at 100 %. The fence and eventually the tank will be supported by the farmer. IGAs are also funded through cost-shared with the possibility of funding to 75%, the remaining 25%, if they are to be given in cash may come from a loan from microfinance institutions with the commitment and responsibility of the beneficiary.

Implementation of the Project.

The perimeters and hydraulic work arrangements will be performed by selected companies. The training will be provided by the competent technical services and/or by external service providers. The other operations (reforestation, IGA of women, institutional support) will be carried out by the Project Management Unit with, if necessary, the support of local technical services (water and forestry services, rural engineering, hydraulics in particular) on the basis of memoranda of understanding. Short-term loans will be made by financial institutions present in the area on their own resources, with, if necessary, the contribution of the beneficiaries of the project.

The investments, including the rehabilitated and developed areas, will be given to beneficiary organizations which will be organized for their operation with the support of competent technical consulting services for their care and maintenance. A network of craftsmen maintainers will be set up at each administrative area concerned in order to ensure the monitoring and maintenance of solar equipment.

Institutional arrangements

- ***Contracting authority and Promoter***

The contracting authority of the project is the Republic of Niger, represented by the Ministry of Agriculture. The PRRA-CC is under the supervision of the Ministry of Agriculture (MAG), as contracting authority of programs and sub-programs of the Economic and Social Development Plan (PDES) and 3N Initiative which are inserted in the project components. The Project management will be provided by the Project Management Unit equipped with autonomy of administrative and financial management. It will report directly to the General Directorate of Rural Engineering of the Ministry of Agriculture and will be based in Niamey.

- ***Organization of the Project***

Steering Committee of the Project

Created by decree of the Minister of Agriculture, the Steering Committee is responsible for the strategic direction, monitoring and supervision of the implementation of the project. It approves AWPBs and meets twice a year. It is chaired by the General Secretary of the Ministry of Agriculture and includes all stakeholders taking into account the key actors including:

- The Ministry of Agriculture (DEP / Ministry of Agriculture, the DGGR, the DGA and ONAHA),
- The Initiative 3 N High Commission,
- The Ministry of Planning and Community Development,
- The Ministry of the Environment,
- The Ministry of Finance,
- The Executive Secretariat of CNEDD,
- The Ministry of hydraulics,
- The Ministry of Livestock,
- The Ministry of Decentralization,
- A representative of the governorate and regional council by region,
- A representative of the Rural Code,
- A representative of RECA
- A representative of the umbrella organizations of farmers' organizations,
- A representative of the implementation entity (West African Development Bank - Observer).

A national technical planning workshop will be organized once a year, prior to the first session of the national steering Committee. This workshop will bring together all actors involved in the technical implementation of the project. The procedures manual will specify the relevant structures.

The NSC will serve as a space for debate on themes concerning the Project and interdepartmental coordination of project activities. It will review and approve the Manual of Procedures, schedules, progress and audit reports of the project.

Project Management Unit

The Ministry of Agriculture will set up a National Project Management Unit (PMU) based in Niamey. Under the authority of the Director of Lands management and Irrigation, the National Project Management Unit will be responsible for overall management, technical, financial and monitoring coordination. The PMU staff will include:

- A Coordinator (Engineer of irrigation Engineering and Agricultural Engineering,) put at disposal by the minister of agriculture
- Technical Coordinator Specialist in irrigation engineering and in Monitoring and Evaluation
- A Responsible for the Development of Rural Engineering specialist in agriculture and focal point of the Niamey Region;
- An Accountant, Specialist procurement;
- The support staff will be an expert accountant specialist in procurement, a secretary, three drivers, one messenger / courier, a laborer and two guards (night and day).

It will have logistics (1 a vehicle for the coordinator, 6 double cabin pick-up and 1 motorcycle) and offices and financial resources necessary for its operation. The unit of monitoring and evaluation of project activities will benefit from the assistance of an office recruited for this purpose at the start of the project for the establishment of monitoring and evaluation system. At the regional level, focal points will be appointed to ensure the planning, coordination and monitoring of project activities.

Regional Focal Points

To facilitate the implementation of the project in the regions, a focal point (Engineer Agricultural Engineering) by region, will be appointed by order of the Minister of Agriculture after a preselection on the basis of CV. Under the authority of the coordinator, the focal point will be responsible for planning and monitoring of the technical activities of the project in close collaboration with the General Directorate of Rural Engineering (DGGR) which is heavily involved in the implementation of the PRRA-CC process. To allow greater ownership of project activities, a framework agreement will be signed between the DGGR and the project in order to empower them in the project execution in the region. Further conventions of implementation of the main centers of project activities will be signed with other regional departments (agriculture, environment, etc.).

The focal point will have an equipped office with in the premises of the DRGR, an all-terrain vehicle double cabin pick up and computer equipment.

Specific institutional arrangement for environmental and social risks management

In the context of the implementation of the project and in accordance with national legislation, the environmental assessment office of Niger (BEEEI) is responsible for the monitoring of environmental and social issues. Thus, the BEEEI is involved in the selection of sub-projects in order to define the category of ESIA required based on the environment and social impacts and risks. Environmental and social impact assessment of sub-projects will be prepared by the beneficiaries and submitted to the BEEEI for review.

The implementation of mitigation measures will be monitored by the BEEEI on all the sites of the project. To do so, an agreement was signed between the BEEEI and the "Direction Générale du Genie Rural" (DGGR). The Article 8 of the agreement specifies the tasks of the BEEEI for the management of the Environmental and Social Management Framework (ESMF) and the Pest and Pesticides Management Plan (PPMP) issues related to the sub-project[29]. The details of the intervention of the BEEEI are attached to the agreement (See appendix 9).

Implementing Entity (BOAD) Specialized Technical Services

The implementing entity (BOAD) will give general management support and specialized technical support services to the project. The indicative services provided by the implementation entity (BOAD) are summarized in below:

Identification, Sourcing and Screening of Ideas:

- Provide information on substantive issues in adaptation associated with the purpose of the Adaptation Fund (AF).
- Engage in upstream policy dialogue related to a potential application to the AF.
- Verify soundness and potential eligibility of identified idea for AF.

Feasibility Assessment / Due Diligence Review:

- Provide up-front guidance on converting general idea into a feasible project;

[29] Article 8: Commitments and obligations of the BEEEI: The BEEEI must: (i) join the PMU in the implementation of the ESMF and PPMP, the validation of ESIA and if necessary environmental and social audit of the project; (ii) ensure the effective implementation of mitigation measures contained in the ESMF, PPMP and additional ESIA; (iii) have as necessary, environmental and social audits made by the promoter, and validate the reports; (iv) carry out an environmental assessment at the end of the project; (v) provide the necessary expertise for the monitoring and the control of the implementation of ESMFP, PPMP and complementary ESIA; (vi) perform regular missions of controlling and monitoring of the impacts of the project and capacity-building missions; (vii) prepare annual work programs for the above mentioned benefits and budgets; (viii) prepare and submit missions reports to the PMU and the annual activity reports; (ix) accept financial control of the PMU and the audit of donors; (x) regularly and periodically submit supporting accounting records of expenditure on activities carried out (capacity building, control and environmental monitoring missions, etc.).

- Source technical expertise in line with the scope of the project;
- Verify technical reports and project conceptualization;
- Provide detailed screening against technical, financial social and risk criteria and provide statement of likely eligibility against AF requirements;
- Determination of execution modality and local capacity assessment of the national executing entity;
- Assist in identifying technical partners;
- Validate partner technical abilities;
- Obtain clearances from AF.

Development & Preparation of sub-project:

- Provide technical support, backstopping and troubleshooting to convert the idea into a technically feasible and operationally viable project;
- Source technical expertise in line with the scope of the Project needs;
- Verify technical reports and project conceptualization;
- Verify technical soundness, quality of preparation, and match with AF expectations;
- Negotiate and obtain clearances by AF;
- Respond to information requests, arrange revisions;
- etc.

Implementation of the project:

- Technical support in preparing TORs and verifying expertise for technical positions;
- Provide technical and operational guidance project teams;
- Verification of technical validity / match with AF expectations of inception report;
- Provide technical information as needed to facilitate implementation of the project activities;
- Provide advisory services as required;
- Provide technical support, participation as necessary during project activities;
- Provide troubleshooting support if needed;
- Provide support and oversight missions as necessary;
- Provide technical monitoring, progress monitoring, validation and quality assurance throughout;
- Receipt, allocation and reporting to the AFB of financial resources;
- Allocate and monitor Annual Spending Limits based on agreed work plans;
- Oversight and monitoring of AF funds;
- Return unspent funds to AF.

Evaluation and Reporting:

- Provide technical support in preparing TOR and verify expertise for technical positions involving evaluation and reporting;
- Participate in briefing / debriefing;
- Verify technical validity / match with AF expectations of all evaluation and other reports;
- Undertake technical analysis, validate results, and compile lessons;
- Disseminate technical findings.

The table below shows the roles of various entities by project component:

Table 20: Roles of key stakeholders

Products	Public institutions (ministries and technical services Agriculture, Hydraulics, Environment, BEEEI, DGPV ...)	Local organizations (umbrella, cooperatives ...)	Private technical support structures	Project Management Unit	Implementation entity
COMPONENT 1. Enhancing stakeholders' technical and institutional capacities and dissemination of lessons learned during the project execution				Coordinate support among stakeholders, manage funds; ensure the proper conduct of procurements of goods and services markets, develop activity reports, Ensure effective monitoring and evaluation of project	The implementing entity (BOAD) will give general management support and specialized technical support services to the project. The indicative services provided by the implementation entity (BOAD) are relative to: (i) Identificatio
Outcome 1.1. Project proposals and environmental studies validated and the funding approved by the board of Adaptation Fund and BOAD					
Output 1.1.1. Support to the formulation of project documents (PCN, feasibility study, E&S Management Framework (ESMF), Pest and pesticides management Plan (PPMP), Full Project Document, public Consultation, national approvals of the project).	Provide necessary information for the formulation of project documents	Participation in public consultation activities	Provide expertise for the capacity building of the local development services agents of Ministry of Agriculture on climate change and its impacts on food security		
Output 1.1.2. Output 1.1.2. Support for the realization of d'Avant-Projet Détaillé (detailed preliminary studies) and ESIA of sub-projects	Provided necessary support for the realization of the tehnical studies	Provide support through case studies for training of state officials	Provide the necessary expertise for the training of technical staff on natural resource monitoring tools		
Output 1.1.3. Support to the technical control of the amenagement	Participate in the organization of training		Provide the necessary expertise for the capacity enhancing		

Products	Public institutions (ministries and technical services Agriculture, Hydraulics, Environment, BEEEI, DGPV ...)	Local organizations (umbrella, cooperatives ...)	Private technical support structures	Project Management Unit	Implementation entity
Output 1.1.4.Review and approval of the environmental and social impact report or Impact Notice of the sub-projects, and support for environmental monitoring of sub-projects	Provide technical support for review and approval of the Sub project ESIA report or Impact Notice			activities Etc.	n, Sourcing and Screening of Ideas; (ii) Feasibility Assessment / Due Diligence Review; (iii) Developme nt & Preparation of sub-project; (iv) Implementation of the project; (v) Evaluation and Reporting.
Outcome 1.2. The capacities of decentralized technical services are strengthened					
Output 1.2.1. Capacity building of local development services agents of Ministry of Agriculture on climate change and its impacts on food security.	Participate in the organization of training		Provide expertise for the capacity building of the local development services agents of Ministry of Agriculture on climate change and its impacts on food security		
Output 1.2.2. Training of Government technical agents in the use of the tools to monitor the changes in the status of natural resources	Participate in the organization of training for its own staff	Provide support through case studies for training of state officials	Provide the necessary expertise for the training of technical staff on natural resource monitoring tools		
Output 1.2.3. Strengthening of the technical capabilities of the Government actors in the implementation of the environmental and social safeguard measures	Participate to the training		Provide the necessary expertise for the capacity enhancing		
Outcome 1.3. The capacities of farmers' groups and other stakeholders to understand and adopt modern irrigation techniques to climate change are strengthened					

Products	**Public institutions (ministries and technical services Agriculture, Hydraulics, Environment, BEEEI, DGPV ...)**	**Local organizations (umbrella, cooperatives ...)**	**Private technical support structures**	**Project Management Unit**	**Implementation entity**
Output: 1.3.1. Sensitization and training of grassroots communities on threats related to climate change and on adaptation and resilience measures related to food security	Provide support for sensitization and training of communities	Provide support for the mobilization and sensitization of communities	Provide the necessary expertise		
Output 1.3.2. : Training of producers to agricultural practices that preserve sustainably soil and water resources	Provide support for training of farmers	Mobilize and organize farmers	Provide the necessary expertise for the training of farmers on sustainable management of water resources and soil		
Output 1.3.3. Training of local technicians in installation and repair of modern irrigation systems (Drip system kits, Californian network) and photovoltaic equipment	Provide support for the organization of craftsmen training	Mobilize and organize craftsmen	Provide the necessary expertise for the training of craftsmen on the installation and repair of modern irrigation systems (Drop kits, Californian network) and photovoltaic systems		
Output 1.3.4: Training of producers and health centres on the application of pesticides, toxicological management of pesticides and obsolete products and packaging	Provide support for the organization of stakeholders training	Mobilize the stakeholders Partcipate to the training	Provide the necessary expertise for the training		
Output 1.3.5. Enhancing Community Development Plans with adaptation to climate change measures	Support the effective implementation of developed adaptation plans and ensure the implementation of the agreements signed on the use of resources	Cooperate with local authorities in the preparation, extension and implementation of adaptation plans and agreements on the sustainable use of	Provide the necessary expertise to develop adaptation plans to climate change integrated into local development plans		

Products	**Public institutions (ministries and technical services Agriculture, Hydraulics, Environment, BEEEI, DGPV ...)**	**Local organizations (umbrella, cooperatives ...)**	**Private technical support structures**	**Project Management Unit**	**Implementation entity**
	(soil and water).	resources.			
Outcome 1.4: The lessons learned are used to strengthen the resilience of agriculture by irrigation through modern techniques to a larger scale					
Output 1.4.1 Production of fact sheets on lessons learned	Provide expertise if necessary Support for the dissemination and extension fact sheets	Provide support for the dissemination and popularization of fact sheets	Provide expertise to the development of fact sheets on lessons learned		
Output 1.4.2. Sharing of project results and lessons learned, and integration of new approaches at the local, regional and national scales	Participate in the entire process	Provide support for the dissemination and popularization of lessons learned	Provide the necessary expertise to the dissemination of information on the media, to farmers and policymakers.		
Output 1.4.3. Meeting for government technical staff, beneficiaries and other stakeholders to improve the strategies that can scale up the resilience of vulnerable populations with the use of modern irrigation techniques	Support the advocacy process with the Government	Ensure advocacy with decision makers and farmers	Provide the necessary expertise for workshops organization		
Output 1.4.4. Preparation of a large-scale project integrating the results of lessons learned	Provide expertise if necessary	Provide support to the capitalization of project achievements for their scaling	Provide the necessary expertise for the formulation of a large-scale project.		

Products	Public institutions (ministries and technical services Agriculture, Hydraulics, Environment, BEEEI, DGPV ...)	Local organizations (umbrella, cooperatives ...)	Private technical support structures	Project Management Unit	Implementation entity
COMPONENT 2. CONFORTATION AND DEVELOPMENT OF IRRIGATED AREAS					
Outcome 2.1: Water management is strengthened and soil and water resources conservation are implemented					
Output 2.1.1. Development of peri-urban areas and village market gardeners	Provide expertise if necessary	Provide support for the dissemination of information within communities for the selection of beneficiaries (individual farmers, farmer groups)	Support farmers in the formulation of project proposals Provide irrigation equipment Provide maintenance and repair services if necessary		
Output 2.1.2. Protection and improvement of exploited land	Provide expertise if necessary	Provide support for the mobilization of communities for soil conservation activities.			
Outcome 2.2: Energy bills related to water pumping are reduced					
Output 2.2.1: strengthening of existing perimeters with solar pumping stations	Provide expertise if necessary		Support farmers in the formulation of project proposals Provide solar equipment Provide maintenance and repair services if necessary		
Output 2.2.2 : New perimeters equipped with solar system	Provide expertise if necessary		Support farmers in the formulation of project proposals		

Products	Public institutions (ministries and technical services Agriculture, Hydraulics, Environment, BEEEI, DGPV ...)	Local organizations (umbrella, cooperatives ...)	Private technical support structures	Project Management Unit	Implementation entity
			Provide solar equipment Provide maintenance and repair services if necessary		
COMPONENT 3. SUPPORT FOR THE DIVERSIFICATION OF LIVELIHOODS AND IMPROVEMENT OF FARMERS' INCOMES					
Outcome 3.1: Support to the access to quality agricultural inputs					
Output 3.1.1. Organization of groups for the acquisition of improved farm inputs	Provide support to the organization of groups and the acquisition of inputs	Provide support for the dissemination of information within communities on the best inputs			
Outcome 3.2: Support to the development of off-farm income generating activities					
Output 3.2.1 : Support for the development of additional farm income generating activities					
Output 3.2.2 Support for Improvement of incomes of farmers through better conservation of agricultural products					

B. *Describe the financial risks' management measures and risks of project /program.*

The policy of BOAD requires that risks assessment is conducted in all its programs.

For risks related to solar systems, it should be noted that the solar pump initiatives exist in Niger, in particular, on the hydro-agricultural perimeter of Karma and the mini-projects of drinking water. As for the solar pumping of Karma, it was a test to see how to reduce energy costs over large areas. The main difficulties are presented below with the measures proposed in this project to address them:

Table 21: Encountered difficulties and measures

Encountered difficulties	**The measures in this project**
The inaccessibility of the equipment due to the relatively high cost and its unavailability on the local market,	Many actors are set in Niger and solar equipment market is under development. The tenders will be launched internationally for the supply of solar equipment.
The low capacity of stakeholders to ensure the proper use and maintenance of such technology,	The Craftsmen will be trained at national level for the installation and repair of solar equipment
The acts of vandalism perpetrated. There are mainly the theft of panels that have led to the closure of several mini water supplies	An agreement which will be signed with the beneficiary groups will include a requirement to secure the site and the installed equipment

For financial risks' management, this project management framework will take into account the budgetary and fiduciary management arrangements governing the operations of public sector institutions and organizations under the financial laws of the government. The government procurement policy as well as that of the Adaptation Fund and BOAD's financial management requirements will be incorporated into the framework. The following table presents the risks of the project.

Table 22: Risks' matrix

Risks	**Level**	**Mitigation Measures**
Sub-project proposal don't meet the requirements or objectives of the full project	Medium	It is expected the capacities enhancement of the beneficiaries in the formulation of sub-projects through training workshops and technical support by the SPAC. Indeed, the technical studies are conducted by the producers Organisations (PO), through their skills if they have or support-consulting services (SPAC). According to the SPIN, the SPAC are: Economic interest groups (GIE), groups of Service Council (GSC), the Non-governmental organizations (NGOs) [30].
The inaccessibility of the equipment due to the relatively high cost and its unavailability on the local market,	Weak	Many suppliers controlling costs and mounting techniques exist in Niger. The market for solar equipment is under development. However, the tender will be launched

[30] See Strategy of Small Irrigation Niger (SPIN) page 35.

Risks	Level	Mitigation Measures
		internationally for the supply of solar equipment.
The low capacity of stakeholders to ensure the proper use and maintenance of such technology,	Weak	The Craftsmen will be trained at national level for the installation and repair of solar equipment
The acts of vandalism perpetrated. There are mainly the theft of panels that have led to the closure of several mini water supplies	Weak	An agreement which will be signed with the beneficiary groups will include a requirement to secure the site and the installed equipment
The political and security conditions in the program area are deteriorating	Weak	The approach of the PRRA-CC is based on local producers that will be identified with the support of the umbrella and local administrative authorities in areas recognized as low security risk.
Low participation and involvement of decentralized public services	Weak	Creation of committees formed of representatives of the decentralized public services to guide the implementation of the project, both regionally and locally.
Lack of support from local administrative authorities (municipalities and regional councils)	Weak	Local administrative authorities were involved in the project design phase through meetings and during public consultation workshop in each region, department and selected municipality. The project is part of the approach of SPIN which considers the municipality as a point of entry of any administrative procedure.
New facets of climate risks emerge during the life of the project	Medium	The project will work with systems for crisis prevention coordinated by the government. The project will train the different actors (mentoring technical services and farmers) to better understand and follow the predictions of climate changes to prevent / anticipate crises
The groundwater level declines	Weak	The project will organize training sessions for state technical services for monitoring groundwater levels and its evolution
Low knowledge of technologies promoted by farmers	Weak	Farmers will benefit from several training sessions before the start of development activities and ongoing support and advice of decentralized technical services of the state. Furthermore local technicians (craftsmen) will be specially trained to control technologies. Finally, as part of the acquisition of materials, suppliers will ensure transfers of competence to the beneficiaries as well as maintenance services for the duration of the project.
Reluctance to apply the acquired knowledge and practices on climate change adaptation	Weak	Sensitization and training provided by the relevant bodies identified by the project.
Lack of coverage of expenses of the infrastructure and irrigation equipment renewal	Weak	The project will train selected farmers in management (business plan and technical and economic monitoring) and banking (blocked savings account, financial education) to ensure sustainability of investments.
Vulnerable beneficiaries undergo	Medium	The project will help respond to shocks by

Risks	Level	Mitigation Measures
other crises (locust invasion ...) leading to their decapitalization.		strengthening the resilience of beneficiaries through support for income generating activities. The project in monitored consultation with authorities to manage locust invasions will anticipate problems in order to put the project away from such calamities.
The technical practices promoted by the project are confined to the first beneficiaries	Weak	The project plans a strong sub-component on dissemination of lessons learned and emphasizes on a scaling through the formulation of a larger project
Lack of infrastructure monitoring that would be abandoned as soon as the project is completed	Weak	The development will be realized in a participatory approach of beneficiaries. The formulation of requests by themselves helps ensure their own choices concerning the techniques and technologies, as well as monitoring measures of perimeters to develop.
Conflicts between groups on the areas developed for the collective use of the works, the equitable distribution of agricultural inputs and equipment, maintenance of perimeters.	Weak	The project implementation approach will be based on the search for a consensus based on local authorities (municipalities, chiefdoms) and the umbrella groups.
Failure of Coordination of activities due to conflicts of interest among stakeholders	Weak	Establishment of a consultation platform on the project both in terms of information and sharing of knowledge between the different actors
Emergence of constraints related to land ownership in the choice of sites for reforestation	Weak	Incentives to landowners who agree to participate in the reforestation programme

C. Describe the management measures of environmental and social risks, in line with the environmental and social policy of the Adaptation Fund.

Environmental and social challenges

The environmental and social challenges of the project are mainly on climate, soils, water resources, biodiversity, heritage and cultural heritage, access to resources and equity, energy resources, vulnerable groups, labor laws, vulnerable groups and resource efficiency.

Climat

While production systems are heavily dependent on rainfall, the striking feature of the climate of the project area is drought; it is linked to several factors, such as inadequate and poorly distributed rainfall, high temperatures, and high evapotranspiration.

Soils

The major constraints of soils cultivated in the project areas are many: general lack of organic matter and phosphorus, continued decline of fertility, tendency to acidification, sensitivity to water and wind erosion, low water retention capacity , degradation by alkalizing and salinization phenomena. This fact has an impact on the agro- forestry-pastoral production.

Despite the size of the territory, the soils are, in large part, not suitable for agriculture. Often laundered, they are characterized by low agricultural wealth. Under these conditions, they must be carefully managed in order to make them profitable.

Water resources

Recurrent droughts generate a significant change in water resource. Niger River and all streams became very irregular. In some areas of the project, groundwater recharge is difficult

Access and Equity

The project aims to develop units of 5 hectares. It is not intended to obstruct access to resources and equity.

However, when these cases will be registered in some areas to operate, the beneficiaries, as recommended by the Environmental and Social Management Framework, will submit the environmental and social impact assessment report to Niger Agency of ESIA and BOAD to examine the compliance of their project regarding the national regulations, standards of environmental and social safeguard of BOAD and the environmental and social principles of the Adaptation Fund

Gender Equity and Women's Empowerment

The project will seek to promote equity and empower women and youth.

Fundamentals of work

In terms of working conditions, the project will be implemented in accordance with the requirements of the Labour Code in force in Niger. The said code will apply to all project sites. The project will ensure that the working conditions are met.

Resource efficiency.

The project aims to promote energy efficient system, the drip system and the Californian network, two effective systems in irrigation**.**

Legacy and cultural heritage

In the project areas, there are no tourist attractions or cultural heritage. However, these problems can be solved if a site is affected, according to national procedures, the principles of the Adaptation Fund and the safeguard standards of BOAD.

Vulnerable groups

The project will take into account the marginalized and vulnerable groups. It is planned to subsidize their irrigation equipment up to 100%. In all cases, the assessment of the environmental and social impact reports, to be submitted for review as part of the selection of sub-projects must comply with national regulations, standards of environmental safeguards of BOAD and environmental and social principles of the Adaptation Fund.

Natural habitats

The risks on natural habitats were examined in the context of the environmental and social management. Specific impacts will be assessed based on assessments of the environmental and social impacts of subprojects.

Biodiversity

In Niger, one can distinguish the W Park and Reserve of Aïr Ténéré which are part of biosphere reserves. The project will not intervene in the departments where the W Park and the Aïr Ténéré reserves are located. However, the impact assessment of the subprojects will consider biodiversity issues.

Project alternatives

In the context of the resilience to climate change, several initiatives are underway in the project area, in particular, the actions of implementation of irrigation infrastructure. However, given the magnitude of the adverse effects of climate change and the assigned scope, impacts remain limited. The non-realization of this project would be a real loss of profits to combat food insecurity, the energetic constraints for water drainage, water loss and land degradation. This would contribute to the degradation of the living conditions of the populations that would increase their pressures on the environment and natural resources. In light of the foregoing, the non-realization of this project is not to consider.

Political, legal and institutional framework of the Republic of Niger

In Niger, the policy framework of environmental management is, above all, enshrined in the fundamental Law (Constitution of November 25, 2010) which states that "everyone has the right to a healthy environment" and that "the State has an obligation to protect the environment for the benefit of present and future generations. Also "the State shall ensure the evaluation and supervision of impacts of all project and development program on the environment".

In addition, the country adopted a new environmental policy integrating environmental concerns. This policy is enshrined in the National Environmental Plan for Sustainable Development (PNEDD), developed in 1998, adopted in April 2000 by the Government of Niger and in lieu of the national agenda. The plan also represents the operationalization tool through six priority programs.

Legally, several international and national texts adopted by Niger, specifically dealing with the protection of the environment will apply in the project.

Internationally, the main conventions which have a link with the development of the project are on the Biodiversity; the Climate Change; the desertification, the wetlands, the pollution, cultural heritage.

Nationally, obligations and laws and regulations of environmental protection applicable to the PRRA-CC, are, among others, the constitution of November 25, 2010; Law No. 98-56 of 29 December 1998 on framework law on environmental management; Law No. 2001-32 of December 31, 2001, on the orientation of the Land Planning Policy.

Institutionally, the implementation of environmental protection and management policy for sustainable development is the responsibility of a multitude of stakeholders including the Ministry of Environment, Urban Safety and Sustainable Development (ME / SU / SD). The latter is the leader of public institutions through its decentralized services. Thus, for the monitoring and control of the PRRA-CC impacts, ministries and civil society concerned are mainly: (i) the ME / SU / SD; the Ministry of Agriculture; the Ministry of Livestock; the Ministry of Water and Sanitation; the Ministry of Public Health; the Ministry of Energy and Petroleum; the National Council of the Environment for Sustainable Development; RECA and ANPÉIE (civil society).

The country has put on an ESIA Office calls "Bureau des Evaluations Environementales et de l'Etude d'Impact (BEEEI)" who has the responsibility to manage all the ESIA process with development stakeholders.

Besides the national legal system, it should be added the Environmental and social principles and safeguards of the Adaptation fund and the West African Development Bank (BOAD), the two financial institutions which will co finance the project.

ENVIRONMENTAL AND SOCIAL CLASSIFICATION OF THE PROJECT

The project includes the development of new areas for irrigation with a drainage system consisting of boreholes, drip and Californian network, photovoltaic solar pumps, etc. dimensioned according to perimeters. A total of 1000 ha will be developed within five Region namely: Dosso, Niamey, Tahoua, Tillabery and Agadez. All of these sites will be divided into units of 5 ha, or 200 units.

The Adaptation Fund presents a set of principles by which it enacts environmental and social safeguards applicable to the projects it finances. The principles applicable in the context of the project are presented in the table below.

Table 23: Determination of triggered E&S principles of the Adaptation Fund.

Environmental and social Principles of Adaptation Fund	**Principles Applicable**	**Principles Non applicable**
Compliance with national legislation and international conventions	X	
Fairness and equal access	X	
Vulnerable and marginalized group	X	
human rights	X	
Gender Equity and Promotion of Women	X	
Rights and working conditions	X	
Climate change	X	
indigenous people		X
involuntary Resettlement		X
Habitat Protection	X	
Conservation of biological diversity	X	
Resource management and pollution prevention	X	
Public health	X	
Cultural Heritage	X	
Land and land conservation	X	

The implementation of the PRRA-CC will triggered the environmental and social safeguards of BOAD, which are in the table below.

Table 24: Determination of E&S safeguard standards triggered of BOAD.

Environmental and social safeguards standards of BOAD	**Safeguards triggered**	**Safeguards not triggered**
Operational policy in terms of environmental and social impact assessment	X	
Operational policy on natural habitats	X	
Operational Policy on forest management	X	
Operational Policy on Dam Safety		X
Operational Policy on projects related to international waterways		X
Operational Policy on projects in disputed areas		X
Operational Policy on Involuntary Resettlement		X
Operational Policy on Indigenous Peoples		X
Operational Policy on Cultural Heritage	X	
Operational Policy on Pest Management	X	
Operational policy in the consideration of cumulative effects in the ESIA of Bank projects	X	
Operational policy for public participation in the environmental and social impact assessment process	X	

Despite the positive impacts that can build the project, the activities of the project[31] will result in adverse environmental and social impacts. Many environmental and social principles of the adaptation fund and the Operational Policies of BOAD above are triggered by the project in terms of environmental and social impact. But, after analyzing the project with the Environmental and Social Classification screening tool of BOAD the characteristics of the project correspond to a Category B project as provided by the environmental and social safeguards of BOAD. The project is classified as Category B.

A project is classified as Category B if the negative effects it may have on human populations or important areas point of view of the environment - wetlands, forests, grasslands, and other natural habitats, etc. - are less severe than those of a Category A project. These effects are very local nature, few of them are irreversible, and in most cases mitigation measures can be designed more readily than for the effects of Category A projects. «The environmental and social impact assessment of such a project is to examine the positive and negative effects that the project could have on the environment, and recommend any measures needed to prevent, minimize, mitigate or compensate for adverse effects and improve environmental performance. (See pages 11 and 12 of the document PO-PB-00 of the Bank). Thus, the project is subject to a simplified environmental and social impact assessment (See Annex 1.D of Operational Policy Bank's environmental and social impact assessment) but also to the preparation of a pesticide management plan. Because the localization of the intervention areas of the project is not really done, the national regulation has recommended the formulation of an environment and social management framework (ESMF).

ESIA process of the sub-project

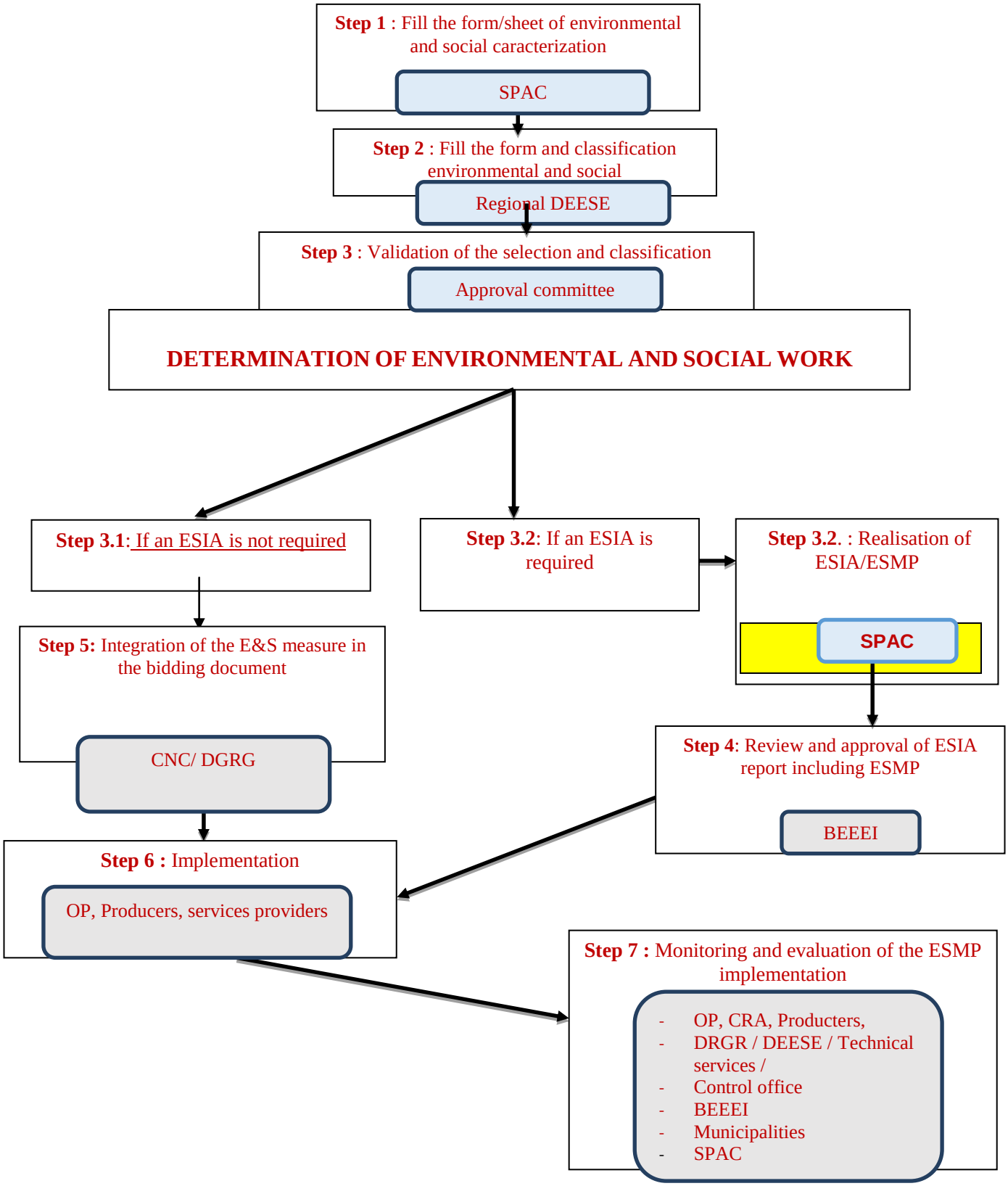
The process comprises the following steps:

- Screening: To determine the project activities that may have negative impacts on the environment;
- Identifying environmental categories: To determine the mitigation and / or compensation activities having adverse impacts;
- Identification of activities requiring the implementation of a specific environmental and social impact assessment;
- Review and approval of selection: To describe institutional responsibilities for analysis and approval of the results of the selection, implementation measures and the preparation of specific environmental and social impact assessment reports;
- Integration of environmental and social measures in the Tenders Documents (CAD);
- Enforcement of environmental and social measures;
- Monitoring: To monitor environmental parameters during the implementation of activities;
- Monitoring indicators: identifying the specific parameters for effective monitoring.

The flow chart below, describes the sub-project ESIA process

[31] The main PRRA-CC's activities include: Strengthening the capacity of local government services development on climate change and its effects on food security; Awareness raising and training of grassroots communities on threats related to climate change and adaptation and resilience for food security; Training of producers to agricultural practices that preserve a sustainable soil and water resources; Local technicians mount the formation and repair of innovative irrigation systems (drip system, Californian network.) And photovoltaic systems; The development of peri-urban areas and gardeners villagers (development 1,000 ha of small irrigated aras in units of 5 hectares each, are 200 units with activities such as: transportation equipment; boreholes; installation of the solar system consists of solar panels, inverter, controller and connection accessories for pumping; land preparation and plowing; installation of drip-drop network or Californian network, as appropriate; planting, maintenance, harvesting, etc; fertilizer application (organic manure or chemical fertilizers); use of pesticides.

The sub-project ESIA process



DETERMINATION OF IMPACTS AND RISKS OF THE PROJECT

The determination of environmental and social impacts and risks has taken into account the three components of the project are

- Component 1: Enhancing stakeholders' technical and institutional capacities and dissemination of lessons learned during the project execution
- Component 2: Confortation and development of irrigated areas
- Component 3: Support for the diversification of livelihoods and improvement the of farmers' incomes.

This determination is made by a cross-analysis of environmental and social characteristics of the project intervention communes and reference activities to achieve, in terms of environmental and social principles of the Adaptation Fund, the Environmental and social safeguards of BOAD. Moreover, the determination of environmental and social impacts of the project considering the different implementation phases of activities, including: site preparation, infrastructure construction (solar device and other) and commissioning and / or the development of infrastructure.

Positive environmental and social impacts of the project

- **Positive impacts on revenue**

Project funding begat economic benefits to common beneficiaries through increased revenue that will contribute to improving the quality of life of beneficiaries. Indeed, the activities to be financed by the project will create temporary jobs with the recruitment of local labor during the period of development works and / or expansion of irrigated sites. With the creation of temporary jobs and the purchase of materials (piping, pumps Groups, agricultural tools...), the project will generate economic benefits in the areas of intervention.

Moreover, the experiences with the strengthening of small-scale irrigation through previous projects and programs across the country (PRODEX, PPI, PUSADER, PMERSA ...), have shown increased yields of agricultural productions link with increasing incomes. Indeed, it has been well demonstrated that the strengthening of small-scale irrigation, helped improve farm productivity and consequently allowed the increase of production and producers' incomes. Thus, the strengthening of small irrigation modernization (installation of solar systems) of irrigated agriculture will undoubtedly improve the living standards of farmers by increasing their purchasing power. This will also result in a socioeconomic development induced joint intervention of the PRRA-CC and by fixing the rural population. This positive impact contributes to the reduction of rural exodus which is widely practiced in the target areas of the Project. In addition, it is planned training of artisans / youth assembly and repair techniques of drip- drip systems and solar systems. Revenues generated by the sale of garden produce and hiring, will certainly allow beneficiaries (women) to undertake other income generating activities (IGA) and thus contribute to the fight against poverty for the recipient households

- **Impact on food security**

The project will contribute to the reduction of the risks associated with food insecurity. Indeed, the development and/or the extension of perimeters irrigated family-type or group will constitute a constant source of supply in agricultural products through diversified and sustained production. In addition, the actions of capacity building provided for farmers on new cultivation techniques and the use of agricultural inputs (fertilizers and pesticides) will improve the production, both qualitative and quantitative. Thus, the improvement of the performance of production systems and the diversification of activities will contribute undoubtedly to improved incomes and the supply conditions of the populations of the beneficiaries of the project, moreover in Tillabery and Tahoua regions where the problem of food security arises with acuity.
On the other hand, the intervention presents a number of indirect impacts which may prove positive screw - in the Middle screw:

- improvement of the means of access to the services and agencies in charge of support in the field of agricultural production;

- increase the number of jobs and simultaneous increase in the average per capita income, which will have the consequence to contribute to the fight against poverty.

In addition, the extension of sown areas and the increase of the productivity of the land by the rationalization of cultivation techniques, will cause a substantial gain of agricultural production, and therefore contribute to improving food security as a pressing need for the fight against poverty. Indeed, according to consulted populations, the exploitation of crops for food purposes (consumption) and commercial sites, will contribute to intensify and diversify the crops at the level of the sites that will be retained. These people say that production in irrigated crops, are primarily intended for own consumption and for sale. What allows them to combat food insecurity (own consumption) on the one hand, and on the other hand, to increase their income through the sale of horticultural products.

- **Impact on the socio- economic conditions of women**

The sub projects to be funded through the market gardening practiced by women will improve their socioeconomic conditions and therefore contribute to the reduction of their vulnerability. Indeed, through the expansion of gardening activities, women gain more autonomy and assert themselves as full participants**.**

- **Impact on Environmental and Social Management**

It is expected, component 1 of the project, building the capacity of government services in the environmental and social management with tools such as GIS. Which will increase the country's capacity in environmental and social management .The Beneficiaries will also receive a board support and strengthening their capacity in environmental management of the project including the use of pesticides and other chemicals.

- **Positive impacts on water resources**

Under the project, the drip- drip irrigation techniques and the California network will be used. These techniques operate at low pressure and water are efficient. «Irrigation is well made with a good command of inflows and considerable water savings. In addition, the system to be adopted will allow to limit losses by evaporation, runoff or deep infiltration. This localized irrigation technique (drip) will allow a perfect control of water, limiting the drop in groundwater level and decreasing the pressure on groundwater resources compared to the technique of gravity irrigation The method of drip- drop is a simple and effective irrigation irrigation technique that will allow to reduce the consumption of substantially water as it moistens the soil portion located in the immediate vicinity of the roots and limits evaporative losses, runoff or deep infiltration, and therefore significantly limit the drop in groundwater level.

- **Positive impact on widlife**

The development of garden sites will allow no doubt create a microclimate favourable to the development of plant species (woody). Increase the rate of vegetation roofing (revegetation) of selected horticultural sites, will allow to create a new ecosystem that will serve as a magnet to species avian (birds), and thus help to restore the strength of the avifauna in the level of market sites that will be affected by the project funding (especially in the dallos of Dosso, the valleys of Agadez region and the area of the river).

- **Positive impacts on crop production**

Cultivation techniques to be adopted as part of the project will allow to increase crop production. In addition, with the perfect water control, farmers will increase the number of season crop (culture throughout the year) and therefore increasing qualitatively and quantitatively the plant production.

- **Positive impacts on pastoral productions**

Improving yields is the result of different factors including:

- Better meeting water needs of crops;
- Better control of crop management and farming operations;
- Better satisfaction of nutritional needs of crops;
- Better supervision of farmers by extension workers;
- Better access to seeds and pesticides by improving the financial base of operators.

Thus, improving crop yields by strengthening small-scale irrigation, will result in increased amounts of crop residues and agricultural by-products. These large quantities of agricultural by-products (residues of vegetable crops) will be valued by cattle and thus help improve the feed balance and consequently strengthening the livestock sector of intervention in public project.

- **Positive impacts on migration and on strengthening the family relationship**

Migration and rural exodus are a dynamic characteristic of the people of Tillabery, Dosso and Tahoua. This mobility practiced during the lean period, contributes to meet basic needs of rural households. Thus, the development of small-scale irrigation, as referred by the project, will help slow mobility (migration and rural exodus), to restore the economic system in the beneficiaries and make a substantial qualitative improvement levels life and therefore placing the agricultural activity as a way to fight against poverty, control of migration flows and preservation of the family fabric.

Indeed , revenues from the sale of garden produce , serve mainly to the purchase of food crops (millet, rice and corn) to face the lean period , and to a lesser extent to mutual assistance and the purchasing pharmaceuticals. Thus, the development of small-scale irrigation, will certainly induce the increase in revenues, and therefore improve the living conditions of the population, especially in terms of food security. The Gardening activities will fill the inhabitants of beneficiary villages, especially the most vulnerable (women and youth) through the creation of a significant number of working days .
Therefore the strengthening and / or expansion of market garden site will help to reduce the period of inactivity, to the promotion of gender and also reduce the rate of rural exodus in public intervention.

- **Positive impacts on community life**

The current context, characterized by the gradual withdrawal of States, the implementation of the decentralization process, empowerment of civil society and enhancing the role of the private sector, offers all the rural perspectives and new opportunities to participate in defining the policies, strategies and projects and their implementation. Therefore, the activities of peasant organizations are very diverse. They concern the development of agro- pastoral production, vegetable growing, fruit growing, fishing, marketing and handicraft, mining and processing of forest products, natural resource management actions and protection the environment. Thus, the project interventions will create a full involvement of farmers' organizations, and enable the development of community life which is one of the key elements of sustainability of all actions planned under the project.

- **Impacts on the community social organization**

Project impacts apprehended on the socio-cultural organization, include: (i) strengthening local farmer organizations; (ii) the socio institutional support that the developed sites, will induce; (iii) the establishment of cooperatives and management committees; (iv) strengthen the capacity of market gardeners.

- **Impacts on human health**

Positive impacts are the expected improvements, expansion and enhancement of the sites irrigated with project interventions. These include: (i) improving the nutritional status of populations in the availability and consumption of vegetable products containing protein- energetic substances which improves health especially of children, especially in the regions of Tillaberi , Dosso and et Tahoua ; (ii) increasing the purchasing power of the population with the use of irrigation, will enable the availability of therapeutics and prevention against certain diseases (purchase of medicines, mosquito nets,).

Other socio-economic and environmental benefits have been described under Part II, item B.

Negative impacts of the project

Despite the beneficial effects related to the implementation of the project, it is not less that this project can cause negative on both biophysical and human impacts concerned including the: (i) adverse impacts on vegetation cover and plant biodiversity; (ii) negative impacts on wildlife; (iii) negative impacts on soils; (iv) negative impacts on the landscape; (v) impact on the health and safety of populations.

- **Negative impacts on vegetation cover and plant biodiversity**

The work of extension and / or rehabilitation of irrigation projects under (installation of solar devices, irrigation system, irrigation pond, various constructions) will cause a disruption of ecosystem dynamics involved (valleys, oases, dallols and the Niger River Basin) with the destruction of plant species, thus contributing to accentuate the erosion phenomenon.

- **Negative impacts on wildlife**

The work of extension and / or rehabilitation of sub irrigation projects will result in the destruction of vegetation, and thus induce the destruction of the habitat of small animals (reptiles, rodents and other small birds). However in view of the state of vegetation in areas with high potential for irrigation, the effects on wildlife habitat will be less. In addition, the use of phytosanitary products for the treatment of crops has the potential risk of destruction of certain species of non-target fauna, including insects, reptiles and amphibians that are essential to the ecological balance of a given environment.
Therefore, the use of pesticides during processing of crops, will result in the disappearance of some elements of biodiversity especially in the valleys, oases, dallols and shallows where the potential is relatively large. Finally, discharge of drainage water loaded with mineral fertilizers and pesticide residues can cause degradation of the water quality and lead to poisoning of the animal species present in the water

- **Negative impacts on soil**

The work of expansion and / or rehabilitation under irrigation, will disturb the structure of the soil affected, and are also able to generate risk of soil contamination through the storage and discharge of building materials (cement gravel ...) that may cause a one-time soil pollution. Furthermore, solid waste that will be generated by the work, will constitute another source of soil pollution at the sites selected for the project activities.
Indeed, these sites will have a very low grip, but could still generate solid waste (cement bags and other packaging, material residues of irrigation networks, household waste workers, etc.).
These impacts are not permanent since they cease with the closure of sites. However, their effects may persist (including the effects of solid waste) if the conduct and closure of sites are not accompanied by procedures that respect the environment. The fundamental objective through the strengthening of small irrigation by the project is the improvement of living conditions of the beneficiaries. However, market gardening activities will risk inducing intensive use of agricultural inputs (mineral fertilizer), and consequently soil salinity at all sites selected by the project. In addition, the use of agrochemicals (fertilizers) for developing and / or intensification of agriculture, has the potential to result in the alteration of the texture and structure of land concerned, and pollution resulting from the intensive use pesticides. Thus , soil productivity losses resulting either from over-irrigation or poor drainage of the soil which lead to their waterlogging and salinization due to increased mineral salts in the soil when the water s' evaporates. Ultimately these soils are not suitable for cultivation. Ultimately these soils are not suitable for cultivation.

- **Negative impacts on the landscape**

The work of extension and / or rehabilitation of sub irrigation projects will cause denaturation of the landscape concerned, especially with the destruction of part of the existing vegetation.
The excavation for the installation of various irrigation systems, embankments, etc. will disturb the balance of the environment and transform it. There will be a change in the configuration space, and degradation of the harmony of the present landscape.

- **Impacts on the health and safety of people**

The development of market garden site will result in the availability of water in wider areas that will cause water stagnation and create a situation favorable to mosquito breeding.

Indeed, the water reservoirs at the basin and irrigation canals may be prejudicial to the health of farmers, because they will create the right environment for the development of vectors and microorganisms of waterborne diseases (proliferation of mosquitoes and other bugs). Therefore, the prolonged presence of water will be a factor in increasing the incidence of diseases (malaria, schistosomiasis, respiratory,) related to the stagnation of water, particularly at sky canals and ponds open. Furthermore, the use of pesticides (very harmful to human health) in the fight against parasitic attacks, presents a potential risk to the health of farmers, local residents and pets. Indeed, the use of phytosanitary products will be a source of intoxication for farmers, local residents and pets. Other socio-economic and environmental benefits have been described under point B, Part II.

Environmental and social risks

- **Ecological Risk**

The project, particularly during the development work and extension of the market garden site will result destruction of plant species and wildlife habitat. The uncontrolled application of pesticides will result in negative impacts on plant population.

These risks can be summarized as: (i) downsizing and / or biomass; (ii) the loss of species or groups of species; (iii) erosion and loss of biodiversity; (iv) etc. Wildlife will be affected by pesticides in the framework of pest control. Indeed, when treating crops with pesticides, a significant proportion of product is disseminated in the environment, and this even beyond the treatment site; (ii) the consumption by animals recently treated pastures; (iii) the use of empty containers for watering the animals. Cette intoxication peut se traduire par des avortements chez les femelles en gestation. This poisoning can result in abortions in pregnant animals. It can also lead to the loss of the animals.
These risks / impacts on flora and fauna will finally lead to the rupture of the ecological balance of the environment.

- **Risk of occurrence of waterborne diseases**

The use of pesticides and other chemicals to fight against pests carries the risk of water pollution. The compounds are found in water and are a potential source of development nuclei. It can also result in the proliferation of mosquitoes and other insects due to water stagnation.

- **Risk of soil acidification**

It is planned in component 3, support for the acquisition of agricultural inputs including fertilizers and pesticides. The non- rational use of its fertilizers and pesticides will lead to acidification of soils.
Chemical residues may form with other naturally occurring compounds in the soil can degrade the complex soil pH and induce acidification.

- **Risk of damage to health and life safety**

The project implementation involves risks to human health through the use of pesticides and other chemicals on the plots. The pesticide exposure can be direct (contact during the application, passing over a treated site) or secondary or indirect (for water, for food ...) and is likely to concern in this case all population. The risk of occasional or prolonged exposure may cause acute or chronic poisoning, increase in pesticide application (spray manipulation ...), and contact with treated plants or to a technical problem. Thus, the risks vary not only of the toxicological profile of the product (product hazard) but also the nature of the exhibits and their intensities .Occasionally, the acute poisoning causes irritation , lesions (eyes, skin), burns, poisoning, asthma, fainting, and that , in case of accidents but also in case of mishandling. De Prolonged, intoxication, due to exposure to small doses repeated over time, can cause serious damage to organs (cancer, neurological diseases, reduced

fertility ...). Thus, one of the most significant risks of pesticides on human concerns intoxication. Indeed, the use of these products to fight against pests to increase agricultural production can be populations poisoning source that can often lead to death. The main routes of contact between man and pesticides that may be the cause of this poisoning are:

- Dermal exposure when pesticides are handled without gloves, when liquid is spilled on clothing or when the pesticide mixture is made with hands ;
- Respiratory tract or inhalation exposure to vapors concerns concentrated products when preparing porridge , exposure without appropriate protective equipment when spraying ;
- The consumption of processed agricultural products whose afterglow period is not respected;
- The digestive tract during a siphon hose with the mouth or when smoke or eat without washing hands after applying pesticides.

It should also be noted that if the sources of drinking water are contaminated, the consumption of this water can cause a long-term bioaccumulation of pesticides among consumers and cause disease. Finally, the consumption of contaminated products (vegetables) following treatment may also cause several diseases.

- **Risk of conflicts between farmers and pastoralists**

During the operation phase of the project, there may be conflicts between farmers and ranchers in the area. The oxen by examples may go into the fields and damage crops.

- **Risk of accident**

In the component 1, there is provided a series of formations which will require the displacement of the players from one point to another. These activities present a risk of traffic accidents. This risk is also present during the transport of the equipment to my development sites.
In Component 2, equipment installation including solar kits, irrigation kits are risks of industrial accidents for workers. During operations, producers will be exposed to the risk of accidents that can range from simple injuries to death. In Component 3, the supply of agricultural inputs also presents risks of traffic accident during transportation and industrial accident during application.

- **Risk of non- profitability of the project to a slice of farmers or inequitable access to beneficiaries**

There exist several kinds of types of producers are distinguished among which small producers and vulnerable and marginalized groups including women and youth. They may not be involved in activities provided for in component 1 including the strengthening of technical and organizational capacities. They also may not benefit from the project's financial resources particularly in the selection of sub - project proposals. This risk is low.

- **Risk of discrimination of vulnerable groups**

Vulnerable and marginalized groups may find themselves excluded from all project activities especially as they do not have the means to acquire productions equipment's. They can also remain in the margins of technical support and advice provided to other producers. This risk is low given the forms of intervention of the grant project include 100% of production attachments.

- **Risk of exploitation of work, children chore**

In all African countries such as Niger, it is common for children to participate in agricultural activities. It is therefore likely that children work on sub project sites will be selected. Law No. 96-039 on the Labour Code in Niger will be applied to beneficiary groups to avoid this problem.

- **Incidental findings Risks**

This risk is low because the public consultation which was conducted in areas of project intervention with the populations, has identified the presence of physical and cultural heritage in the areas of

intervention. However, in case of accidental discovery, procedures and guidelines of the BOAD on physical and cultural heritage will be applied.

- **Risk of infringing human rights**

It is slightly probable that this project negatively affect human rights and the rights of children and women. Rather, it reinforces the right to food.

PROPOSED MEASURES FOR ENVIRONMENTAL AND SOCIAL MANAGEMENT

The following measures are recommended for the various phases of the activities planned by the project, in order to mitigate negative impacts and enhance positive impacts.

Specific measures will be identified during the implementation of environmental and social impact assessments or impact Instructions subprojects. These measures will be the subject of specific environmental and social management plans for every website.

- **Measures before start of development works**

Before starting the rehabilitation, expansion and development of irrigated areas in the municipalities of intervention, it is desirable to apply preventive measures with a view to limit and / or eliminate certain relevant negative impacts. In this context, the following measures are proposed:

- Performing a reference position;
- Conduct a detailed ESIA or Impact Notice for sub projects;
- Inclusion in the Bidding Documents (DAO), environmental and social terms, and make compliance of the application of these provisions and any other provisions for assisting in the preservation of the environment by any company contractor a market;
- Promote the employment of local labor conditions to avoid frustration and conflict. Similarly , purchases of materials must favor the economic operators of project intervention areas to contribute to economic recovery in the region and this in compliance with the standards;
- Provide qualified technical assistance and close the project in the implementation framework of the ESMP and any environmental and social activities through a stakeholder capacity-building program;
- Inclusion in the manual of procedures of the provisions proposed to ensure the effectiveness of the consideration of environmental and social issues , and environmental and social;
- Conduct information and awareness campaigns for local people. This measure improves the social acceptability of the project and the success regarding the activities to drive;
- Establish and form committees of water users and / or committees of irrigators. Thus, around a landscaped perimeter, operators will be encouraged to organize block / plot (control the quality of seeds and inputs used, the operation of pump equipment). The leadership of women and young people will be encouraged to participate actively in the management of facilities and infrastructure.
- Promote and foster project proposals from women's groups.

- **Measures for development work**

To mitigate the impacts of project activities, the following measures must be applied. It is :

- to take all the necessary steps (implementation bins for example) to collect and remove waste from the work without causing harm to the biophysical circles concerned. Therefore, it is essential to require contractors to provide a site waste management system to avoid point source pollution of soils;
- Put PPE at the disposal for workers;
- A pharmaceutical box emergency care to deal with unexpected accidents at work (eg injuries);

- Make available all the safety equipment for workers (gloves, shoes and nasal masks);
- Inform and educate all workers on site security arrangements and certain diseases, including STI / HIV / AIDS and respiratory infections.

- **Measures during the operation phase**

  - **Water Resources Preservation Action**

The first step to take is to optimize water consumption to minimize deepening concerned tablecloths long term. Therefore, it is necessary to promote irrigation techniques that save water, such as California network with a dropwise system, to optimize the water consumption. Moreover, it is also important to install two monitoring wells at the sites. This allows to obtain information on the groundwater level of the relevant aquifers.

In addition, it is important to reduce inputs of agrochemicals (fertilizers) used to improve soil fertility or for reasons of intensification in order to limit the contamination of groundwater, particularly in areas where the water table is not deep (valleys, oasis, Dallols and river area). It is thus essential to periodically take samples of water for laboratory analysis to determine the physicochemical quality of groundwater in all areas affected by the intervention of the PARR-CC. We must therefore carry out regular operations to monitor and control parameters affecting water quality, such as pH, temperature, conductivity and some chemical elements at all sites.

Thus, in the context of environmental monitoring program, a network of quantity and quality water monitoring will be set up to assess potential changes in the quantity and quality of groundwater. To properly carry out these actions, the regional directorates of hydraulics must be fully involved.

  - **Soil conservation measures**

The most harmful effect to prevent is soil salinization by transfers of chemicals (fertilizers). It is therefore essential to optimize the dosage of agrochemicals (fertilizers). It should also take action capacity building (training and awareness) for the benefit of market gardeners, on the optimal use of fertilizers, on respect for the cultural calendar, on promoting organic fertilization and management solid waste from packaging of pesticides.

  - **Vegetation Protection Measure**

To mitigate the negative impacts on the flora, it is essential to promote agroforestry practices with appropriate native species and improving land conditions. Reforestation actions around the hedgerow shaped sub-sites will be conducted to improve the state of vegetation cover sites and their vicinities.

  - **Wildlife Protection Measures**

For a better safeguard wildlife (mammals and birds) located in the PARR-CC zones, it is essential to organize awareness raising and capacity building on issues dealing with wildlife protection and phytosanitary treatment. For the fight against the massive destruction of non-target fauna (insects, reptiles, amphibians ...) during phytosanitary treatment, it is necessary to promote other alternatives to chemicals, including the use of local products (neem oil and tobacco). Finally, we must encourage biological control, including the installation of a hedge cowpea which drives pests and is a forage species for animal production. This justifies the development of pests and pesticides management plan to define mechanisms and actions to minimize impacts related to the application / use of agro-chemicals.

  - **Ecological Risk Prevention Measures**

Protective measures of fauna and flora will reduce the risk of erosion of animal and plant species and thus the breakdown of the ecological balance.

  - **Preventative measure of soil acidification**

To prevent the risk of acidification of soils and soil yield reduction, it is essential to make available to producers the good practice guides on the use of fertilizers and train producers for their effective use. Advisory support actions should be instituted for producers for a proper understanding and use of the

devices in place for the rational management of chemical products. The evolution PH ground sites will be monitored through sampling and laboratory analyzes.

- **Measures relating to the safety and health of producers**

To protect the health of consumers and market gardeners, concrete steps must be taken. This is among others:

- Train and equip phytosanitary brigadiers in the joint project interventions to provide support to rural producers who exploit gardeners sites in case of parasites;
- Organize periodic training and awareness for vegetable farmers on the optimal use of agrochemicals (nitrogen fertilizer), on the harmful effects of phytosanitary treatments and phytosanitary brigadiers on port protective equipment (masks nasal) during application of pesticides;
- Provide and ensure the use of personal protective equipment (PPE) to producers on sites
- Inform and educate gardeners operators on waterborne disease and accumulation of trace elements in plants;
- Strengthen health centers in municipalities affected by the project interventions for the treatment of poisoning or waterborne diseases.

- **Measures relating to the breeding and population migration**

To do this, it is among others:

- Develop fodder crops (eg, forage sorghum, cowpea, etc ...) that are likely to adapt to the environmental conditions of the environment, and, in collaboration with research institutions (INRAN, ICRISAT and Universities) and populations;
- Inform and educate local populations on life in association and sexually transmitted diseases, including STI / HIV / AIDS

- **Risk prevention measures for traffic accidents**

To prevent the risk of traffic accident, it is necessary to ensure that the vehicles requested for the transportation of the equipment is in good condition and is current as technical visit. It is also necessary to raise awareness among drivers in particular the limitation of speeds in areas at risk.

- **Optimization Measures**

To enable the project to truly play its role to strengthen irrigation and adaptation to climate change effects, it is important to take other actions to minimize the negative impacts and maximize positive impacts. It is:

- ensure seed in quantity and quality as well as focus on biological control ;
- support vegetable producers to modernize agricultural practices through subsidies in agricultural equipment and packaging products, particularly those who have proven experience in promoting irrigation;
- organize periodic training sessions to strengthen the capacity of agricultural and vegetable farmers in pesticide use techniques;
- Develop and implement a capacity building program of local institutions, departmental and regional (Council of Support Services including SPAC) to promote protection of the environment and ensure technical support to vegetable producers to make acceptable crop .Strengthening of technical measures.

Measures of technical building concern (i) the development of a manual of good agricultural practices; (iii) the provision for the realization of Environmental Impact Assessments ; (iv) the provision for the implementation of possible ESIA ; (v) establishing a baseline situation and the establishment of a database " agriculture / livestock / environment" ; (vi) monitoring and evaluation of project activities.

The measures relating to the risk of (i) non- profitability of the project to a slice of farmers or inequitable access to beneficiaries , (ii) discrimination of vulnerable groups , (ii) exploitation of work , children chore ; (iv) Incidental Findings Risks ; (v) infringing human rights are contained in the following table.

Especially for the present project, the Environmental and Social Principles of the Adaptation Fund will be take in account by all the sub-project proponent. The following table describes the management of risks and impacts of the project in accordance with the Environmental and Social Principles of the Adaptation Fund.

Table 25: Environmental and social impact/risks of project and mitigation measures

Components in line with the AF guidelines	Impacts / Risks	Level	Mitigation Measures
Project does not comply with environmental and social legislation of the country and financial institutions	Non-compliance with the policy and legal frameworks of Niger and the financial institutions policies and guidelines	Weak	The project has been developed taking into account the commitments and legal and regulatory provisions of Niger including the Law No. 98-56 of 29 December 1998 relating to the framework law on environmental management. In Niger, the environmental management policy framework is, above all, enshrined in the fundamental Law (Constitution of November 25, 2010) which states that "everyone has the right to a healthy environment" and that "the State has an obligation to protect the environment for the benefit of present and future generations. Also "the State shall ensure the evaluation and supervision of impacts of all project and development program on the environment". In addition, the country adopted a new environmental policy integrating environmental concerns. This policy is enshrined in the National Environmental Plan for Sustainable Development (PNEDD), developed in 1998, adopted in April 2000 by the Government of Niger and in lieu of the national agenda. The plan also represents the operationalization tool through six priority programs. Legally, several international and national texts adopted by Niger, specifically dealing with the protection of the environment will apply in the project. Internationally, the main conventions which have a link with the development of the project are on the Biodiversity; the Climate Change; the desertification, the wetlands, the pollution, cultural heritage. Nationally, obligations and laws and regulations of environmental protection applicable to the project, are, among others, the constitution of November 25, 2010; Law No. 98-56 of 29 December 1998 on framework law on environmental management; Law No. 2001-32 of December 31, 2001, on the orientation of the Land Planning Policy. The project has its roots in the Strategy of Small Irrigation Niger (SPIN) adopted in April 2015 (Axis 1 of

Components in line with the AF guidelines	Impacts / Risks	Level	Mitigation Measures
			the strategy). It is in accordance with the environmental management policy and the Framework Law on Environment of Niger and the policies and procedures of BOAD that an Environmental and Social Management Framework (ESMF) and a pest and pesticides management plan (CPMP) have been developed within the framework of the implementation of the project. All the policies of BOAD triggered during screening are taken into account in developing the ESMF and PPMP.
Management of natural resources, pollution and protection of natural habitats	Degradation of water quality through drainage of residues of fertilizers and pesticides used and solid waste	Medium	The Environmental and Social Management Framework (ESMF) proposes the following measures to prevent water pollution. <u>Measures during the development works</u> To mitigate the impacts of the project activities, the following measures should be applied. This is to take all provisions (implementation of garbage bins for example) to collect and remove waste from the work without causing harm to the Biophysical environment concerned. Therefore, it is essential to require contractors to provide a site waste management system to avoid point-source pollution of soils. <u>Measures during the development of perimeters</u> The first step to take is to optimize the consumption of water to minimize in the long term the deepening of concerned groundwater. Therefore, it is necessary to promote irrigation techniques that save water, including the California network with a Drip system system to optimize water consumption. The second measure is to install a piezometer at the sites level. This allows to obtain information on the groundwater level of the relevant aquifers. In addition, it is important to reduce inputs of agrochemicals (fertilizers) used to improve soil fertility or for reasons of intensification, to limit the contamination of groundwater, particularly in areas where the water table is not deep (valleys, oasis, Dallos and rivers area). It is thus essential to periodically take samples of water for analysis in the laboratory to determine the physicochemical quality of groundwater in all areas covered by the Project interventions. It is therefore necessary to carry out

Components in line with the AF guidelines	Impacts / Risks	Level	Mitigation Measures
			regular monitoring actions and control parameters affecting water quality, such as pH, temperature, conductivity and some chemical elements at all sites. So in the context of environmental monitoring program, a network of sampling points and observations must be set up to assess potential changes in the quantity and quality of groundwater. To properly carry out these actions, the regional directorates of hydraulics must be fully involved.
	Destruction of wildlife habitats and some species of the non-target wildlife including insects, reptiles and amphibians from the use of pesticides	Medium	To allow a better safeguard of wildlife species (mammals and birds) found in the project areas, it is essential to organize awareness raising and capacity building on aspects dealing with the protection of wildlife and phytosanitary treatment. For the fight against the massive destruction of non-target fauna (insects, reptiles, amphibians,) during phytosanitary treatment, it is necessary to promote other alternatives to chemicals, including the use of local products (neem oil and tobacco). Finally, we must encourage biological control, including the installation of a hedge of Cowpea which hunt the pests and which is a forage species for animal production. This justifies the development of pests and pesticides management plan to define mechanisms and actions to minimize impacts related to the application/use of agro-chemicals.
Soil conservation and preservation of biodiversity	Acidification of soils by the uncontrolled use of chemicals	Medium	The most harmful effect to prevent soil salinization is by chemical inputs (fertilizer). It is therefore essential to optimize the dosage of agrochemicals (fertilizers). It should also carry out actions of capacity building (training and awareness) for the benefit of market gardeners, on the optimal use of fertilizers, on respect for the cultural calendar, the promotion of organic fertilization and of management solid waste from packaging of pesticides. The Project will not induce a greater use of fertilizers compared to the current use which is also uncontrolled. Instead, the project wants to limit the use of chemical fertilizers by encouraging composting for the restoration of soil fertility. This action is provided in the component C.2.1 of the project. The agroforestry system and planned reforestation will help to conserve soil and restore medium-term soil fertility. These actions will also help limit the silting of sites, delay or change the dynamics of water erosion.

Components in line with the AF guidelines	Impacts / Risks	Level	Mitigation Measures
	Disappearance of some elements of biodiversity by the uncontrolled use of pesticides during processing of crops	Medium	The use of pesticides and chemical fertilizers will cause the destruction of certain components of biodiversity. To reduce these impacts, measures of good practice in pest and pesticide management were elaborated. A manual will be available for the producers for a better use of these products. In addition, the reforestation activities and integration of agroforestry with the planting of nutritional or medicinal value species will help conserve soil and restore medium-term soil fertility. These actions will also help limit the silting of sites, delay or change the dynamics of water erosion.
Public health	Risk of poisoning by inhalation or by direct consumption of water or food contaminated by pesticides or fertilizers	Medium	To protect the health of consumers and market gardeners, concrete steps must be taken. These are, among others: (i) train and equip phytosanitary brigadiers in the municipalities of intervention to provide support to rural producers who exploit market gardens in case of parasites invasions; (ii) organize periodic training and sensitization for market gardeners farmers on the optimal use of agrochemicals (nitrogen fertilizer), on the harmful effects of phytosanitary treatments and phytosanitary brigadiers on the wearing of protective equipment (nasal masks) during application of pesticides; (iii) inform and sensitize market gardener farmers on diseases related to the presence of water and the accumulation of trace elements in plants; (iv) strengthen the health centers of municipalities affected by the project interventions for the treatment of poisoning or illnesses related to water stagnation. Good practices in terms of pesticide use have been proposed in pests and pesticides management plan.
Equity and equal access	Risk of non-profitability of the project to a slice of farmers or inequitable access to beneficiaries	Weak	Of the eligibility criteria, clear and transparent, sub-projects will be defined in consultation with all stakeholders. The planning and implementation will be participatory and this process will be adopted to ensure equal voice to all. The project activities target the vulnerable groups dependent on agriculture in the various selected areas. In this context, all farmer groups which request it therefore has an equal opportunity to benefit from adaptation activities proposed by the project. This is also to ensure access to the project by all especially vulnerable as the project provides that farmers are formed into groups to gather all the assets to support their selection.

Components in line with the AF guidelines	Impacts / Risks	Level	Mitigation Measures
			The project also includes to put in place a communication system so that all production groups are informed of the project and its benefits. In addition, the project will undertake, to the extent possible, an assessment of access and equity for vulnerable groups during the implementation phase by consultation means with communities.
Consideration of vulnerable groups	Risk of discriminatio n of vulnerable groups	Weak	The project proposes a 100% subsidy for the development of the sites (solar equipment, pumps, irrigation systems, etc.). This does not limit the vulnerable groups to benefit from the project. Project interventions are proposed to reduce the vulnerability of existing systems and promoting sustainable and environmentally friendly livelihoods for food security and risk mitigation, to ensure better adaptation to changing weather conditions without compromising on output and productivity. Indeed, the revenues from the sale of garden produce, serve mainly for the purchase of food crops (millet, rice and corn) to face the lean period, and to a lesser extent for mutual assistance, for the organization of ceremonies (marriage and baptism) and the purchase of pharmaceuticals. So, the development of small-scale irrigation, will certainly induce increased income and, consequently, improve the living conditions of the population, especially in terms of food security. These gardening activities will allow to occupy the inhabitants of beneficiary villages, especially the most vulnerable (women and youth) through the creation of a significant number of working days.
Workforce and working conditions	Risk of exploitation of work, children chore	Medium	To ensure the best working conditions, the following measures are proposed: - To provide workers a pharmaceutical box of emergency care to deal with unexpected accidents at work (eg injuries); - To provide all safety equipment for workers (gloves, shoes and nasal masks); - Although beneficiaries are responsible for the exploitation of their perimeter, the project will ensure the elimination of the worst working conditions and especially the forced labor of children. Order No. 96-039 on the Labour Code in Niger, will be the reference document to ensure optimal working conditions.

Components in line with the AF guidelines	Impacts / Risks	Level	Mitigation Measures
Indigenous Peoples	None	None	The project does not affect indigenous people in the intervention areas.
Involuntary Resettlement	None	None	The project does not cause involuntary resettlement. It is in the interests of maintaining populations in their current environment while strengthening their capacity to adapt to climate change. That is why the project has placed particular emphasis on the development of existing perimeters. Therefore, the project will not induce displacement or the occupation of people's assets, and therefore does not require the development of a master plan for resettlement of populations.
climate Change	Emission of greenhouse gases	Very weak	The project proposes the use of solar energy, low-carbon, replacing fossil-fueled pumps with all their environmental impacts cortege (GHG emissions, etc.). The project will thus, contribute to the fight against the impact of climate change. Moreover, with the Drip system very water-saving and with an increase of production, the project ensures the preservation of water resources and adaptation of farmers to climate change.
Preservation of cultural and natural heritage	Incidental findings Risks	Weak	No negative impact on the physical and cultural heritage of the people in the intervention areas were identified during the public consultation which was conducted in the project intervention areas with the populations. In addition the project intervenes on perimeters in exploitation. In case of accidental discovery, the procedures and guidelines of BOAD on the physical and cultural heritage will be applied.
Human rights protection	Risk of infringing human rights	Weak	The project does not affect human rights. The rights of children and women are taken into account in the implementation of the project.

Environmental and Social Management Framework Plan (ESMFP)

An Environmental and Social Management Framework Plan (ESMFP) has been drafted to guide the Environment and social Management Plan of the subprojects when these will be formulated. The ESMFP include the Pest and Pesticide Management Plan (PPMP) prepared in the framework of the development of the project.

The ESMFP includes: (i) identification of impacts, (ii) a description of measures, (iii) the process of environmental screening, and (iv) the budget to ensure effective management of environmental impacts. To be effective, the ESMFP must be fully integrated with the overall management of the project effort at all levels. It should be taken into account during the cycle. The project implementation manual will have to consider the ESMP. The Project Management Unit will be responsible for the implementation of the ESMP. The BEEEI will ensure the review of the ESIA of the subprojects, the

monitoring and evaluation of the implementation of the ESMFP in accordance with environmental procedures of the Niger and taking into account the requirements of policies and guidelines BOAD.

The methodological approach adopted for developing the ESMF and PPMP was based on the concept of a systemic approach, in consultation with all stakeholders involved in the project. Indeed, the development of such documents has favored a participatory approach which helped integrate, progressively, the opinions and arguments of various stakeholders.

See an extract of Framework Plan for Environmental and Social Management and Management Framework Plan of pests and pesticides in Appendix 5.

The Environment and social impact assessment (ESIA) will be prepared by each sub project proponent when the localization will be determined. The ESIA of each sub project will take in account all the environment and social principle triggered by the project according to the procedure put in place by the ESMF.

An Environmental and Social Management Plan (ESMP) specific to each site will be developed during the realization of the EISA or Impact Notice of sub-projects. These ESMP will include specific mitigation and prevention measures and indicators to assess the performance of these measures during the implementation of the sub-projects.

Grievance mechanism in the framework of the project

In the line of GEF grievance mechanism, BAOD has a policy and grievance procedures manual. This manual defines the complaint resolution mechanism in the implementation of any project financed by BOAD. It aims to establish an effective dialogue between those affected by the projects it finances and all interested parties, to resolve the problem or problems at the origin of a request, without seeking to assign responsibility or fault to any of these parties. The objective of the grievance mechanism is to ensure a fair and effective operationalization process, available at the project, country or the client company. Affected communities and other stakeholders which will be affected by the PRRA-CC sub-projects can submit complaints to the Bank by the circuits, either by mail, email, fax or phone. The procedures to resolve a grievance in the framework of the project is described in the appendix 6.

D. Describe the arrangements made for monitoring and evaluation (M & E), including the plan budgeted for monitoring and evaluation.

A monitoring and evaluation of project activities will be set up to assess progress regarding the objectives and outcomes outlined in the project document. It will allow to identify strengths and weaknesses in order to make informed decisions and in time. Monitoring will focus on the implementation of project activities and will be based on the measurement of progress at each critical stage of the process. A first level of monitoring is entrusted to technical project steering committee made up of several actors (State and Non-state involved in the project). At the level of each economic region of the country, the regional commission of sustainable development will be the monitoring relay to ensure the smooth running of the project activities. Periodically, the Department of Planning of the Ministry of Agriculture will conduct monitoring and evaluation missions and, produce reports on the level of implementation of the recommendations of the Technical Steering Committee. One of monitoring tools will be the work and annual expenditures plan which will be validated by the technical steering committee.

In the implementation, permanent proximity support-coaching will be provided to grassroots. At the level of targeted sites, the Committees or Village Groups and other decentralized local structures protecting the existing environment will be equipped with simple participatory monitoring and evaluation tools to monitor and evaluate their own project activities during and after execution.

Planning and Monitoring Evaluation

The system of M & E of the program will be built around the logical framework as a tool for

management, planning and assistance in decision making for all implementing partners.

Several participatory tools will be used to measure project performance. Additional effect/impacts surveys (start, mid-term and completion) and analysis of technical, annual economic and financial performance of farms (that received irrigation equipment) will measure the project's impact for groups targets (improvement of yields, water saving, energy independence, reduction of their poverty and improvement of their resilience). A computerized database will be developed for the project.

Quantitative targets will be approved by region at the start of the project when reviewing the logical framework with stakeholders taking into account the intervention sites. A midterm review and a final evaluation are planned in order to assess the changes observed at baseline[32]. The M & E system will support decision-making for the adoption of actions or activities of resilience for future projects.

The M & E tools will be developed based on existing operational arrangements and the level of ongoing projects (survey sheet, further investigation to assess the effects/impact, monitoring sheets of activities, thematic studies, nominative targeting system, agronomic monitoring system, dashboards).

It will be also to enrich the tools available (eg EX-ACT software developed by FAO) for the development of carbon audits in order to monitor the effects related to activities implemented under the PRRA-CC.

A synergy will be developed between the PRRA-CC and projects/programs in the regions concerned.

The implementing partners are: i) for operational monitoring, the technical services of the ministries involved (environment, agriculture, livestock, rural engineering, hydraulics and rural code); ii) for the dissemination of information on the environment and climate change, NGOs and consulting-services groups (GSC). A regional technical assistance will occur, from time to time, to strengthen quality control.

The monitoring and evaluation will be done through:

- Balance sheet and programming meetings with grassroots actors;
- Weekly Points, monthly, quarterly and annual reviews at the project team level;
- Field visits.

Annual evaluation: Annual evaluations that involve the project management unit, the Steering Committee of the project, the implementing agencies and representatives of the beneficiary communities will be conducted. They will be organized under the supervision of the Planning Director and in collaboration with the coordinator of the project, the preparation of annual progress reports, including recommendations to be submitted for adoption to the Project Steering Committee. They will take into account the progress toward goals, lessons learned, risks management, implemented budgets and difficulties. The inspection by the Project Management Unit will be complemented by the financial monitoring by a competent body.

Mid-term evaluation: It will be conducted independently and will focus on the character of effectiveness, efficiency and ownership of the implementation of the project. The report will highlight issues requiring decisions and actions, and the reports of the first lessons learned from project design, execution and management. It will be preceded by a detailed financial audit.

Final evaluation: it will be made at the end of the project and will be based on the same approach as the mid-term evaluation. It should also make recommendations on further steps in sustainability.

Ex-post evaluation: It will focus on the sustainability of the project results and lessons learned, including best practices, cost estimates, by applying lessons at both sectoral and thematic levels as well as the basis for policy development and future planning.

There will be internal M&E carried out by the project management unit. This will be focused on the technical and financial management matters.

[32] A baseline situation will be specified at project start for each intervention site

Beyond this, a programme of monitoring and evaluation (M&E), in accordance with established BOAD procedures will be carried out by the BOAD Organizational Unit in charge of M&E in collaboration with Programme team.

A Monitoring and Evaluation (M&E) system for the programme will be established, based on these indicators and means of verification. Costs associated with implementing this system are detailed below.

Specialized Technical Services	**Responsible Parties at BOAD**	**Budget US$** *Excluding programme team staff time*	**Time frame**
Quarterly reports	Programme manager and Monitoring and Evaluation Unit	30 000	Quarterly
Annual progress reports	Programme manager and Monitoring and Evaluation Unit	8,000	At the end of each year
Mid-term Evaluation	Programme manager and Monitoring and Evaluation Unit External Consultants	10,000	At the mid-point of programme implementation.
Final Evaluation	Programme manager and Monitoring and Evaluation Unit External Consultants	10,000	At least three months before the end of programme implementation
Programme Terminal Report	Programme manager and Monitoring and Evaluation Unit External Consultants	5,000	At least three months before the end of the programme
Audit	Programme manager and internal audit unit External Consultants	30,000	Yearly
Visits to field sites	Programme manager and Internal audit unit Monitoring and Evaluation Unit External consultants Government representatives	9,000	Yearly
TOTAL INDICATIVE COST Excluding programme team staff time and BOAD staff and travel expenses		US$102,000	

Environmental and social monitoring and surveillance

Institutional arrangements for monitoring and environmental monitoring

The surveillance and environmental monitoring will be provided by BEEEI[33] in connection with the Project Management Unit. From the perspective of institutional arrangements at the central level, environmental monitoring is in the first instance the responsibility of the BEEEI given its sovereign mission. This mission of BEEEI will be done in collaboration with DGGR[34] and other structures partners of the PARR-CC.

All the results of the monitoring should also be discussed and shared during the sessions of the National Steering Committee of the PARR-CC for validation. At regional and local level, the surveillance and monitoring system determined centrally will build on the DEESE[35] in collaboration with DRGR and other decentralized technical services.

The actions of capacity building to carry out, include training for the benefit of the various stakeholders to ensure ownership of the contents of ESMF. They also concerned the missions as part of the implementation of the environmental surveillance and monitoring program.

[33] Bureau des évaluations environnementales et des études d'impact
[34] Direction Général du Génie Rural
[35] Divisions Environmental Assessments and Ecological Monitoring

Strategy for implementation of the measures

The ESMF of the PARR-CC will be anchored in environmental strategies underway or in prospect of implementation in the agricultural sector, such as PRODEX, PIPA / SA, PPAAO in Niger. It is well to create and federate synergies with such programs and build on the achievements and opportunities offered or planned, especially in terms of strengthening environmental capacities. This comes within the framework of a rationalization of resources and the search for complementarity to better ensure the achievement of common goals and improve the quality of the expected positive impacts on the same targets of the sector.

Environmental Surveillance Program

Environmental and social surveillance is primarily intended to monitor the proper implementation of activities and works for the duration of the project, and that, with regard to respect of environmental and social measures which are proposed, laws and regulations governing environmental evaluation in Niger and environmental policies of BOAD. The monitoring program should contain:

- The list of items or parameters requiring environmental surveillance;
- All measures and means envisaged to protect the environment;
- The implementation actors;
- Commitments of contracting authorities and contractor in filing monitoring reports (number, frequency, content).

Under the PARR-CC, environmental monitoring will be provided by BEEEI in collaboration with the implementing agencies and their branches. To allow agencies to carry out the monitoring program, their ability in the field will be strengthened.

Environmental and social monitoring program

Despite the knowledge of certain environmental and social phenomena related to generic impacts of the project activities, it nevertheless remains that there is still a degree of uncertainty in the accuracy of other impacts, particularly regarding diffuse impacts and residual impacts. For this reason, it is necessary to develop an environmental monitoring program. The latter shall verify the correctness of the evaluation of certain impacts, assess the effectiveness of mitigation measures implemented and allow to make proposals for possible corrective action when necessary. The environmental monitoring program will present the indicators to monitor the mitigation and improvement measures. Moreover, the environmental and social monitoring will track the evolution of the state of the environment, including the sensitive elements, using relevant indicators on the environmental components established on a consensual basis by the various stakeholders in the execution. The monitoring indicators as well as some parameters should be redefined and refined following completion of detailed environmental studies.

A. Environmental monitoring program for the project

 Monitoring in realization phase of infrastructure: During the work under the project in particular, the realization of boreholes, construction of new perimeters, rehabilitation or strengthening of infrastructure of existing perimeters, regulations into force and particularly those relating to the environment must be respected. The borehole drilling, the installation of the pumping system and the energy system with solar panels, buildings for storage of production equipment and harvesting of products must follow the selection procedure and be subject to close monitoring to prevent pollution and nuisances and / or disturbances related to the activities.

 Monitoring in realization phase of operations in support of the production: The conduct of activities (i) of supply / production, control, distribution and use of appropriate agricultural inputs (seeds and improved seedlings, fertilizers, pesticides , etc.) and (ii) promotion of good agricultural practices, shall be in accordance with applicable regulations and in particular those concerning the

environment and the social. These activities should be monitored to avoid water and air pollution, and soil, flora and fauna degradation.

 Monitoring in realization phase of operations in support of the promotion of agricultural products: The use of new techniques for processing and packaging of agricultural products must be in compliance with the regulations in force and in particular those concerning the environment and social. The promotion of agro-processing and packaging techniques will be subject to close monitoring to ensure compliance with hygiene standards and prevent and / or avoid food poisoning.

 Monitoring in realization phase of research and technology vulgarization activities*:* During agricultural research, the regulations in force and in particular those concerning the environment and the social must be respected. Research projects should follow the screening procedure and their experimentation should be done as part of a quality management plan, including compliance with environmental and social constraints corresponding to those presented in the ESMF and PPMP. In phase of agricultural technologies vulgarization, the monitoring will focus on the essential components described in the canvas above including: the state of water resources, water quantity and quality; chemical soil fertility, soil and land degradation; the physical properties of soils, behavior and land use, changes in fauna and flora, starting from biodiversity, the type of facilities; the evolution of techniques and agricultural technical performance, hygiene and health (waterborne diseases, poisoning, pollution, nuisances, etc.).

B. Monitoring Indicators

Indicators are parameters whose use provides quantitative and qualitative information on the impacts and environmental and social benefits of the project. Indicators are used, first, for the description with verifiable accuracy, of the impact generated directly or indirectly by the activities of the project components, and, secondly, for the highlighting of importance of impact. They provide a summary description of statements and constraints and allow to observe the progress achieved or deterioration suffered over the time or compared to targets. They reveal past trends and serve, to some extent, as prediction tools. As such, they are an essential component in the project ESIA in order to assess the effectiveness of the project activities, including the construction and rehabilitation of agricultural infrastructure and their subsequent operation and maintenance. The monitoring indicators will assist in the implementation of mitigation measures, monitoring and evaluation of the entire project to assess the effectiveness of activities. These indicators will be developed by consultants under the ESIA to be carried out, or by the ESIA office (BEEEI)[36] of the Ministry of Agriculture, in the case of simple mitigation measures to be proposed.

To assess the effectiveness of project activities, the environmental and social monitoring indicators below are proposed:

Indicators of strategic order to monitor by the environmental and social unit of the project:
The strategic indicators to be monitored by the BEEEI with technical services involved (namely DGPV[37]) are:

- Level of integration of environmental criteria in the different actions of the project;
- Number of actors trained in environmental assessment of agricultural activities;
- Existence of a manual of good agricultural practices;
- Number of actions or sub projects subject to an ESIA with the ESMP and PMPP implemented;
- These indicators will be monitored regularly during the implementation and progress of actions and will be incorporated into the monitoring system of the project.
- The various indicators below are proposed to follow these steps:

Monitoring in realization phase of infrastructure

- Effectiveness of environmental and social clauses in execution files (DAO);
- Efficiency of waste disposal systems from the construction work;
- Number of open quarries and reclaimed by the construction companies;
- Number of accidents caused by the work;

[36] Bureau des évaluation environnementales et des études d'impact (BEEEI)
[37] Direction générale de la protection des végétaux (DGPV)

- Number of hectares reforested after site clearing for new or modified;
- Number of jobs created locally (unskilled local labor used for work);
- Level of involvement of communities and local actors in monitoring of the work;
- Level of consensus (approval) on the selection of buildings and development sites;
- Quality of completed infrastructure;
- Functionality of completed infrastructure;
- Rate of access to infrastructure.

These indicators will be monitored by the structures in charge of rural infrastructure and control offices which assist the steering committee

Monitoring in realization phase of operations in support of production

- Rational and ecological use of agricultural inputs (improved seeds and seedlings, fertilizers, pesticides, brood, fry, feedstuffs);
- Number of awareness sessions organized for farmers on the optimal use of agricultural inputs;
- Rational and ecological use of agricultural materials;
- Application level of environmental and social mitigation in agricultural mechanization;
- These indicators will be monitored by the ESIA office of Niger (BEEEI).

Monitoring in realization phase of operations in support of the enhancement of agricultural products

- Respects of level of hygiene, health and safety;
- Number of training and sensitization sessions organized for transformers;
- Application level of environmental and social mitigation measures in the agro-processing;
- These indicators will be monitored by the ESIA office of Niger (BEEEI).

Monitoring in realization phase of research and technology vulgarization activities

- Existence of manual of good agricultural practices;
- Application level of environmental and social measures in farming practices;
- Number of training sessions organized for vulgarization workers;
- Existence of manual on good practice of agricultural vulgarization;
- Effectiveness of environmental and social monitoring and reporting of vulgarization activities.
- These indicators will be monitored by the BEEEI.

 Indicators to be monitored by state institutions in charge of environmental and social issues:

- Validation of the environmental and social screening of activities of the PARR-CC
- Review and approval of ESMP which should take account the pest and pesticides management
- External monitoring of the implementation of the ESMP and PPMP

The BEEEI in collaboration with other technical services ensure external monitoring of the implementation of the ESMF, including checking the validity of the environmental classification of projects during selection, development, validation and dissemination of any ESIA If necessary, and monitoring of the implementation of the ESMP from the ESIA of sub-project. The monitoring of environmental and social measures proposed is an integral part of monitoring and evaluation of the project.

 Indicators to be monitored by other state institutions in vulgarization phase

During the vulgarization phase of agricultural technologies, the monitoring will focus on the main environmental components that could be affected by agricultural activities (water, soil, vegetation and wildlife, living environment, health, etc.). At that level the monitoring will ensured by the BEEEI in collaboration with state structures in charge of the management of these components as part of their sovereign functions as shown in the table below. The table below shows the environmental and social monitoring indicators proposed.

Table 26: ESMF and PPMP monitoring plan.

component	Monitoring elements	Types of indicators and elements to collect	periodicity	Manager / Actors
waters	State of Water Resources Hydrometric and water quality	- Physico-chemical and bacteriological analysis of water (pH, BOD, COD, heavy metals, bacteria, pesticides, nitrates, ...) - Pollution, eutrophication, sedimentation, hydrologic regime, state of flooding - Monitoring of groundwater and aquatic vegetation (eg, cattail, etc.).	Annual	BÉEÉI; DGGR (General Directorate of Génie Rural) DGPV (General Directorate of plants protection)
soils	chemical fertility	- Erosion / gully - Pollution / degradation - Organic matter content - Mineral elements Composition - Saturation rate - Exchange Capacity	Annual	BEEEI, DGGR DGA (General directorate of agriculture) DGPV INRAN[38]
	Soil science and soil degradation	- developed areas - abandoned areas	Semi-Annually	
	Physical Properties	- Depth, texture, structure, porosity, water holding capacity	Annually	
	Behavior and land use	- Sensitivity to wind and water erosion (area affected) - Degradation rate (salinization, alkalinization, erosion) - Yields of major crops.	Annually	
Vegetation and Fauna	Fauna evolution and the state of Flora	- Degradation rate - Reforestation rate - Evolution of vegetation types - Biomass productionTaux de recouvrement des sols - Actions de reforestation et mise en défens.	Annually	BÉEÉI DGPV
Production Systems	Type of developments	- Irrigation system	Semi-Annually	BEEEI DGGR

[38] Institut National de la Recherche Agronomique du Niger.

component	Monitoring elements	Types of indicators and elements to collect	periodicity	Manager / Actors
	Evolution of technical and agricultural techniques Performances	- Areas cultivated and production or yield; - Cultivation practices; - Adoption of production techniques; - Agricultural processing rate - Volume of consumed inputs (pesticides, herbicides, fertilizers)	Semi-Annually	BEEEI DGGR
living environment	Hygiene and Health Pollution and nuisances, Safety during operations and work	- Control effects on production sources - Compliance with hygiene on the site - Waste Management Practices - Presence of vectors and appearance of water-related diseases (malaria, bilharzia, diarrhea, schistosomiasis, etc.) - Actions of fight against waterborne diseases - Epidemiological surveillance - Port of appropriate protective equipment.	Semi-Annually	BÉEÉI DSRP DGPV
Indicators of monitoring of the PCGES measures	Realization of ESIS	- Number of realized ESIA - Level of implementation of mitigation measures	Once in the program's life	Project Management Unit (PMU)
	Development of manuals	- Maintenance Manual		
	Monitoring and evaluation measures	- Number and types of monitoring indicators; - Number of monitoring missions		
	Training, IEC Awareness	- Training sessions in evaluation and environmental and social monitoring of projects organized - Number of evaluation modules and environmental and social monitoring projects developed - Number of IEC sessions organized; - Number and type of persons reached	At the end of each training	PMU

These indicators will be monitored regularly during the implementation and advancement of components and will be incorporated into the project Implementation Manual

C. Overall estimate of Environmental and Social Management Framework Plan (ESMFP) and Pest and Pesticides Management Plan (PPMP) costs

At the current stage of the project, cost estimates can only be approximate, since we are not able to assess the nature of the places where the actions envisaged will be conducted under the project. However, lump entries were made for the implementation of large parts of ESMFP.

Table 4 : Implementation costs of ESMFP and PPMP.

Mesures	Intervention	Responsible			Schedule / Period
		Execution	control	Supervision	
Mitigation Measures	General and specific measures of the negative impacts of the project activities	companies	BEEEI and Technical Services	PMU	During all phases of the program
Training	Environmental and Social Assessment of projects; Monitoring and Enforcement of environmental measures	BÉEÉI	BEEEI	PMU	During all phases of the program
Strengthening the framework for pesticide management	Broadcast regulatory texts broadcast lists of authorized products educate stakeholders facilitate access to pesticides of quality to producers	DGPV	BEEEI	PMU	During the project implementation
	Promote pest control techniques environmentally Regularly monitor water quality Equip manipulators (plant health brigadiers) protection kits Raise awareness and producers about the harms of pesticides Train manipulators (phytosanitary brigadiers, storekeepers) on the safe management of pesticides; Strengthen the capacity of health centers on the management of poisoning	DGPV	BEEEI	PMU	During the project implementation
Information and sensitization	Information and sensitization campaigns on environmental and social issues related to the project	NGO	BÉEÉI	PMU	During the project implementation

Development of Manual of good agricultural practices	Preparation and approval of the manual	Consultant	BÉEÉI	PMU	At the beginning of the project implementation
Implementation of a database of environmental data of the rural development sector	Creation of the database	Consultant	BÉEÉI	PMU	During the project implementation
Regulatory and technical institutional measures	Realization of ESIA	Consultants	BEEEI	PMU	Once the APD validated
	Implementation of any ESMP	Project	BÉEÉI	PMU	Throughout the project life
	Support to structures for the implementation of the ESMF during screening	Regional / Departmental Technical Services	BEEEI	PMU	APD
	ESMFP Evaluation (permanent, mid-term and final)	Consultants	BEEEI	PMU	Halfway through and at the end of the program
Technical measure for pest and pesticides management	Improvement of the conditions of storage of pesticides support for the application of pesticides Strengthen of obsolete management Strengthen of empty packagings management	DGPV	BEEEI	PMU	During the project

E. Include a results framework for the project proposal, including milestones, targets and indicators.

Note:

The definition of project indicators was carried out on the basis of the Niger national strategies such as the 3N Initiative and the Strategy of Small Irrigation in Niger (SPIN) and the results frameworks of the main donors such as the Fund Adapted (FA) and the West African Development Bank (BOAD)

* I3N / SPIN Indicators + Adaptation Fund Indicators BOAD Indicators

Logic intervention	Indicator	Basic data	Target	Mean of verification	hypothesis / Risk
General Objective: Improve the resilience of agriculture to climate change to support food security in Niger, through the promotion of modern irrigation techniques and diversification of income sources for farmers	- Part of producers of intervention areas with access to time / at the right time to factors of productions adapted at reasonable cost * - Number of new sources of revenue created *	No producer in the target areas will benefit from the proposed comprehensive interventions.	200 producer groups in intervention areas have 1,000 ha of irrigated sites developed with the drip or California system powered by solar energy to enhance the resilience of agriculture to water and energy stress due to climate change Up to 51% of beneficiaries are women (young and older). Up to 40 to 50 % of beneficiaries are young people (male and female) About 4,000 households diversify their income sources to deal with the uncertainties related to climate change	Annual report of the crop year - Reports survey households on the level of household food security - Reports on the execution and monitoring and evaluation of the project	Political instability - Multi-dimensional crises New facets of climate risks emerge during the project life Reluctance to apply the acquired knowledge and practices on climate change adaptation
Component 1: Enhancing stakeholders' technical and institutional capacities and dissemination of lessons learned during the project execution	Number and type of target institutions strengthened to minimize exposure to climate change and variability hazards Percentage of the targeted population aware of the adverse impacts on climate change foreseen and the adequate responses+ The priorities relating to climate change are integrated into the national small irrigation plan	Insufficient training and documentation about the adaptation practices of the agriculture sector to climate change and its effects on food security.	The technical services of the Government in charge for small irrigation including agriculture, agricultural engineering, environment, hydraulic, local farmers and artisans (female and male) receive training on: - The fight against climate change and food insecurity - The technologies promoted in the project The communities in the target area have revised their adaptation plan.	- Reports on the execution and monitoring and evaluation of the project - Workshop reports - The technical ministries reports - Survey reports	Low participation and involvement of local public services and the population The technical practices promoted by the project are confined to the first recipient

Logic intervention	Indicator	Basic data	Target	Mean of verification	hypothesis / Risk
			The most successful experiences and those missed are documented at local and national levels on fuel development policies		
Outcome 1.1. Project proposals and environmental assessment validated and the funding approved by the board of Adaptation Fund and BOAD	PCN, feasibility studies, full project, ESIA, pest and pesticide management plan available.	No project documents available.	The requirement of AF and BOAD are taken in account to facilitate the project approval by the board of Adaptation Fund and BOAD.	The approval of the Project by the board of Adaptation Fund and BOAD	No compliance with the adaptation projects requirements of the AF, the BOAD and Niger republic.
Output 1.1.1. Support to the formulation of project documents (PCN, feasibility study, E&S Management Framework (ESMF), Pest and pesticides management Plan (PPMP), Full Project Document, public Consultation, national approvals of the project).	PCN approved by BOAD and AF Feasibility studies approved by BOAD ESIA, pest and pesticide management plan validated at national level and environmental and social compliance certificate issued by the Niger republic Full project approved by BOAD and AF board Public consultation conducted	No project documents available No public consultation conducted	The PCN is prepared and approved by the FA The document of E&S Management Framework and the document of Pest and Pesticides Management Plan are prepared and validated at the national level and AF level The public consultation is conducted in the project area A Full project is prepared and validated	PCN approved by AF Full project approved by AF Environmental compliance certificate issued by the Niger republic Funding of the project approved by BOAD and AF boards	Project documents don't meet fully the requirements of AF and BOAD
Output 1.1.2. Support for the realization of d'Avant-Projet Détaillé (detailed preliminary studies) and ESIA of sub-projects	Number of Preliminary draft Detailed document Number of ESIA report or Impact Notice prepared and validated	Full project E&S Management Framework Pest and Pesticides Management Plan	200 documents of Avant-Projet Détaillé prepared and submitted for funding 200 ESIA report or Impact Notice are prepared and submitted for approval	Preliminary draft Detailed document Subproject ESIA report or Impact Notice	Sub-project proposal don't meet the requirements or objectives of the full project
Output 1.1.3. Support to the technical control of the amenagement	Frequency of the missions of control and supervision of works	Full project E&S Management Framework Pest and Pesticides Management Plan	2 missions of control and supervision of works are carried out each year by a control Office		Faible capacité de maitrise des technologies promues par le projet
Output 1.1.4.Review and approval of the environmental and social impact report or Impact Notice of the sub-projects, and support for environmental monitoring of sub-projects	Number validation sessions Support for environmental monitoring of sub-projects	E&S Management Framework Pest and Pesticides Management Plan	Each ESIA report is review and approved by the BEEEI of Niger One support mission is conducted per year	ESIA or Impact Notice report Monitoring report Mi-term abd final evaluation report	Unavailability of BEEEI
Outcome 1.2. The capacities of local governance technical	Number and type of target institutions strengthened to	The trainings on the consequences of the	The technical services of the Government in charge for small	Reports of technical ministries	Low participation and involvement of local public

Logic intervention	Indicator	Basic data	Target	Mean of verification	hypothesis / Risk
services are strengthened	minimize exposure to climate change and variability hazards+	adverse impacts of climate change and adaptive measures in terms of small-scale irrigation are not yet mastered by the decentralized services.	irrigation including agriculture, agricultural engineering, environment, hydraulic, receive training on: - The fight against climate change and food insecurity - The technologies promoted in the project	- Reports on the execution and monitoring and evaluation of the project	services
Output 1.2.1. Capacity building of local development services agents of Ministry of Agriculture on climate change and its impacts on food security.	- Number of sessions of capacity building achieved * - Number of people trained on climate change and its effects on food security +.	Number of people trained and sessions Conducted are Insufficient	1 training workshops are organized during the first two years of the project on the impact of climate change and food security for 38 frames, at the rate of 2 frames in each of the 17 departments and one regional framework (4)	Workshop Reports - The technical ministries Reports - report of Execution s and monitoring and evaluation of the project	Low participation and involvement of local public services
Output 1.2.2. Training of Government technical agents in the use of the tools to monitor the changes in the status of natural resources	Number of sessions of strengthening of capacities organized*[39] Number of people trained in order to meet, and mitigate the negative consequences of events due to climate change+[40]	The knowledge of technical services on the monitoring tools of soil and water resources are not updated	3 training workshops, one for each theme (GIS, monitoring of groundwater and soil fertility) are organized during the first two years of the project for 38 frames taken at the departmental and regional beneficiary services	- Workshop Reports - The technical ministries Reports - report of Execution and monitoring and evaluation of the project	Low participation and involvement of local public services
Output 1.2.3. Strengthening of the technical capabilities of the Government actors in the implementation of the environmental and social safeguard measures	Number of sessions of strengthening of capacities on E&S management organized Number of guide to good practice of pesticide management developed and available to producers Rate of adoption of best management practices by producers	Control of environmental issues and social of all government actors involved in this innovative project is insufficient Insufficient support from management of pesticides by farmers	5 training workshops are organized due to one per intervention region of the project 200 copies of manuals of good practice in the management of pesticides At least 80% of the producers have adopted good pratices on pest management	Workshop Reports Good pratices manuals report of Execution and monitoring and evaluation of the project	Low participation and involvement of local public services
Outcome 1.3. The capacities of farmers' groups and other stakeholders to understand	Percentage of the targeted population aware of the adverse impacts on climate	Workshops organized are insufficient	Workshops are organized for local farmers and artisans to acquire knowledge on climate threats and	- Workshop reports - The technical	Weak mobilization and participation of the population

[39] I3N P: Coordination and management / SP 5. Mobilization and empowerment of stakeholders

[40] Adaptation Fund / output indicator 2.1.1.

Logic intervention	Indicator	Basic data	Target	Mean of verification	hypothesis / Risk
and adopt modern irrigation techniques to climate change are strengthened	change foreseen and the adequate responses+*°[41]		adaptation measures, The communities in the target area have revised their adaptation plan.	ministries reports - reports of the execution and on monitoring and evaluation of the project - Survey reports	
Output 1.3.1. Sensitization and training of grassroots communities on threats related to climate change and on adaptation and resilience measures related to food security	- Number of mobilized actors *[42] - Number of activities of information and sensitization undertaken *[43] - Number and type of reduction of risks actions or strategies introduced at the local level[44]	The conducted sensitization are insufficient	At least, 200 people among selected farmers benefit directly and 20,000 people indirectly benefit from sensitization campaigns carried out during the second and third year of the project.	Reports of awareness activities - The technical ministries reports - reports on the execution and monitoring and evaluation of the project - Survey reports	Lack of support from local administrative authorities (municipalities and regional councils)
Output 1.3.2. Training of producers to agricultural practices that preserve sustainably soil and water resources	Number of actors mobilized * - Number of capacity building sessions undertaken * - Rate of adoption of best management practices by producers *	The number of farmers trained on the water economy is currently insufficient in the target areas	200 farmers benefit from training workshops on irrigation systems and agricultural techniques to reduce climate risks More than thirty sessions are made	- Reports of workshops - The technical ministries Reports - Reports on the execution and monitoring and evaluation of the project - Survey reports	The technical practices promoted by the project are confined to the first recipient
Output 1.3.3. : Training local technicians in installation and repair of modern irrigation systems (drip kits, Californian network ..) and photovoltaic equipment	Number of actors mobilized * - Number of capacity building sessions achieved *	The number of artisans who have benefited from this training is insufficient compared to the needs.	28 local craftsmen from beneficiary areas of the project, two craftsmen by department, are trained and equipped for the installation and repair of irrigation systems and innovative solar photovoltaic systems. At least, six workshops are organized during the first 3 years of the project	Workshop reports - The technical ministries reports - Reports on the execution and monitoring and evaluation of the project - Survey reports	Low participation of local technicians

[41] Adaptation Fund / Indicator results / BOAD / monitoring and evaluation indicators of development results - Agriculture and Food Security / I3N PS 1. Increased agro-forestry-pastoral production and fisheries / PO1 - Increased production under irrigation
[42] I3N P: Coordination and management/ SP 5. Mobilization and empowerment of stakeholders
[43] I3N P: Coordination and management/ SP 5. Mobilization and empowerment of stakeholders
[44] Adaptation Fund/output indicator 3.1.

Logic intervention	Indicator	Basic data	Target	Mean of verification	hypothesis / Risk
Output 1.3.4: Formation des producteurs et des centres de santé sur l'application des pesticides, la gestion toxicologique des pesticides et des emballages et produits obsolètes	Proportion of beneficiaries whose pesticide application capabilities have been strengthened Number of health centre whose capacities have been strengthened to handle the cases of poisoning Number of services of destruction of obsolete products and packaging of pesticides that have benefited from technical and financial support	The capacities of the beneficiaries to the implementation and management of pesticides are very low The capacity of health centres in the areas of intervention for toxicological situations are very limited The field of intervention of the destruction of obsolete pesticides and pesticide packaging services is very limited	5 workshops are organized due to one per intervention region during the first and second years of the project implementation 5 workshop are organized per year during two years to enhancing the capacity of health centers on toxicological Management The services in charge of destruction of obsolete products and the packaging of pesticides were appuees technically and financially for efficient management of obsolete products and the packaging of pesticides generated	Training report Evaluation and monitoring report Disposal of the packaging of pesticides and obsolete products report	Low participation of the actors
Output 1.3.5. : Enhancing Community Development Plans with adaptation to climate change measures	Number of actors mobilized * - Number of PDC adjusted to address the risks of climate change	The good practices of efficient use of water and soil resources are not observed by communities as part of a local adaptation plan integrating food security and climate change	At the end of the project, the local development plans of 12 towns in the beneficiary regions are updated. 20 framework agreements are signed with communities for the effective use of land and water	- Documents of elaborated plans - Reports of validation workshops on elaborated plans - Copy of framework agreements signed by communities - Reports on the execution and monitoring and evaluation of the project - Survey reports	Some of the adaptation measures to climate change technically necessary are not priorities for the community
Outcome 1.4: The lessons learned are used to enhance the resilience of agriculture by irrigation through modern techniques to a larger scale	The priorities relating to climate change are integrated into the national small irrigation strategy +	Lack of documentation about the adaptation practices of the agriculture sector to climate change and its effects on food security.	The most successful experiences and those missed are documented at local and national levels on fuel development policies	- The technical ministries reports - reports on the execution and monitoring and evaluation of the project - Survey reports	The technical practices promoted by the project are confined to the first recipient
Output 1.4.1. Production of fact sheets on lessons learned	Number of fact sheets elaborated on innovative irrigation technologies	Sheets on farming and climate resilience technologies practices	At the end of the Project, 11 fact sheets are compiled on the practices and promoted technical	- fact sheets - The technical	Fact sheets developed by the project remain confined to the first

Logic intervention	Indicator	Basic data	Target	Mean of verification	hypothesis / Risk
		are insufficient		ministries reports - Reports on the execution and monitoring and evaluation of the project	recipient
Output 1.4.2. Sharing of project results and lessons learned and integration of new approaches at local, regional and national level	Number of awareness and advocacy activities held for parliamentarians and decision makers	the advocacy actions undertaken are insufficient	At least five meetings are held each year for the duration of the project	Reports of meetings, workshops Reports on the execution and monitoring and evaluation of the project	Limited availability of
Output 1.4.3. Meeting for government technical staff, beneficiaries and other stakeholders to improve the strategies that can scale up the resilience of vulnerable populations with the use of modern irrigation techniques	Number of workshops with all stakeholders, including policy makers to improve the National Small Irrigation Strategy and its action plan	The workshops organized are insufficient	At least, one meeting in the fourth year of the project At least the action plan of the National Small Irrigation Strategy is revised to strengthen the use of modern irrigation techniques as mean of resilience of populations to climate change and the fight against food insecurity and poverty	- Workshop reports - The technical ministries Reports reports of Execution and monitoring and evaluation of the project - Survey reports	Low commitment of the State to carry out the reforms
Output 1.4.4. Preparation and implementation of a large-scale project integrating the results of lessons learned	A national project developed and scaled	The project will build on the lessons learned from the pilot project	A large project prepared and implemented to reach the majority of vulnerable populations by the end of the third year More than 50% of farming communities in Niger practice agriculture on the basis of resilience thanks to intensified measures of project interventions throughout the country.	Project documents	Coordination failure of activities due to conflicts of interest among stakeholders
Component 2: Confortation and development of irrigated areas	- Optimization levels in water use and land conservation - Number of farmers adopting improved technology Power of the renewable energy (GWh/an) produced Part of the expenditures related to energy as regard the facilities	Traditional farming techniques degrade soils and most common surface irrigation is ineffective to more than 50% The charges of the power (electricity) often represents 60 to 70% of the cost of the motorized irrigation	At least 60% water savings are made on the developed areas of small irrigation, The part of the power (electricity) charges represents less than 60% in the irrigation cost.	Technical Reports Monitoring and Evaluation Reports Research Reports	- No access to developed land / Conflict - Increase physical of pollution, chemical and biological origin / proliferation of vectors waterborne diseases - Criteria for selection not established - Lower water tables / Floods / invasions of locusts, birds and rodents Low control of

Logic intervention	Indicator	Basic data	Target	Mean of verification	hypothesis / Risk
					technologies promoted by producers
Outcome 2.1. Water management is strengthened and soil and water resources conservation are implemented	- Optimization levels in water use * - First results observed in land conservation * - Improved physical infrastructure to address climate change + - Number of farmers adopting improved technology °	Traditional farming techniques degrade soils and most common surface irrigation is ineffective to more than 50%	At least 60% water savings are made on the developed areas of small irrigation,	technical Reports Monitoring and Evaluation Reports Research Reports	- No access to developed land / Conflict - Increase physical of pollution, chemical and biological origin / proliferation of vectors waterborne diseases - Criteria for selection not established - Lower water tables / Floods / invasions of locusts, birds and rodents
Output 2.1.1. Development of peri-urban areas and village market gardeners	Agricultural land (ha) developed or rehabilitated with irrigation system * ° - Rehabilitated area * - Number of wells for agricultural purposes achieved *	Irrigation with modern and innovative techniques is low	1000 hectares developed are irrigated, with 600 ha in drip and 400 ha in California network With boreholes performed on 2/3 of developed sites	technical Reports reports of Execution and monitoring and evaluation of the project	Low control of technologies promoted by the producers, inadequate coverage ; infrastructure renewal and charging of irrigation equipment Groundwater level decline
Output 2.1.2. Protection and improvement of the exploited land	Number of physical assets strengthened or constructed to withstand conditions resulting from climate variability and change (by type of goods) +	Water and soil resource conservation activities are not developed on the sites	1,500 hectares of which 1000 hectares of developed sites and 500 ha of immediate surroundings of the sites will be affected by the actions of protection and agro forestry and anti-erosion treatments (stone bunds, crescents, thresholds and dry stone walls, Zaï, etc.), the planting of trees having nutritional or medicinal value as moringa and characteristics for composting for the restoration of soil fertility.	technical reports reports on the execution and monitoring and evaluation of the project	Emergence of constraints in line with land property in the framework of the identification of sites to be afforested Lack of monitoring of infrastructures wich will be abandoned just after the end of the project
Outcome 2.2. Energy bills related to water pumping are reduced	Power of the renewable energy (GWh/an) Part of the expenditures related to energy as regard the facilities	The charges of the power (electricity) often represents 60 to 70% of the cost of the motorized irrigation	The part of the power (electricity) charges represents less than 60% thanks to the use of solar pumping system on the existing sites	The energy bill represents less than 20% of operating expenses of perimeters through the use of the solar system	Low control of technologies promoted by producers
Output 2.2.1. New perimeters solar system equipment	Type of equipment	No equipment is available	120 modules of 5 ha of small irrigation schemes are equipped with a solar pumping system (solar panels, inverter, controller,	Technical reports Reports on the execution and	Inaccessibility of the equipment due to the relatively high cost and its unavailability on the local

Logic intervention	Indicator	Basic data	Target	Mean of verification	hypothesis / Risk
			connection accessories for pumping 80 modules of 5 ha of small irrigation schemes are equipped with a solar pumping system	monitoring and evaluation of the project	market
Componet3: Support to diversification of livelihoods and improvement of farmers income	Percentage of farmers from targeted areas having benefited from agricultural input kits Percentage of target population with the means of subsistence sustainably resilient to climate change	Farmers have low knowledge on the existence of quality fertilizers and pesticides Very few people have means of livelihoods sustainably resilient to climate change in the target areas	100% of the producers benefit from the establishment of a fact sheet that will indicate the quality of inputs, the standards for their use, The best deals, the shops in good standing with the recommendations of the State, At least, 70% of beneficiary households and agricultural producers develop additional IGA	- Technical ministries reports Reports on the execution and monitoring and evaluation of the project - Survey reports	- Volatility in input prices Vulnerable beneficiaries undergo other crises (locust invasion) leading to their decapitalization.
Outcome 3.1 Support to the access to quality agricultural inputs	Percentage of farmers from targeted areas having benefited from agricultural input kits	Farmers have low knowledge on the existence of quality fertilizers and pesticides	100% of the producers benefit from the establishment of a fact sheet that will indicate the quality of inputs, the standards for their use, The best deals, the shops in good standing with the recommendations of the State, etc.	- Technical ministries reports Reports on the execution and monitoring and evaluation of the project - Survey reports	- Volatility in input prices
Output 3.1.1. Organization of groups for the acquisition of improved farm inputs	Number of mobilized actors *	Farmers do not have a sufficient support and advice in choosing quality fertilizers and pesticides	At least, 200 producers receive support and advice on the basis of a dedicated technical fact sheet and also a grant of 75% for the acquisition of better quality inputs for the development perimeters	- Technical ministries reports - Reports on the execution and monitoring and evaluation of the project - Survey reports	Populations lack necessary counterpart resources to obtain the necessary additional financing
Outcome 3.2. Support for the development of off-farm income generating activities	Percentage of target population with the means of subsistence sustainably resilient to climate change	Very few people have means of livelihoods sustainably resilient to climate change in the target areas	At least, 70% of beneficiary households and agricultural producers develop additional IGA	- Technical ministries reports - Reports on the execution and monitoring and evaluation of the project - Survey reports	Vulnerable beneficiaries undergo other crises (locust invasion) leading to their decapitalization.
Output 3.2.1. Support to the development of additional farm income generating activities	Type of revenue sources for households generated in the climate change scenario + % Women and youth who developed new IGA*	Very few households have income sources adapted to climate change	IGA adapted to climate change scenarios are proposed and implemented by people including women and youth.	- Technical ministries reports Reports on the execution and monitoring and	Populations lack necessary counterpart resources for to develop IGA

Logic intervention	Indicator	Basic data	Target	Mean of verification	hypothesis / Risk
				evaluation of the project - Survey reports	
Output 3.2.2 Support for improvement of incomes of farmers through better conservation of agricultural products	Number and type of adaptation assets (physical as well as knowledge) created to support individual and community strategies + Storage Capacity (Ton) built or rehabilitated for agricultural products °	The infrastructures of conservation of products are inadequate or inappropriate.	- 31 conservations stores, 31 solar dryers and 31 agricultural marketing kiosks	Technical ministries Reports Reports on the execution and monitoring and evaluation of the project - Survey reports	Conflicts between groups on the collective use of the structures.

F. Demonstrate how the project / programme aligns with the Results Framework of the Adaptation Fund

Project Objective (s) 19	Project Objective Indicator(s)	Fund Outcome	Fund Outcome Indicator	Grant Amount (USD)
OS1. Strengthen the capacity of stakeholders on resilient irrigation systems to climate change and disseminate lessons learned during the project execution	The local institutions of 3 ministries strengthened, including: the Ministry of Agriculture, the Ministry of Water Resources and the Ministry for the Environment.	*Result 2:* Institutional capacity-building to reduce climate-induced risks associated with socio-economic and environmental losses *Result 3: Strengthening of sensitization and ownership of the process of adaptation and climate risk reduction at the local level* *Result 7: Improvement of policies and regulations that promote and enforce resilience measures*	2.1. Number and type of targeted institutions with increased capacity to minimize exposure to climate variability hazards 3.1. Percentage of the target population aware of the negative impacts of climate change and appropriate responses 7. The priorities related to climate change are integrated into the national development strategy	731 000
OS2. Support the establishment of efficient water and energy saving technologies, soil conservation aimed at improving farm productivity	Small-scale irrigation perimeters originally constructed: - Drip system efficient 95% or California network efficient 85%. - Solar Pumping	*Result 4: Increase of capacity to adapt to climate change within development areas and regarding the relevant natural resources*	4.2. Improved physical infrastructure to withstand climate change	7 224 000
OS3. Support diversification of livelihoods to improve the farmers' Incomes	(Percentage) of the target beneficiary of support for the population diversification of livelihoods.	*Result 6: Diversify and strengthen livelihoods and sources of income for vulnerable people in targeted areas*	6.2. Percentage of the target population by means of resilient livelihoods to climate change suffered	160 000
Project Outcome(s)	Project Outcome Indicator(s)	Fund Output	Fund Output Indicator	Grant amount (USD)
Outcome 1.2. : The technical capacity of the local services	38 district and regional executives of Agricultural	*Product 2.1 : Capacity building of centers and*	2.1.1. Number of trained personnel to respond to and	64 000

of the State are strengthened to analyze the effects of climate change on food security in the various localities of the country, and support activities of resilience of grassroots communities	Engineering and Environment concerned	*national and regional networks to respond quickly to extreme weather events*	mitigate the impacts of climate-related events	
Outcome 1.3 : Strengthening community capacity to understand, the adoption of modern irrigation techniques to climate change	Type of actions of sensitization and capacity building of the target population on the impacts of climate change and appropriate responses to threats	*Product 3 : Targeted population groups involved in sensitization activities for the adaptation and risk reduction*	3.1.1 Number and type of risk reduction actions or strategies introduced at local level	532 000
Outcome 1.4 : Replication of project lessons learned and integration into local policies,	Type of documented approach of lessons learned dissemination Number of sensitization and advocacy activities held for policy makers	*Product 7: Better integration of climate resilience strategies into national development plans*	7.1. Type and sector of policies introduced or adjusted to meet the risks of climate change	135 000
Outcome 2.1. Strengthening management of water and the activities of conservation of soil and natural resources to increase agricultural productivity.	1000 ha of small irrigated perimeters in Unit of 5 ha each are 200 units, of which 60% with the drip system and 40% with the California network.	*Product 4: Physical, natural and social vulnerable assets strengthened in response to the impacts of climate change, including climate variability*	4.1.2. Number of physical assets strengthened or constructed to withstand conditions resulting from climate variability and change (by type of assets)	7 224 000
Outcome 3.1. Support for access to quality agricultural inputs	Type of support for access to quality inputs	*Product 6: Individual and community strategies strengthened in comparison to the impacts of climate change, including climate variability*	6.1.2. Type of revenues sources for households generated in the climate change scenario	60 000
Outcome 3.2. : Improvement of the incomes of farmers through better conservation of agricultural products	31 conservation stores, 31 solar dryers and 31 agricultural marketing kiosks	*Product 6: Individual and community strategies strengthened in comparison to the impacts of climate change, including climate variability*	6.1.1. Number and type of adaptation assets (physical as well as knowledge) created to support individual and community strategies	100 000

G. Include a detailed budget with budget notes, a budget on the use of management fees Implementing Entity, and an explanation and breakdown of implementation costs

Implementing Entity (BOAD) Specialized Technical Services

The implementing entity fee will be utilized by BOAD to cover its indirect costs in the provision of general management support and specialized technical support services. The table below provides an indicative breakdown of the estimated costs of providing these services.

Category	Indicative Services Provided by BOAD	Estimated Cost of Providing Services
Identification, Sourcing and Screening of Ideas	Provide information on substantive issues in adaptation associated with the purpose of the Adaptation Fund (AF). Engage in upstream policy dialogue related to a potential application to the AF. Verify soundness and potential eligibility of identified idea for AF.	***US$ 30,000***
Feasibility Assessment / Due Diligence Review	Provide up-front guidance on converting general idea into a feasible project Source technical expertise in line with the scope of the project. Verify technical reports and project conceptualization. Provide detailed screening against technical, financial social and risk criteria and provide statement of likely eligibility against AF requirements. Determination of execution modality and local capacity assessment of the national executing entity. Assist in identifying technical partners. Validate partner technical abilities. Obtain clearances from AF.	***US$ 100,000***
Development & Preparation	Provide technical support, backstopping and troubleshooting to convert the idea into a technically feasible and operationally viable project. Source technical expertise in line with the scope of the Project needs. Verify technical reports and project conceptualization. Verify technical soundness, quality of preparation, and match with AF expectations. Negotiate and obtain clearances by AF. Respond to information requests, arrange revisions etc.	***US$ 138,000***
Implementation	Technical support in preparing TORs and verifying expertise for technical positions. Provide technical and operational guidance project teams. Verification of technical validity / match with AF expectations of inception report. Provide technical information as needed to facilitate implementation of the project activities. Provide advisory services as required. Provide technical support, participation as necessary during project activities. Provide troubleshooting support if needed. Provide support and oversight missions as necessary. Provide technical monitoring, progress monitoring, validation and quality assurance throughout. Allocate and monitor Annual Spending Limits based on agreed work plans. Receipt, allocation and reporting to the AFB of financial resources. Oversight and monitoring of AF funds. Return unspent funds to AF.	***US$ 400,000***
Evaluation and Reporting	Provide technical support in preparing TOR and verify expertise for technical positions involving evaluation and reporting. Participate in briefing / debriefing. Verify technical validity / match with AF expectations of all evaluation and other reports Undertake technical analysis, validate results, and compile lessons. Disseminate technical findings	***US$ 100,000***
Total		***US$ 768,000***

Project Budget for the Adaptation Fund

Project Title: project for strengthening the resilience of agriculture to climate change in Niger				
impact activity	**Responsible / Implementation Agent**	**Name of Donor**	**Budget Description**	**Total (USD) X 1000**
Objective 1:				
Strengthen the capacity of stakeholders on resilient irrigation systems to climate change and disseminate lessons learned during the project execution				
Impact 1.2. The capacities of decentralized technical services of the state are strengthened				
Output 1.2. : Strengthening capacities of decentralized technical services of the state		Adaptation Fund	Training on climate change and its impact on food security	16.00
			GIS-Training	16.00
			Training on monitoring of groundwater	16.00
			Training on monitoring and management of soil fertility	16.00
			Sub-Total 1.2	**64.00**
Outcome 1.3. The capacity of the farm groups and other stakeholders to understand and adopt modern irrigation techniques to climate change is *strengthened*				
Output 1.3. Capacity building of stakeholders to understand and adopt agricultural practices and innovative irrigation technologies to address climate change		Adaptation Fund	Training on adaptation measures to climate change	44.50
			Training on farming techniques	50.00
			Training on innovative irrigation techniques and network maintenance	60.00
			Training on the operation and management of a group	37.20
			Training on the control of seed	37.20
			Training on the conduct of the nurseries	37.20
			Support-advice	40.00
			Training of local craftsmen on the installation and repair of innovative irrigation systems and photovoltaic	73.90

			Support for equipment of local farmers	56.00
			Elaboration of communal acclimated development plans	96.00
			Sub-Total 1.3	**532,00**
Outcome 1.4 : The lessons learned are used to strengthen the resilience of agriculture by irrigation through modern techniques at a larger scale				
Output 1.4. Sharing of knowledge and dissemination of good practice		Adaptation Fund	Development of fact sheets for innovative irrigation technologies	45.00
			Knowledge sharing workshops with decision makers and parliamentarians	60.00
			Revision of strategies and national texts workshop for the dissemination of resilient agricultural practices	30.00
			Sub-Total 1.4	**135.00**
Objective 2 :				
Support for the establishment of efficient water and energy saving technologies, soil conservation to improve farm productivity.				
Impact 2.1. Water management is strengthened and soil conservation and water resources are established				
Output 2.1 : Strengthening of water management and establishment of soils and water resources conservation activities		Adaptation Fund	Installation of Drip system units (Module 5 ha)	4033.613
			Installation of California network units (Module 5 ha)	268.908
			Construction of boreholes	1 176.471
			Close protection of site work (fencing, planting, etc.)	1 300.00
			Treatment sites and surroundings (stone bunds, crescents, thresholds dry stone ...)	378.151
			Promotion of manure pits (14,13m3 per unit)	67.227
			Sub Total 2.1	**7 224.371**
Objective3 :				
Support to diversification of livelihoods to improve the incomes of farmers				
Impact 3.1. Support for access to quality agricultural inputs				
Output 3.1.1. Organization of groups for the acquisition of improved farm inputs		Adaptation Fund	Acquisition of quality inputs	60.00
			Sub Total 3.1	**60.00**

Impact 3.2 : Support for the development of off-farm income generating activities				
Output 3.2.2 : Support for the improvement of the income of farmers through better conservation of agricultural products		Adaptation Fund	Conservation Store Construction	100.00
			Sub Total 3.2	100.00
			Total AF	8 875
			Coordination and management	
			Recurrent costs	707.00
			Planning, monitoring, evaluation, equity, gender and communication	53.00
			Subtotal Coordination and project management	**760.00**
			Physical contingencies (1%) and contingency price increase (2%)	268.00
			Management costs of the implementing institution	768.00
			Total Budget	**9 911.00**

H. Include a disbursement schedule time-bound

Adaptation Funds disbursement schedule time-bound

1 USD= 500 FCFA

	Upon Agreement signature	One Year after Project Start[a/]	Year 2[b/]	Year 3	Year 4[c/]	**Total**
Scheduled Date	oct-16	oct-17	oct-18	oct-19	oct-20	
Project Funds (X 1000 USD)	**1 269**	**4 062**	**3 300**	**248**	**264**	9 143
Implementing Entity Fee (X 1000 USD)	107	341	277	21	22	768
Total (X 1000 USD)	**1 376**	**4 403**	**3 577**	**269**	**286**	**9 911**

a / Use start date to estimate the year of first disbursement
b/ Subsequent dates will follow the year of the beginning of the project
c/ Add columns for years if necessary

Table 18: schedule for implementation of the project

Topics		Year					
		0	1	2	3	4	5
COMPONENT 1 : TECHNICAL AND INSTITUTIONAL CAPACITY BUILDING							
1.1. Support for the realization of studies, the control and the supervision of works							
1.1.1. Support to the formulation of project documents	Support to the formulation of project documents (PCN, feasibility study, E&S Management Framework (ESMF), Pest and pesticides management Plan (PPMP), Full Project Document, public Consultation, national approvals of the project).						
1.1.2. Support for the realization of d'Avant-Projet Détaillé (detailed preliminary studies) and ESIA of sub-projects	Realization of d'Avant-Projet Détaillé (detailed preliminary studies) and ESIA of sub-projects						
1.1.3. Support to the technical control of the amenagement	Technical control of the amenagement						
1.1.4. Support for review and approval of the environmental and social impact report or Impact Notice of the sub-projects, and support for environmental monitoring of sub-projects	Review and approval of the environmental and social impact report or Impact Notice of the sub-projects,						
	Support for environmental monitoring of sub-projects and evaluation of the ESMF of the project						
1.2. Capacity building of local State technical services							
1.2.1. Capacity building of local development service of the state on climate change and its impacts on food security	Training workshop on climate change and its impact on food security						
1.2.2. Training of technical service agents of the State in the use of monitoring tools OF changes in resources (land, water..) such as GIS technologies, piezometric level monitoring systems tablecloths etc.	GIS training workshop						
	Training workshop on the monitoring of groundwater						
	Training workshop on the monitoring and management of soil fertility						

1.2.3. Strengthening of the technical capabilities of the Government actors in the implementation of the environmental and social safeguard measures	Support in the preparation of manuals of good sustainable agricultural practices						
	Building workshop of the technical capabilities of the State on environmental management services						
	Strengthening of the technical capabilities of the support Council services –SPAC-Services d'appui conseil						
1.3. Capacity building of stakeholders to understand and adopt agricultural practices and innovative irrigation technologies to address climate change							
1.3.1. Sensitization and training of grassroots communities on threats related to climate change and adaptation measures and resilience for food security	Training workshop on adaptation to climate change						
	Campagnes d'information et de sensibilisation sur les questions environnementales et sociales						
1.3.2. Training of farmers to agricultural practices that preserve sustainably soil and water resources	Training workshops on farming techniques						
	Training workshops on innovative irrigation techniques and network maintenance						
	Training workshop on the operation and management of a group						
	Training workshop on the control of seed						
	Training workshop on the conduct of nurseries						
	Support-Advice						
1.3.3. Training of local technicians in installation and repair of innovative irrigation systems (Drip system system, network. California) and photovoltaic systems	Training workshops of local craftsmen on the installation and repair of innovative irrigation systems and photovoltaic						
	Support for equipment of local farmers						
1.3.4. Training of producers and health centres on the application of pesticides, toxicological management of pesticides and obsolete products and packaging	Strengthening the capacities of farmers on the application of pesticides						
	Strengthening the capacity of health centers on toxicological management						

	Strengthening the capacities of the national services responsible for the destruction of obsolete pesticides and pesticide packaging						
1.3.5. Development of plans for adaptation to climate change integrated into local development plans and signature of an agreement with target communities ensuring efficient use of soil and water	Support for the elaboration of municipal acclimated development plans						
1.4. Sharing of knowledge and dissemination of good practice							
1.4.1. Development of fact sheets for innovative irrigation technologies							
1.4.2. Knowledge sharing workshops with decision makers and parliamentarians							
1.4.3. Revision of strategies and national texts workshop for the dissemination of resilient agricultural practices							
1.4.4. Development of a large-scale project integrating the results of lessons learned							
COMPONENT 2: CONFORTATION AND MANAGEMENT OF IRRIGATED PERIMETERS							
2.1. Enhancing of Water management and establishment of soils and water resources conservation activities							
2.1.1. Development of peri-urban and village perimeters	Installation works of Drip system units (Module 5 ha)						
	Installation work of Californian network units (Module 5 ha)						
	Construction of boreholes						
	Setting up of tanks						
	Close protection of site works (fencing, planting, etc.)						
	Control and supervision of works						
	Monitoring and supervision of work by the technical services (DGGR / NCA / ...)						
	Additional studies						
2.1.2. Pilot sites Identification and planting varieties of utilitarian trees that are more resistant to the climate in order to improve the local agroforestry system	Treatment of sites and surroundings (stone bunds, crescents, thresholds dry stone ...)						
	Promotion of agroforestry						
	Promotion of manure pits (14.13 m3 per unit)						
2.2. Support for the reduction of energy bills related to water pumping							
2.2.1. New perimeters solar system equipment	Small irrigation Drip system kits Network (power)						
	Kits de petite irrigation Réseau Californien (puissance)						
COMPONENT 3. SUPPORT TO DIVERSIFICATION OF LIVELIHOOD AND IMPROVEMENT OF THE INCOME OF FARMERS							

3.1. Support for access to quality agricultural inputs							
3.1.1. Organization of groups for the acquisition of improved farm inputs							
3.2. Support for the development of off-farm income generating activities							
3.2.1. Support for IGA							
3.2.2. Support for the improvement of the income of farmers through better conservation of agricultural products	Construction of stores of conservation						
	Installation of solar dryers						
	Implementation of marketing kiosk						
4.1. investments							
4.1.1. Refaction /rehabilitation of locals	PMU						
	Offices Focal Point						
4.1.2. Equipment and logistics	Vehicle - Coordinator						
	All-terrain vehicle double cab pickup - Focal Points						
	All-terrain motorcycles						
	Office equipment						
	Audio visual equipment (cameras, video projector, CD-DVD)						
4.1.3. Gestion financière et contrôle des comptes	Elaboration des manuels de procédures						
	Acquisition management software						
	Establishment and support of monitoring and evaluation system						
	Audit of accounts						
4.2. Implementation and operation							
Staff recruitment	Coordinator						
	Rural Engineering Technical Coordinator Specialist in Monitoring and Evaluation						
	Head of Rural Engineering development specialist in agriculture and focal point of the Niamey Region						
	Accountant specialist in procurement						
	Executive Secretary						
	Drivers						
	Orderlies						
	Guardians						
	Focal points rural engineering specialized in agriculture						
	Focal points drivers						
4.2.2. Field missions	Coordinator						

	Technical Coordinator						
	Drivers						
	Focal points						
	Drivers						
4.3. Planning, monitoring, evaluation, equity, gender and communication							
	Organization of meetings and supervision of CNP						
	Mid-term and final evaluation						
	Impact Evaluation						
	Various trainings (monitoring evaluation and capitalization, gender, procurement, etc.)						
	Working missions at BOAD						
	Study trips						
	Communication						

FINANCING PLAN

The project financing plan is as follows:

Plan de financement prévisionnel (X 1000 USD)							1USD = 500 FCFA
COMPOSANTES	TOTAL HT	TOTAL TTC	FA	BOAD	ETAT		
					MHT	TAXES	MTTC
COMPONENT 1 : Enhancing stakeholders' technical and institutional capacities and dissemination of lessons learned during the project execution	**2 960**	**3 426**	**731**	**1 917**	**232**	**546**	**778**
1.1. Support for the studies, control and supervision of works	**1 470**	**1 668**	**0**	**1 278**	**112**	**278**	**390**
1.2. Strengthened capacities of technical services decentralized state	143	**168**	64	78,6	**0**	26	**26**
1.3. Capacity building of stakeholders to understand and adopt agricultural practices and innovative irrigation technologies to address climate change	832	**982**	532	180	**120**	149	**269**
1.4. Sharing of knowledge and dissemination of good practices	515	**608**	135	380	**0**	93	**93**
COMPONENT 2: CONSOLIDATION AND DEVELOPMENT OF IRRIGATED PERIMETERS	**22 093**	**26 070**	**7 224**	**14 869**	**0**	**3 977**	**3 977**
2.1. Development of peri-urban and villages areas	14 293	**16 866**	7 224	7 069	**0**	2 573	**2 573**
2.2. Support for reducing energy bills related to water pumping	7 800	**9 204**	0	7 800	**0**	1 404	**1 404**
COMPONENT 3. SUPPORT FOR ALTERNATIVE LIVELIHOODS AND IMPROVEMENT OF FARMERS INCOME	**1 008**	**1 189**	**160**	**848**	**0**	**181**	**181**
3.1.Support for access to quality agricultural inputs	200	**236**	60	140	**0**	36	**36**
3.2. Support for the development of off-farm income generating activities	808	**953**	100	708	**0**	145	**145**
COMPONENT 4: INVESTMENT, COORDINATION AND PROJECT MANAGEMENT	**2 042**	**2 410**	**760**	**1 251**	**32**	**368**	**400**
4.1. Investissements	622	**734**	0	590	32	112	**144**
4.2. Recurring cost	1 171	**1 382**	707	465	0	211	**211**
4.3. Planning, monitoring and evaluation, equity, gender and communication	249	**294**	53	196	0	45	**45**
BASIC COST	**28 084**	**33 073**	**8 875**	**18 884**	**264**	**5 072**	**5 336**
Physical contingencies (1%)	281	**331**	89	189	3	51	**53**
Contingency for rising of prices (2%)	562	**663**	179	381	5	101	**106**
TOTAL 1	**28 927**	**34 067**	**9 143**	**19 454**	**272**	**5 224**	**5 496**
IMPLEMENTATION ENTITY MANAGEMENT FEES (BOAD)	**768**	**768**	**768**				
TOTAL COST	**29 695**	**34 835**	**9 911**	**19 454**	**272**	**5 224**	**5 496**

PART IV: ENDORSEMENT BY GOVERNMENT AND CERTIFICATION BY THE IMPLEMENTING ENTITY

A. Record of endorsement on behalf of the government[45]

Provide the name and position of the government official and indicate date of endorsement. If this is a regional project/programme, list the endorsing officials all the participating countries. The endorsement letter(s) should be attached as an annex to the project/programme proposal. Please attach the endorsement letter(s) with this template; add as many participating governments if a regional project/programme:

Dr KAMAYE Maâzou Adaptation Fund National Designated Authority Conseil National de l'Environnement pour un Développement Durable Cabinet du Premier Ministre	Date: *July, 31st, 2015*

B. Implementing Entity certification

Provide the name and signature of the Implementing Entity Coordinator and the date of signature. Provide also the project/programme contact person's name, telephone number and email address

I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans (Initiative 'the Nigeriens nourish the Nigeriens' (I3N), Small Scale Irrigation Strategy of Niger (SPIN), *Sustainable Development Strategy and Inclusive Growth (SDDCI), The National Action Plan for Climate Change Adaptation* (PANA), Guiding principles of Rural Development Policy for Niger, The National Food Security Full Program, *The Economic Recovery Programme (PRE),* Poverty Reduction Strategy (SRP), Rural Development Strategy, National Strategy for Development of Irrigation and Water Runoff Collection (SNDI/CER))and subject to the approval by the Adaptation Fund Board, commit to implementing the project/programme in compliance with the Environmental and Social Policy of the Adaptation Fund and on the understanding that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.	
MBENGUE Almamy Implementing Entity Coordinator - BOAD	
Date: *August, 3rd, 2015*	Tel. +228 99 86 86 60 / 22 23 25 24 Email: ambengue@boad.org
Project Contact Person: AMEGADJE Mawuli Komi	
Tel.: +228 90 04 62 54 Email: mawulikomi@yahoo.fr	

6. Each Party shall designate and communicate to the secretariat the authority that will endorse on behalf of the national government the projects and programmes proposed by the implementing entities.

APPENDIX

Appendix 1: Letter of endorsement

REPUBLIQUE DU NIGER

FRATERNITÉ-TRAVAIL-PROGRÈS

Cabinet du Premier Ministre

Conseil National de l'Environnement pour un Développement Durable

ADAPTATION FUND

Letter of Endorsement by Government

Niamey, 31st July, 2015

To : The Adaptation Fund Board

C/o Adaptation Fund Board Secretariat

Email: Secretariat@Adatation-Fund.org

Fax: 202 522 3240/5

Subject: Endorsement for Project «Enhancing resilience of agriculture to climate change to support food security in Niger, through modern irrigation techniques ".

In my capacity as Designated Authority for the Adaptation Fund in Niger, I confirm that the above project proposal is in accordance with the Government's national priorities in implementing adaptation activities to reduce adverse impacts of, and risks, posed by climate change in Niger.

Accordingly, I am pleased to endorse the above project proposal with support from the Adaptation Fund. If approved, the project will be implemented by Banque Ouest Africaine de Développement (BOAD) and executed by Ministère de l'Agriculture du Niger.

Sincerely.

Dr KAMAYE Maâzou
Adaptation Fund National Designated Authority

CNEDD SECRETAIRE EXECUTIF Cabinet du Premier Ministre

Appendix 2

Brief presentation of the 3N Initiative

Brief presentation of the 3N Initiative

The 3N initiative 'Nigeriens Nourish Nigeriens "is a major focus of the President of the Republic Programme for the rebirth of Niger. It is built on the achievements of the Rural Development Strategy and is part of the implementation process of the Comprehensive Development Plan for Agriculture in Africa (CAADP), the Common Agricultural Policy of ECOWAS (ECOWAP) and the WAEMU Agricultural Policy (PAU). The I3N enables Niger to accelerate the achievement of the Millennium Development Goals, particularly MDG 1 and MDG 7.

The desired overall goal is to "help to put Niger people free from hunger and to guarantee the conditions for full participation in domestic production and the improvement of their income". The specific objectives are "buildng national capacity for food production, supply and resilience to food crises and disasters."

The implementation of the I3N is based on five strategic areas:

I. Axis 1: Increase and diversification of agro-forestry-pastoral and fish production.

The I3N comes therefore as a catalyst for technology transition by creating the appropriate conditions for significantly and sustainably increase of the productivity of fisheries and agro-silvopastoral production systems. For that reason, it will be necessary to invest significant resources, in order to: (i) improve the productive capacity of land and water; (ii) extend the use of techniques and technologies, innovative and adapted to the ecological and socio-economic realities of Niger; (iii) create the legal, institutional and fiscal conditions of promotion of agricultural development, transformation and modernization of production systems.

II. Axis 2: Regular supply of rural and urban markets in agricultural and food products.

The I3N's Investments will be made to:

(i) The promotion of agro-processing and agro-industrial production to meet urban demand increasingly turned to the finished products; (ii) the improvement of infrastructure and marketing channels including export by helping to facilitate the transport of basic food products and carried out for cereals, horticultural crops, livestock and certain forest products market infrastructures.

III. Axis 3: The improvement of the resilience of populations faced with climate change, crises and disasters.

The I3N proposes to overcome the deficiencies in crisis management while improving the response capacity of households and grassroots communities to cope with the deficit situations of agricultural or pastoral production and natural disasters. The measures to be promoted will allow to:

I) improve the efficiency of anticipation and coordination of interventions in emergencies mechanisms. ; (ii) Contribute to provide appropriate and adequate responses in emergency situations especially by increasing national reserves of stocks of agricultural and food products and the creation of conditions to ensure an emergency rehabilitation-development continuum for the most vulnerable socio-economic groups and (iii) contribute to the development of a risk management plan that integrates various types of risks faced by farmers, households and communities.

III. **Axis 4. Improving the nutritional status of Nigerien**

To improve the nutritional status, the I3N provides measures and investments aiming to contribute to:

(i) The promotion of balanced food consumption patterns, good lifestyle in rural and urban areas;
(ii) The reduction of the prevalence of various forms of malnutrition through the transition to a larger scale application of good essential family practices
(iii) The effective management of acute malnutrition in situations of crises through the improvement of curative care capacities (including screening) of cases of acute malnutrition (moderate and severe); the strengthening of the institutional framework for the management of malnutrition;
(iv) The strengthening of health monitoring system of foodstuffs (cold chain, hygiene, etc ..) and

(v) The strengthening of the national nutrition surveillance system and evaluation of nutrition

interventions (SNIS, sentinel sites, SAP, nutrition surveys).

IV. **Axis 5. Axis Animation and Coordination of the I3N.**

The I3N is intended to be a mobilizing and unifying framework. So, it will involve: (i) maintaining a continuing and growing effort in financing investments for food and nutrition security and agricultural development through greater mobilization of public and private resources; (ii) Ensuring effective coordination and governance of the I3N, through the establishment of transparent governance arrangements, participatory and inclusive, mobilization of rural and urban communities and stakeholders on the objectives of the I3N and institutional strengthening of the high Commission in the I3N.

The I3N intervention guiding principles are: (i) concentration of actions and support at the municipalities, agricultural villages and family farms levels; (ii) inclusion of gender and specific groups in all actions; (iii) targeting to optimize investments; (iv) sustainability of the productive base through the promotion of sustainable practices of natural resource use and adaptation to climate change; (v) mobilization and empowerment of all groups of stakeholders at all stages of the design and implementation process, paying attention to farmers' organizations, women and youth.

The implementation of the I3N will be based on five strategic areas that are translated into five strategic programs (SPs), 12 operational programs and on an institutional mechanism whose main characteristics are inclusiveness, co-responsibility, consultation and permanent dialogue.

PS1: Increase and diversification of agro-forestry-pastoral and fish production

PS2: Regular supply of rural and urban markets in agricultural and food products

PS 3: Improvement of the resilience of vulnerable groups to climate change, crises and disasters

PS4: Improvement of nutritional status of Nigeriens

PS5: Animation, coordination of the I3N and impulse of reforms

Appendix 3

Brief presentation of the Small Scale irrigation Strategy of Niger (SPIN)

EXPECTED IMPACT AND EFFECTS OF THE IMPLEMENTATION OF SMALL IRRIGATION STRATEGY

The expected impact of the SPIN is:

I. Food and nutrition security of the population is improved

There are two (2) overall effects of the SPIN:

OE1 : The productions from small irrigation are increased

OE2 : Producers' incomes increased sustainably

Therre are four (4) specific effects (SE):

SE1 : The resources of land and water are sustainably managed for small irrigation

SE 2 : Irrigating farmers highlight the irrigable potential optimally

SE 3 : Irrigating farmers and farmers organizations have access to markets for their products

SE 4 : he Ministry in charge of small-scale irrigation is responsible for managing the strategy

The SI action plan details and precises the operational choice and the sequencing of actions that are consolidated in the results described below.

1.1.1. Description of the effects

SE 1 : The resources of land and water are sustainably managed for small irrigation:

The ambition of the SPIN is to intensify further small-scale irrigation in the country in a dynamic of exploitation and sustainable management of available resources. Thus, six (6) products are referred to for the specific purpose.

P1SE1: The potential in irrigable land is known: Currently the official area known is 270,000 ha. It is in all documents but its basic definition is not sufficiently known. In some documents, this figure was estimated based on the current surface water resources available in the 80s (basin of the Niger River, Dallols, Goulbi, Koramas and oasis).
Which raises questions and many voices announce a higher potential. There is talk of 330,000 hectares or even millions of hectares. And to encourage and establish a viable action plan, it is important to know the potential in irrigable land in the country, its location and what is already done on these lands. The SPIN also provides continuous monitoring of the use of this potential and its regular update.

P2SE1: The water and land resources are protected: Once the potential is known, the SPIN aims to establish a mechanism for its protection to ensure sustainable land use in a context of climate change.

P3SE1: Measurements of environmental impacts are taken into account in small irrigation activities
In order to achieve positive results on the environment with the development of small irrigation, small irrigation projects must take into account the environmental measures.

Therefore texts and laws governing environmental and social impact studies should be popularized. Similarly irrigating farmers will be sensitized on the impacts of small-scale irrigation to get them to make mitigation actions of the negative impacts of the activities.

P4SE1: The integrated water resources management is promoted:
The climate context is generally precarious. The land and water resources are in continuous degradation.The realization of small irrigation development requires the mobilization of water and irrigable soil. Awaiting an exhaustive inventory of the irrigation potential and planning across different basins, the SPIN will promote on the one hand the right techniques and optimal management of water and soil on the plot and on the other hand the inclusion of other resource users (large irrigating, farmers, fishermen, etc.) in the agricultural development of multi-use resource

P5SE1: Land tenure security is strengthened:
The orientation principles of the rural code and additional texts thereto are the general framework of land legislation in Niger. However, the importance of land tenure security of land used for small-scale irrigation is unknown of irrigating owners or rural farmers. So to promote the development of small-scale irrigation and secure investment, it is important to generalize the security of land used for small-scale irrigation. This land security will be made by the agreed services through the recognition of property rights and exploitation in compliance with the guiding principles of the Rural Code.

P6SE1: The lands are developed for small irrigation optimally and sustainably
Several advantages in terms of development opportunities, equipment and management have been capitalized in the small irrigation sub-sector. However, the capture infrastructure, drainage and distribution techniques, cultivation techniques and speculations are used without taking into account social, soil and hydrogeological contexts of the sites. This repository, non-comprehensive and dynamic, will be a guide for the selection of effective and appropriate technologies to the local context for an economically viable and sustainable development

SE 2 : Les irrigants mettent en valeur les terres de manière optimale et durable

To have this specific purpose, five (5) products are implicated:

- **P1SE2 : A funding mechanism suitable for small irrigation is set up:**

In accordance with the ambition of the SPIN, the farmer is the first actor the identification of the real concerns of production. To this end, the SPIN will create a harmonized framework to respond to the request expressed and motivated. The satisfaction of this demand requires the formulation of a bankable project which can contribute to achieving food security of a community. We must not only enable the producer to develop the project file but also and especially allow him to access to project funding through mechanisms that leave im fully responsible for his action and investment.

The sustainability of farms requires reconciliation between operators and systems and to some extent the private sector financing (SPAC, cratsmen-repairers, etc.) for better support of beneficiaries in the development and maintenance of infrastructure.

- **P2SE2 : Les intrants de qualité sont disponibles et accessibles :**

The market of agricultural inputs offers today a variety of fertilizers and seeds from various sources. In the absence of an effective system of border control, marketing of agricultural inputs and information, we are witnessing the marketing of unconventional fertilizers, pesticides and seeds. But the sustainability of small-scale irrigation farms can only be ensured through the use of quality inputs whose negative impact is minimal on water and land resources. In addition, the SPIN supports and promotes the popularization of the use of organic manure, environmentally sustainable and environment friendly.

- **P3SE2 : The maintenance of Infrastructure is ensured:**

The satisfaction of a request at the base does not in itself guarantee the sustainability of the investment. One of the conditions of sustainability is the ongoing management of the investment. So, the SPIN requests from the beneficiary of the investment the full support of operation expenses of the development, including maintenance and renewal of small-scale irrigation facilities. The use of techniques adapted to local know-how, the economic profitability of the development and the participation required from the farmer for investment in the request can be used as guarantee in the ability of the irrigating farmer to maintain the investment.

- **P4SE2 : Professional capacities of irrigating farmers and farmers' organizations are strengthened:**

The SPIN will train the farmers and all the actors of the chain upstream and downstream of the production. Indeed, the low level of education and training of farmers hampers the access of rural people to assets of production and economic opportunities, which is a constraint of the professionalization of farmers.

- **P5SE2 : Les capacités des services techniques sont renforcées :**

The SPIN will support state services responsible for IP (DGA DGGR, DGVP and local services) so that they properly perform the sovereign functions of monitoring and coordination of actions. The State through its central public services and their local bodies involved in irrigation are required

- To support communities in the field of project management and control compliance and approval of projects in accordance with the standards of design and construction work;
- Ensure the empowerment of farmers through the appropriation of irrigation farms by beneficiaries. For this, a specific support for capacity building of these services is essential.

SE 3: Irrigating farmers and farmers' organizations have access to markets for small irrigation products

The SPIN aims through this purpose to train a dynamic synergy and a fair distribution of risk, profit between the farmer, trader and consumer. The economically viable character of the PI implies that profit margins at the level of individual operations, must be sufficient to cover all the costs of irrigation. Thereby the SPIN has five (5) products for this purpose.

- **P1SE3 : The framework of export has improved:**

The SPIN will promote accountability and professionalization of irrigating farmers. As for the State, it must create favorable conditions over the entire IP value chain (import, taxation, regulation, financing, etc.).

The development of structured interprofessions shall permit the marketing of IP products. Indeed, actions like:

  - The spread of sales calendar ;
  - the direct sale from the producer to the retailer or wholesaler ;
  - The promotion of quality IP products, respecting the technical routes, particularly for products subject to competition on regional and international markets;
  - The development of an information system on prices and markets;
  - the distribution of risks among key stakeholders of the IP value chain and the redistribution of income of sectors more favorably to irrigating producers.

- **P2SE3 : Transport infrastructure is developed:**

To improve market access, we must first facilitate the flow conditions for agricultural products in general and of small-scale irrigation in particular. Therefore public authorities must build rural roads to open up production zones to allow access to trucks and wholesalers. Rural roads are not taken into account in the small irrigation but the Ministry in charge of small irrigation should systematically include in these programs and projects of water mobilization and small-scale irrigation, the construction of agricultural feeder roads under the project management of the Directorate General of Rural Engineering in accordance with its powers. Therefore every production areas must be identified and a program of construction on runways should developed. This program must be in line with that of the 3N initiative which already plans to achieve 250 km in 5 years.

- **P3SE3 : infrastructure of storage, conservation and processing are put in place:**

The SPIN considers these infrastructure as part of small-scale irrigation. The investment projects in these infrastructure are eligible. The SPIN will promote the construction of infrastructure of storage, conservation and processing.

- **P4SE3 : Marketing infrastructure are developed:**

The development of structured interprofessions shall permit the marketing of IP products. Indeed, actions like:

- The spread of sales calendar ;
- the direct[46] sale from the producer to the retailer or wholesaler ;
- The promotion of quality IP products, respecting the technical routes, particularly for products subject to competition on regional and international markets;
- The development of an information system on prices and markets;
- the distribution of risks among key stakeholders of the IP value chain and the redistribution of income of sectors more favorably to irrigating producers. Regarding infrastructure, it is planned in the PSPIN the construction and rehabilitation of market infrastructures

- **P5SE3 : Production sectors are organized:**

The organizational and financial support for the structuring of actors upstream and downstream of production (SAC, STD, storage / processing, marketing) is an important activity for making IP an economically viable and sustainable. Furthermore the SPIN needs to develop a product information system to guide buyers and producers.

SE 4 : The Ministry in charge of small-scale irrigation ensures the control of the SPIN:

The Ministry in charge of small-scale irrigation will ensure the implementation of the various control structures of the SPIN while conforming to existing mechanisms including those of the 3N initiative. A permanent secretariat could be created to assume the role of technical assistant for the Department of Studies and Programming Department.

- **P1SE4: The resources are mobilized for the implementation of the SPIN:**

In order to improve the economic environment on small irrigation and direct investments on the basis of economic profitability criteria (especially for small areas), it should guide the actions to:

- The dissemination of information relating to tax and trade regulations;
- The development of an economic information system;
- The provision of support for the organization of the actors;

- Support for processing;

- Support for the financing of production, marketing and processing.

We must also support the establishment of credit institutions notably of proximity, fostering relationships with financial partners, to finance investment and operation.

- **P2SE4: A steering system of the SPIN is set up and is func:**

To ensure the effective implementation of the SPIN, a steering system will be set up with the implementation of the following activities:

- Edit and disseminate the SPIN;
- Raise awareness among local elected officials on the SPIN;
- Implement steering bodies with a permanent secretariat;
- Implement consultation frameworks at the municipal level;
- Organize annual reviews;
- Establish information flow mechanisms;
- Carry out supervision missions;
- Develop and disseminate the implementation reports.

- **P3SE4: Support-advice services are provided by the decentralized entities:**

Dans le cadre de l'appui/conseil pour le développement de la petite irrigation, l'un des défis prioritaires que doit relever le ministère est d'une part d'appuyer les collectivités dans le domaine de la maîtrise d'ouvrage et de contrôle de conformité et approbation des projets conformément aux normes de

[46] This is to end the system of intermediaries, which serves as a screen between the producer and the buyer at the expense of the producer

conception et de réalisation des travaux et d'autre part de savoir comment atteindre les groupes de producteurs et les entreprises rurales pour :

As part of the support / advice for the development of small-scale irrigation, one of the priority challenges facing the ministry is on one hand to support the communities in the area of project management and control compliance and approval of projects in accordance with the standards of design and execution of works and on the other hand how to reach farmer groups and rural enterprises to

- Develop necessary business skills (management, accounting, finance);
- Provide access to information (on markets, standards, best practices and technology);
- Bridge the gap between agricultural research systems and development interventions;
- Build strong and direct links between producers and buyers for all and at all levels of the value chain where the Niger has a comparative advantage.

Appendix 4

Lessons learned from the irrigation projects

LESSONS LEARNED FROM THE IRRIGATION PROJECTS

1. BRIEF PRESENTATION OF PRIOR INTERNENTIONS

The state and technical and financial partners have implemented several projects of SI: PPIP, PBVT, ASAPI, SPFS, PIP2, etc. Since 1996, the Government of Niger has taken the decision to support the growth of small scale irrigation and has encouraged the establishment of a private agency as an organization bringing together professionals from private irrigation, ANPIP.

It is especially the PIP2, financed by the World Bank, which has stimulated the development of private irrigation. The project facilitated access to equipment, inputs and support-advice in creating a favorable environment (installation of input shops, emergence of various providers). With the cost-shared grant system (matching grant), the PIP2 has funded 4,435 files on demand for a total amount of nearly 16 billion CFA francs. Finally the PIP2 has allowed the distribution of 10,870 pump sets from 3.5 to 5 HP and 7,809 treadle pumps, human motor pumps "niyya da kokari[47]".

All these projects contributed not only to build and equip irrigated farms, but also to develop the institutional basis for future growth. They supported the acquisition of technology and encouraged changes in agricultural and culture patterns through the dissemination of technological packages with high productivity. These projects also fostered local entrepreneurship composed of craftsmen drillers, well diggers and pump manufacturers and repairers.

They also encouraged access to microfinance, the provision by the private sector of support-advice services and input supply through shops managed by the associations of farmers. The projects have also supported the development of autonomous farmers' organizations at local, regional and national levels. In addition, they have helped to improve post-harvest practices and encouraged the development of markets, including the organization, infrastructure and market information.
According to data from PIP2, horticultural yields have improved significantly: Onion yields rose from 26 t/ha to 41 t /ha between 2001 and 2006, and those of pepper increased from 11 t/ha to 19 t/ha. The income per hectare of onion and pepper of farmers increased by almost 80%.

The lessons learned following the implementation of several projects have allowed to note improved profitability of small farms (less than 1 ha) where modern techniques and the costs they entail are manageable. Small farms seem generally more efficient than large or very small farms.

In general, the projects have provided a very high level of grants to farmers. The grant rate allowed to PIP2 sub-projects varies between 50 and 90%, the highest rate being applied to small pumps, hand pumps and Drip system system

Moreover, for several years, farmers' organizations have started to develop themselves and move towards greater autonomy. It is true that some of them have very little activity but where farmers have experience and where markets are profitable, farmers are able to seize the opportunities of cooperation.

The Special Program of the President of the Republic (PS/PRN) 2001-2010 meanwhile has considerable focused on the construction of mobilization and surface[48] water control works, which however improve the conditions of development of irrigation.

[47] Translation of: will and courage for pedal pump in Niger
[48] Realization of 69 spreading thresholds, and 51 mini dams

The construction of these works is also one of the strategic options taken by the State since 1997 with the support of technical and financial partners including ADB, GTZ, KFW, BADEA, IDB and the European Union.

2. ACHIEVEMENTS AND WEAKNESSES OF PREVIOUS APPROACHES

Small irrigation actually began to develop after the 1983 drought under the impulse of political authorities. There was talk of offseason cultures opposite of wintering agriculture. The idea was promoted to reach the largest number of farmers and to highlight the maximum irrigation potential, outside geographical constituency's areas of high irrigation (Niger River and Maggia).

2.1. At the program design

Given the weak control of the activity of the population majority, the government and development partners have opted for the creation of public areas in order to "ensure proper supervision of farmers." However, this small-scale irrigation option began to confront multiple problems[49]. Thus in early 1990, the State; with the support of donors, decided a new approach emphasizing the role of private actors in individual farming in irrigated production.

The promotion of private irrigation is seen as a solution that can reduce the problems faced by large areas such as high operating costs, infrastructure care and maintenance problems, low agricultural yields or problems related to the allocation of plots.

The first small-scale irrigation project management experience by private began in 1995 with the Niger Association for the Promotion of Private Irrigation (ANPIP).

This new policy was embodied by the implementation, between 2003 and 2008, of a national project: the Promotion of Private Irrigation Project (PIP) Phase 2, which was aiming at the sustainable development of small scale irrigation, the emergence of viable agricultural enterprises and self-organized and irrigators groups.

The approach is confronted with institutional governance constraints.

2.2. At the operationalization level

In Niger, three major approaches have been implemented by the government and its partners, in the area of intervention:

- **Technicist approach:** It is the approach applied in the years 70-80. This technical approach or "top - down" is to propose projects "turnkey" to the farmers who do not master the technicality of works designed and made without their participation. It is based on the fact that the elaboration of projects or programs is the State's responsibility. Decisions were therefore unilateral and peasants were spectators rather than actors. In this aid project, the donor finances a specific operation, verifies stages of implementation and in general carries out himself expense. The State or financial institutions felt that the involvement of the population would be costly and require much more time. The formulation and implementation were then entrusted to technicians and experts and the objectives were the dissemination of all new techniques that can contribute to increased production.

  In the case of rural development projects, in general, and irrigation in particular, the development works and acquisition of equipment are subsidized at 100%, no contribution (physical and/or financial) is required from the beneficiaries.

[49] Conflicts of collective use of hydraulic works, organization of equitable distribution of agricultural inputs and equipment, inexistence system of perimeters maintenance.

This method was developed mainly by certain projects such as the Project of Small Rural Development Operations (PPODR). It has created infrastructure poorly followed and soon abandoned once the project is completed.

- **Participative approach:**

Recent evaluations such as those of the Development Assistance Committee (DAC) of the OECD in the late 90s showed that a significant proportion of development projects led to poor [50] results. The World Bank added that half of the rural development projects it has financed in Africa, ended in failure[51]. Among the various reasons for this failure include mainly the approaches and methods of preparation and monitoring and evaluation employed by the development technicians (technical approach). The approach mainly involving the private sector has also shown its limits especially in terms of financial management.

Thus, intervention in rural area has evolved towards a participatory approach, which is based on endogenous local development and which favors the development of the soil with an exogenous contribution coming from "above".

The beneficiaries are mainly consulted in the selection of techniques and technologies. But they are poorly involved in the monitoring, evaluation and financial aspects. Over the years, improvements have been made for greater involvement of beneficiaries at all levels, particularly to ensure participation of beneficiaries in the investment.

Two financing options were applied:

a) **Option « grant »:** In this case consideration is required from the beneficiaries: physical and/or financial contribution. Relief of participation for women and groups are recognized. This option has had some success and is still in force[52]. Nevertheless, the different experiments in the West African region aiming at a greater or lesser participation of farmers, face the difficulties of mobilizing their contributions to the investment. The State and funding partners support remains indispensable if we want to make accessible the advice for family farms to large numbers of farmers.

b) **Option « credit »:**. After experimenting with the grant, some projects in the interests of sustainability considered the credit[53] option. The lack of harmonization of options for projects involved in the same areas has hampered the success of this yet sustainable approach. In Niger, the project ASAPI has the authorship of this option that has shown its limitations during famines and the high level of poverty of farmers in certain areas of high potential. However, several microfinance institutions continue today to support farmers[54] in the investment by granting investment or campaign loans. However, it is appropriate to emphasize the high bank interest rates reducing the profitability of investments.

- **Municipal Participative approach:** It is an approach promoted in the context of local governance . It is the municipality's responsibility to elaborate sub-project files and their final choice in consultation with the beneficiaries. They are involved at all levels with the local authorities that centralize applications. This is the Water Recovery Project in the Dosso and Tillabery regions

[50] COMMISSION EUROPEENNE, 2001 – *Manuel Gestion du Cycle de Projet : Guide récapitulatif des formateurs* – Version 1.1., Unité Évaluation de l'Office de Coopération Europaid, Bruxelles.
[51] ZANA M., 2003 – *Préparer et financer les projets dans la coopération au développement* – tome 1 : Préparer les projets de développement par l'approche participative, ARISSALA, Rabat.
[52] A été appliquée par le PBVT et le PIP2 et plus récemment par les Projet Lux Dev/Dosso, PVDT, etc.
[53] PRODEX
[54] Caisse Yarda de Madaoua mis en place par ASAPI

(PVDT) that initiated this approach consistent with decentralization and that involves more beneficiaries.

The work and equipment are funded between 80 and 90% with the mitigation measures for women. A financial and/or physical contribution is required from the beneficiaries.
This approach of empowerment of the municipality in the management of natural resources is, however, faced with a number of regulatory, technical and financial problems namely:

- The ineffectiveness of the transfer of skills on natural resource management by the State to the municipalities;
- insufficiency of the transfer of ownership of capital investments;
- The lack of technical staff in most towns; (agriculture, hydraulics, agricultural engineering, etc.) ;
- Insufficiency of financial resources of municipalities for the management of the different producers' solicitations.
- **The State approach of development of the PI**: it also suffers from the will of paradoxical development, by acting on the basis of social characteristics and economic profitability. The goal is both to reach the maximum of poor and have sustainable micro and macroeconomic impacts. The various approaches observed, often in the same geographical area, are evidence of a lack of a coherent strategy for a coherent and coordinated development of irrigation both locally and nationally.

What has worked …

A. The small private irrigation, a profitable model

The projects of reference: PIP2, PUSADER, ASAPI, PRODEX, PPI Ruwanmu

The experience of Niger-IFAD Programme and other TFP shows that small-scale irrigation is an inexpensive production model (1-1.5 million FCFA/ha) and profitable. Ample margins of improved yields are possible with PUSADER, the average crop yields have increased by 36% (eg .: onion: from 20 to 35 t/ha cabbage: 15 to 23 t/ha) . The use of a pump in common by several neighboring farmers is a common practice, which also addresses the need for irrigators to get closer to protect themselves against the divagation of animals.

B. Good practices in GRN and adaptation to climate change

The projects of reference: PPILDA, PUSADER, PASADEM, PPI Ruwanmu

The Niger-IFAD Programme has extensive experience in GRN and adaptation to climate change through its actions in recovery of degraded lands (5549 ha since 2012), treatment of watersheds, dune fixation (1 000 ha since 2013), RNA (40 000 ha in the Maradi region since 2012), creation of hedges and development of forestry-pastoral areas (2,000 ha since 2012). These actions, carried out either in the form of cash for work either promoted on demonstration plots have been widely adopted by the population. For example, in the Maradi region, the RNA has been adopted by more than 16,000 farmers from 165 villages between 2012 and 2013; in villages where the RNA had been adopted since 2-5 years, the integration of the RNA in the production systems has allowed the reduction of the number of seedlings (with a 50% of seed saving), better yields for millet (from +30 to +220 kg/ha depending on the age of the RNA) and an improvement of people's incomes through the sale of its products and sub-products (up to +70 000 F CFA/year).

C. Peasants' fields Schools (CEP), a proven extension tool

The projects of reference: PPILDA, PASADEM, IARBIC, PPI Ruwanmu

In Maradi, Tahoua and Zinder regions more than 500 CEP and, at least, 2,000 demonstrations plots were carried out for the benefit of over 10,000 farmers (30% of women) by these parties (Niger-IFAD program and project IARBIC). The techniques popularized on the CEP showed their relevance through a significant increase in yields. For example, in the PIP plots animated by PPILDA, it was recorded an average increase of millet production by 66%; in the case of PASADEM, on a sample of 12 demonstration plots installed in 2013, average yields are around 840 kg/ha for millet, 672 kg/ha for cowpeas and 800 kg/ha for peanuts[55].

Similar successes have been achieved by others also; for example, on the 364 CEP animated by the IARBIC project, funded by FAO between 2008 and 2011, the use of improved varieties and mineral fertilizers combined with organic manure has resulted in yield increases of 50 to 140% rainfed crop. The CEP market gardeners (CEP/M) set up by the PPI Ruwanmu are in their early stages, but the producers liked and adopted many of the technologies disseminated (at least 40% of adopters in the first year). In terms of technology diffusion, on average, at least, 10% of the producers participating in the CEP are able to advise and guide other community members in the use of vulgarized technologies

D. Small livestock: inexpensive and income-generating activities

The projects of reference: PPILDA, PUSADER, IRDAR-RCI/PAC2, PASADEM

Small livestock (breeding of small ruminants and poultry) includes activities that can be conducted successfully by even the most vulnerable, due to their low cost and revenue quickly generated. As for the small ruminants breeding, goat is the animal most suitable, due to its prolificacy, its hardiness and low maintenance cost. Good practices of promotion of goat farming have been developed by several speakers (Care, VSF-Belgium, AREN). Poultry farming also presents important advantages, mainly due to: (i) good command of this type of farming by the rural population; (ii) the low maintenance costs and short cycle of these animals.

E. A rural dynamic organized civil society

The projects of reference: PPILDA, PASADEM, PPI Ruwanmu

Following Maradi Trans regional peasant Forum (6-9 February 2014) the peasant's organizations (OP) reaffirmed their willingness to be partners in rural development programs; land issues and marketing of agro-forestry-pastoral production are at the heart of their concerns. Specifically, the OP federations acting at the three regions of intervention of Niger-IFAD Programme are dynamic and operational. They achieve turnover and significant economies of scale, which can be improved through institutional strengthening and a more professional management; at the same time, they already show potential in terms of supervision of their OP members in the marketing of agro-forestry-pastoral products or management. At the level of grassroots OP, the experience of Peasant Farming Support-Consulting Groupings (GACAP) from the CEP is encouraging in terms of professionalization and development of a local supply of rural services.

F. Women as key actors in the nutrition security

[55] According to statistical data of the year 2012 in the area of MTZ millet yield ranged from 487 to 552 kg/ha, that of sorghum between 357-658 kg/ha, the cowpea between 160-339 kg/ha and groundnuts between 164-438 kg / ha.

The projects / speakers of reference: PASADEM, Care, GRET

In the intervention area of the Niger-IFAD program, women's groups are key actors of nutritional security through: (i) management of small cereal stocks through the female hungry season barns; (ii) the promotion of local products through food processing. Indeed, groups that are part of the movement MMD56 initiated by Care were solicited by PASADEM for the management of female hungry season barns, which are food and nutrition security proven tools (lesson learned from the Niger-IFAD Programme for ten years). Several women's groups in the area of intervention further carry out several cereal processing activities (millet, sorghum, wheat) and other vegetable products (cowpeas, water lily, moringa) of good quality food (flour, couscous, dried leaves moringa). These activities allow the group members to meet some family food needs.

G. A successful relationship between civil and social engineering

The projects of reference: PASADEM, PPI Ruwanmu

The social engineering process developed by –Niger-IFAD -Programme on trade infrastructure (semi-wholesale markets, counters and collection centers) is innovative, inclusive and well suited by the actors involved. For the success of this process, social engineering must precede and accompany civil engineering on any type of business infrastructure; localization of market and land, as well as the choice of paths and centers of collection to be developed should be a subject to solid local consensus among authorities and economic operators.

The work of planning, construction and maintenance of rural roads is part of both a favorable institutional environment at national and regional levels and in a social engineering process succeeded locally. Indeed, cooperation between the Ministries of Agriculture and Equipment has helped to: (i) conduct collaborative planning; (ii) develop regional schemes of Rural Roads; and (iii) establish a DVPR in the Niger-IFAD Programme and an interdepartmental committee (MAG ME) responsible for studies, monitoring and control of work.

HG PASADEM of PDE attended identification of key rural roads connecting their markets to production areas they supply. The maintenance of rural roads should be part of the duration and involve primary stakeholders (municipalities, departments, carriers, HG etc.)

H. Transborder markets

The semi-wholesale markets in the regions of Tahoua, Maradi and Zinder are important links in the transborder flow of farming products (small ruminants, cowpea, pepper mainly in exchange for corn and tubers) between Niger and Nigeria. These flows, very important (eg. around a million of small ruminants heads per year), are difficult to quantify at this time. The improvement of cross-border flows and connectivity could benefit both the Niger and Nigeria economy; this theme is currently the subject of a high-level political reflection at the sub regional and international levels.

What could be improved

A. The monitoring of the impacts of management actions of the territory

In the context of scaling, the ecological impacts of natural resource management achievements need a new monitoring system, through a geographic information system (GIS). Such a device enables:

(a) The production of a reliable database on the impact of actions on people's resilience to climate change;

[56] "Mata Masu Dubara", " ingenious women " in haoussa.

(b) Monitoring and analysis of the development of water resources;
(c) The establishment and operationalization of a platform for exchange of environmental information for actors and local institutions; and

(d) The production of data for case studies, notably on best practices for adaptation to climate change.

B. Access to agricultural inputs

Access to and appropriate use of quality inputs (improved seeds, fertilizers, pesticides) helps develop agricultural production. The input shops (BI) can be a good supply system; but the experience of many projects which have promoted them (eg. the Inputs and IARBIC projects) shows that without proper monitoring by STD and without a sufficient level of organization and capacities of OP , the BI cannot function optimally. Other issues of access to inputs to consider consist of: (i) too high fertilizer prices and the existence of a single supply circuit (through the CAIMA); (ii) the lack of information for producers on local supply opportunities in improved seeds;

C. Compliance with certain zootechnical standards

In the purchase and distribution of small ruminants' kits, non-compliance of certain livestock and health standards leads to livestock losses before and after distribution. Three critical elements include: (i) the place of purchase of the animals: transport from a distant market is stressful for the animals; (ii) verification of the compliance of the zootechnical and animal health standards at the time of purchase; and (iii) compliance with quarantine before distribution.

D. The consideration of the added value of operational partners

The using of the same providers (GSC or NGOs) on very different activities may lead to lack of efficacy (eg. GSC used both on the installation of micro-irrigation kits, on setting up and support of CEP, the JDC and MER. A thorough assessment of the strengths/weaknesses and the potential added value of operational partners is necessary before choosing the operators. Once the choice is made, the establishment of precise specifications and avoiding collisions between operators facilitates a quick start and efficient conduct of activities.

E. The dissemination of infantile flour produced locally

Infant foods are produced locally by SMEs (eg. Misola in Tessaoua). These flours are marketed in several types of packaging, of which the most accessible of the 60 g, but allows to provide children's nutritional needs coverage rate (6-23 months) of more than 70% for proteins, iodine, iron, zinc and vitamin A.

Despite the benefits these meals have in a nutritional standpoint, they have a low rate of diffusion and use, especially among the rural population. However in the case of Misola it was found that the launch of awareness and the establishment of a broader distribution network (130 stores at present) have allowed a 500% increase in sales volume. To act on the development of SMEs that produce baby food, special attention must be paid to distribution arrangements and promotion of the use of these products.

F. Support to the rural finance sector

In Niger, rural financing opportunities are very limited at all levels because of the risky nature of agriculture and lack of guarantee of rural promoters.

To overcome this situation, the TFP use several modes of intervention to support or promote access for developers to financial and material resources they need: (i) provision of Financial Institutions (Banks and

SFD) of guarantee funds and / or credit lines, (ii) donations and direct subsidies to beneficiaries, (iii) the cash for work or cash Transfer transiting by the SFD, (iv) cost-shared funding combining loan and/or contribution of the beneficiary and/or subsidy, and (v) relationship development of promoters organized and with strengthened skills (business plan) with the SFD to qualify for credit

All these modes of intervention will be considered and evaluated by the PRODAF not to create distortions in either beneficiaries' access to financing or in the local financial market.

3. KEY LESSONS LEARNED

Lesson 1 Failure to obtain an harmonized sector management, transparent and results-oriented has made sure that the various irrigation projects operate in silos without reference to other actions for development projects in the areas of intervention.

The ministries in charge of the sectors and direct and related sub-sectors of the PI are very weakly associated with the implementation of projects or programs, control and coordination of actions and have no real possibility to develop or assure monitoring & evaluation. These approaches do not allow good overall and equitable planning needs.

Lesson 2 The need to target the support we want to subsidize given the low capacity of technical services and the insufficiency of SPAC to develop and analyze on one hand the project operators and also to accompany the recipient in the induced changes. Indeed, various projects have had to fund non-viable investments with low prospects for sustainability and return on investment (lost investment funds). In the future, it would be socio economically advantageous to favor the approach "investment on demand" with better guarantees in terms of social costs and opportunity[57].

Lesson 3 : The need to strengthen an enabling environment for private participation. in the PI lies in the innovations, investments, incentives and inputs.

- **Innovations**: they include the extension of simple and controllable techniques by villagers, such as treadle pumps and small pumps that reduce the drudgery of dewatering, the introduction of solar pumping, extension of "California system" and Drip system kits. At the level of cultivation practices, the use of short-cycle seeds, winter gardening, crop rotation must be improvements packages to offer to operators by the professionalized SPAC.
- **Investments**: they include innovation funds, of guarantee, rolling, compensatory endowments and other types of subsidies.
- **Incentives**: primarily by bank financing and micro finance institutions, the improvement of loans could be extended and added to the guarantee fund. These incentives have shown their limits in view of the high cost of credit and the inadequacy of products offered by banks. Banks are required to adapt their procedures and requirements to find solutions to rural and small business. Thematic training for operators and other related beneficiaries will be supported. The SPAC and STD will be the main drivers of this improvement of knowledge, management and technical mastery by the beneficiaries.

- **Inputs**: for which the focus should be on the following aspects:
- The availability of improved seeds and fertilizers in appropriate formulation,
- mitigation the high cost of inputs,

- The establishment of a sustainable system of campaign credit. These shortcomings of the input supply system were taken into account by namely the PIP2 project and motivated the installation of 41 input shops in areas of irrigation concentration.

[57] The opportunity cost of a given choice is the best gain (relative to the given range) that can be obtained by choosing one of the other choices. The concept of opportunity cost can account the fact that in considering a choice, we give up other choices that had associated gains

Lesson 4: The most critical project evaluation criteria are the approach, participation, dissemination/promotion of technologies and farming techniques, the promotion of equity towards women and youth.

- **The approach**: Many support projects and programs lead multiple actions in the different stages of the value chain and it is difficult to assess the% of each type of action for lack of variation within a harmonized framework actions by the subsector.
- **The participation** (gift, credit, *maching grant*): Regarding the sub projects, the equipment/inputs the first observation is that there is very little drop of sub-projects funded by the PIP2 after obtaining funding, when the checks before approvals have become systematic.
-

Unfortunately, the selection criteria of promoters adopted by the PIP2 (possession of plots of land and monetary capital to invest in irrigation) could only reduce the participation of poor groups where there are more women. The criteria for approval of applications of the PIP2 are detailed in Appendix 3.

- **Dissemination/promotion of technologies and farming techniques**: A need for capitalization and updating of technology guide available or adapt by area and type of operation is useful, but suffers from the lack of vulgarisation.
- **The promotion of equity to women and young**: the important role of women in agricultural production is fairly documented but the woman is not known so far equitably in the distribution of income generated. The propensity of rural women to undertake income-generating activities, their best credit solvency matters and their inclination to prioritize the fight against food insecurity and poverty at the household level should be better taken into account in the definition criteria for the selection of target groups of small irrigation projects.

Lesson 5 : The constraints of the marketing of small irrigation products persist.

Indeed, if the production side has a very great success, marketing remains a major problem: there is a lack of effective organization of producers for marketing agricultural products and highly fluctuating prices and not paying enough for several reasons: fixing of prices by middlemen/traders, saturation of markets in times of harvest. The actions undertaken by the various projects have not actually eliminated the following major constraints:

- Insufficient financial means of unions and malfunction management system;
- Lack of direct relations between unions and buyers;
- Lack of formal dialogue between intermediaries and unions;
- Lack of a formal information system between such unions based in Agadez and producers in order to provide information to producers on the status of the request;
- Lack of planning of production in line with market demands;
- Isolation of production areas;
- Inadequate organization of transport.

Lesson 6 : The constraints of the marketing of small irrigation products persist.

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- Lack of planning of production in line with market demands;
- The isolation of production areas;;
- Inadequate organization of transport.

<u>Lesson 7:</u> The importance of the existence of a monitoring mechanism of the beneficiaries after the investment.

Regarding the advice support, the operators have strongly emphasized the benefits they derive from the advice support activities including technical routes of production. The main themes developed are advice in farming techniques, including methods of organizing community life and environmental management (good practices). A need to continue and intensify the training of maintenance, facilities management and rational water management and conservation techniques are themes to prioritize because neglected until now.

The PIP2 produced an environmental assessment guide of micro-projects. This guide provides a simplified and streamlined approach to describing each step of the environmental measures in project implementation and facilitating the monitoring and control of their execution. This guide contributes to the environmental education of various actors involved in the development of small-scale irrigation for the inclusion of prevention or mitigation measures of the environmental impact of small private irrigation schemes. A Plan of Impacts Limitation is developed and it selects and defines in detailed and operationally manner the prevention, mitigation, repair or compensation for potential environmental damage generated by the implementation or operation of infrastructure[58].

[58] Example of measures of environmental mitigation: The minimum recommended distance between 2 boreholes must be 25 meters so as not to affect the pumping conditions of neighboring gardens.

Appendix 5

Extract of environmental and social management framework plan and pest and pesticides management plan

FRAMEWORK PLAN FOR ENVIRONMENTAL AND SOCIAL MANAGEMENT

Environmental integration mechanism in the project cycle

The methodology for integrating the environment in the planning, design, building / construction and operation of sub-components stages is as follows:

a. Planning Phase / Project Studies. This is the phase of implementation of the environmental assessment (EA). This phase essentially comprises the execution studies (APS et APD). It is at this stage that takes place the preliminary screening procedure to determine the appropriate type of EE (stage APS) and EE even as such if necessary (stage APD). The EA is an integral part of the APD study and is performed by a consulting firm or an independent consultant proven in environmental assessment.

b. Realization phase / construction of the works. It is the environmental monitoring phase. The implementation phase of the sub-component which will implement specific mitigation measures described in the EA and listed in the Special Provisions Papers (CPS) and the environmental monitoring program. Environmental monitoring will be provided by BEEEI and will be sanctioned by a report of environmental monitoring mission.

c. Exploitation Phase. It's the implementation phase of the environmental monitoring program. The integration of environmental and social aspects in this phase aims to implement the environmental monitoring program. The EA must state the residual impacts and measures that will be implemented to confirm the assessment of the impacts, assess the effectiveness of mitigation, compensation, and assess any other aspects for which it remains uncertainties or which presents a major challenge. Monitoring will be conducted by the BEEEI in collaboration with relevant structures

In addition, during this operation phase, it is anticipated activities for the environmental and social management of the project and that will be executed by the project. It is:

- The realization of the ESIA (including ESMP) for the work classified as "B" category. It should be noted that for activities classified in category "B2" or "C", the application of simple measures suffice. However, it is likely that after sorting, the project carries out ESIA for some works contained in some of the PARR-CC components;
- Institutional support to BEEEI and monitoring of the implementation (ongoing monitoring, final assessment) conducted by agents of BEEEI, technical services of the State and Local Communities;
- Training / sensitization of local stakeholders on good environmental and hygiene practices.

Process of environmental selection (or screening)

The screening is a process used to determine at first, the magnitude of impacts on the biophysical and human environment that each PARR-CC component is likely to generate.

Based on the information in the form of screening (triage) and making a field evaluation, it is possible to determine the sub project for which the implementation of an Environmental and Social Impact Assessment (ESIA) is required. This collection of information can be done through field observations, the use of professional expertise and / or interviews with the people concerned. At the same time, identification of key stakeholders and community groups in the area which may be affected by the project is essential as part of this evaluation on the field.

When the information contained in the form of screening (triage) and / or obtained through the field assessment reveal that a sub component of the project requires only a PGES because the impacts are not significant, then the development of a mitigation and management plan during construction and operation of the project as environmental requirements (simple mitigation measures) will be sufficient.

If appropriate, no safeguard measures will be required for sub components generating only minimal impacts. The table below summarizes all stages of the screening process (triage) of sub-projects.

Table 5 : Synoptic matrix of screening steps and implementation responsibilities.

Phasing of screening	Main tasks	Subtasks	Responsible parties
Phase 1 : Environmental and Social components selection	Sorting of components	Filling of sorting forms and checklist	- Research department in charge of conducting technical, environmental and social studies, as well as tender dossiers (TD) of works - Beneficiaries - Technical Services
		Proposals for mitigation measures	Research department responsible for conducting technical studies, environmental and social, as well as TD of works
		Proposal of the public consultation type to realize	Research department responsible for conducting technical studies, environmental and social, as well as TD of works
		Implementation of the public consultation	Project Management Unit
Phase 2 : Analysis of screening results	Validation of sorting and classification of sub-components.	Verification of the information contained in the Forms	- Technical Services (Environment, Agriculture, Livestock, Rural Engineering, Water Resources, Health, etc.); - BEEEI which will carry out review and approval of environmental classification of projects (screening) as well as ESIA approval. - Project Coordination Unit
		Review of proposed mitigation measures	
		Categorical classification of sub-components	
		Approval of the overall results. Indeed, the results of the classification of sub-projects will be transmitted to BEEEI for verification and approval of the project classification.	
Phase 3 : Environmental assessments if necessary	Realization of an ESIA	Elaboration of Terms of Reference	Management Unit of BEEEI / Project
		Realization of the ESIA	Research department responsible for conducting technical studies, environmental and social, as well as TD of works
		Approval of the ESIA (NOC), the ESIA reports will be submitted for consideration and approval of the national institutions in charge of ESIA.	BEEEI
Phase 4 : Public consultation and dissemination	Consultation and Information Dissemination. The provisions of national legislation regarding EIA feature that information and public participation should be ensured for the implementation of the ESIA, in collaboration with the competent bodies of the	Public Information Notices on the Environmental Assessment	Management Unit of Project
		Publication dans les médias et autres canaux appropriés	BOAD in collaboration with the Ministry of Agriculture
		The provision to the public of documents for consultation	Ministry of Agriculture BEEEI

Phasing of screening	Main tasks	Subtasks	Responsible parties
	administrative district and municipality.		
Phase 5 : Elaboration of monitoring indicators			Research department responsible for conducting technical studies, environmental and social, as well as TD of works
Phase 6 : surveillance and environmental monitoring	Environmental surveillance	Monitoring of the proper implementation of activities and work during the project period in compliance with environmental and social measures proposed, laws and regulations governing environmental assessments in Niger and safeguard policies of BOAD	BÉEÉI
	Environmental monitoring	Assess the effectiveness of mitigation measures implemented and implement corrective measures as needed	- The national external monitoring will be conducted by BEEEI which will carry out the external monitoring at national level of the implementation of the PARR- CC environmental measures ; - The local monitoring will be carried by producer organizations and other decentralized agricultural services. - -The assessment will be conducted by Environmental Consultants (national and / or international), at mid-term and end of the project.

Institutional capacity building

To optimize the objectives of the PARR-CC, it is planned environmental monitoring and monitoring programs of the activities of some components to be subject to environmental assessment. The structures involved in the implementation of the PARR-CC and monitoring and evaluation are listed in the table below.

Institutional mechanism of intervention of the PRRA-CC.

Intervention level	**state structures**	**Other structures and organizations**
Local	Technical Services (Departments of Agriculture, Environment, Rural Engineering, Water and COFODEP)	NGO Producers Cooperatives Peasant Organizations
Regional	Technical Services (Departments of Agriculture, Environment, Rural Engineering, Water, DÉESE/DRESUDD, ONAHA et COFODEP)	NGO Consultants Cooperatives Peasant Organizations
National	UGP/PRRA-CC General Directorate of Rural Engineering Directorate General for Agriculture General Directorate of Plant Protection, DACPOR BEEEI ONAHA	NGO Consultants Cooperatives Peasant Organizations

The institutional mechanism presented above determines needs in environmental management cand environmental monitoring of sub-components capacity building. Indeed, the capitalization of achievements and lessons learned from previous agricultural projects require strengthening of environmental and social management of PARR-CC. During institutional meetings and local consultations, several constraints were raised and recommendations made to better improve the environmental and social management of the PARR-CC

- Good agricultural practices and sustainable production techniques;
- Fonction environnementale au niveau des institutions agricoles et pastorales;
- Strengthen the capacity of various stakeholders on environmental assessment;
- Basis data for the qualitative and quantitative monitoring;
- Support measures to mitigate the effects of certain activities;
- Strengthening of monitoring and supervision of agricultural activities;
- Involvement of producers and local communities in environmental management.

These various suggestions and recommendations made by the actors were at the basis of proposals from capacitation measures described below, in terms of institutional and technical measures.

For the implementation and environmental monitoring of the project, the proposed approach to managing environmental impacts aims to enable operational structures of the rural development sector, but also to farmers, to fully play their roles in the planning, implementation, monitoring and operation of infrastructure and agricultural equipment

To achieve this goal, the ESMFP suggests measures of institutional and technical support, training and awareness to build the capacity of structures and human resources. These actions of institutional and technical support, training and awareness are to: make it operational environmental management strategy of the PARR-CC, foster the emergence of expertise and professionals in environmental management, raise the level of professionalism and employee responsibility for environmental management; protect the environment, health and safety of agricultural producers and populations.

1.3.1. Assessment of needs for capacity building of actors

The composition of the implementation mechanism of the PARR-CC at the scale of intervention areas, involves upgrading all strategic stakeholders and partners in order to appropriate rules and good environmental and social practices, guaranteeing the sustainability of infrastructure (solar system) and facilities to be carried out.

So, for the implementation and monitoring of the environmental sub-components of the PARR-CC in the areas of intervention, it is important that current capacities are built. The implementing bodies (local, regional and national levels) and strategic partners (contractors, private providers, etc.) should have adequate expertise to fully play the roles assigned to them. For this purpose, it is privileged the participatory approach with stakeholders through the diagnosis of training needs expressed by each party, at all planning levels. More specifically, the activities planned for the environmental and social management of the PARR-CC concern the following measures:

a. Measures of Institutional Strengthening

Institutionally, given the very limited duration of the PARR-CC, it would be more realistic to build the capacities of DGGR in the monitoring of the PARR-CC activities and consider supporting in the medium and long term, the creation or strengthening of environmental units within the structures of the Ministry of Agriculture. However, the PARR-CC can be a pretext to impulse this "environmental function" within the structures of the Ministry of Agriculture.

- Strengthening of environmental management capacity of the *DÉESÉ* heads: This is to strengthen the capacities of Heads of Divisions of Environmental Evaluation and Ecological Monitoring (DEESE) of regional environment directorates of the regions affected by the PARR-CC activities in the process of environmental selection of activities and environmental monitoring of their implementation

- *Establish inter-institutional cooperation agreements:* As part of the project implementation and under different aspects within the project, agreements between institutions involved will be necessary. These agreements should be established between the Ministry of Environment and the Ministry of Agriculture to expedite and facilitate the active participation of Institutions responsible of ESIA (including BEEEI) in the verification and validation of the environmental work of E&S focal Points E & S, the supervision of additional ESIA procedures and environmental monitoring.
- *Assist the Project Coordination Unit (UCP) in the integration of tools and recommendations, safeguard documents in the various project manuals*: This exercise is fundamental to allow the coordination team of the project to be supported by environmental experts (preferably those who prepared the environmental and social management documents of the project) in the development and finalization of various manuals of the project, so as to ensure that environmental and social issues are well integrated.
- *strengthening the coordination of regional or local steering committees of the project:* This is to hold regular meetings of the National Steering Committee to make it more dynamic and more attentive to environmental and social issues of the project, particularly by ensuring its role of consultative, sharing, exchange and coordination of the implementation of the ESMF framework. These meetings will better clarify the charter specifying the roles and responsibilities of different members on the monitoring of environmental issues, but also enhance the synergies of action and avoid duplication.

- *Organize meetings of restitution and sharing of ESMF :* The regional Steering Committees should promote the consideration of environmental and social aspects of the project to a rank of high priority, especially in their programs of action. To do this it will need greater restitution and wide dissemination of CGES and share them between research, supervision and agricultural extension institutions, to have a common understanding and agreement on modalities and tools of application proposed, the consensus accuracy of responsibilities including institutional arrangements for implementation. In this respect, the ESMF's appropriation process should be strengthened by developing dialogue with the structures at central level, with a clear definition of roles and responsibilities of each in the implementation and monitoring of the ESMF.

b. Technical strengthening measures

The technical strengthening measures concern (i) the development of a manual of good agricultural practices; (iii) the provision for the realization of the ESIA; (iv) the provision for the implementation of sub components of ESMP having been subject to ESIA; (v) the establishment of a baseline and setting up of a database of "agriculture / livestock / environment"; (vi) the monitoring and evaluation of the PARR-CC activities.

- Development of a manual of good agricultural practices: The PARR-CC will support rural development sector in the preparation of procedures for good agricultural practices to support implementation of activities (farming techniques which respect the environment, optimal use of pesticides and fertilizers, etc.);

- *Provision for realization of the ESIA:* The ESIA may be required for some PARR-CC activities classified in category "B", to ensure that they are sustainable in environmental and social terms. If the environmental classification of activities indicates ESIA must be performed, the PARR-CC shall provide a provision that will be used to pay consultants to conduct these studies.

- Provision for the implementation of possible ESMP: The realization of potential ESMP from the ESIA could cause measures with costs and which will now be budgeted by the PARR-CC to be executed in due time. For this it is necessary to make a provisional endowment that will support the implementation of such measures.

- *Establishment of an environmental data base of the rural development sector:* The PARR-CC will help for the establishment of a basic environmental and social database in the Ministry of Agriculture, to better understand the environmental issues and constraints in the implementation of its agricultural activities. This database will help to establish a repository to better appreciate the impacts and efforts made in the management of rural development.

- Measures for the elimination of vulnerability factors of agricultural activities: The implementation of agricultural activities must be done with accompanying measures of health and social order, to eliminate certain factors of vulnerability of agricultural activities such as malaria, severe malnutrition. The PARR-CC will provide support in these measures.

- Monitoring and Evaluation of the activities of the PARR- CC: The monitoring program will focus on permanent monitoring, supervision, mid-term evaluation and annual evaluation. In addition, the monitoring will require physicochemical, piezometric and health analyzes, for this it is necessary to provide a budget related to this monitoring. Similarly, the OP and local communities should be involved in proximity monitoring. In addition, the PARR-CC shall provide an environmental report at the end of the project. This part also includes the strengthening of capacity of the BEEEI in environmental monitoring of the PARR-CC activities.

Environmental training program for actors

It is based on identified needs and adapted to the context of the PARR-CC sub-components in the study area that institutional capacity building measures of members of the implementation bodies of the various components of the PRRA- CC are proposed, in order to ensure their upgrade in environmental evaluation and infrastructure management in a sustainable development perspective.

It is the Directorate General of Agriculture, Directorate General of Rural Engineering, Plant Protection Directorate and BEEEI, but also responsible for decentralized technical services, and agricultural producers involved in the implementation of the PARR-CC. These actors have a responsibility to ensure the integration of the environmental dimension in the sub-components realizations. They ensure each in regard to studies, monitoring or environmental supervision of the sub-components. The training aims to enhance their expertise in environmental evaluation, environmental supervision of work and environmental monitoring so they can play their roles more effectively in the implementation of sub-

components. It will be organized in the five regions targeted by the PARR-CC (Tillaberi, Niamey, Dosso, Tahoua and Agadez), a training workshop that will allow regional, departmental and municipal bodies involved in monitoring the work to asorb the provisions of CGES, of the procedure for environmental screening and implementation responsibilities. Subjects will be centered on: (i) environmental and social issues in agricultural activities and environmental evaluation procedures; (Ii) health and safety related activities; and (iii) appropriate environmental regulations.

The training should also help to familiarize the actors on the national rules on environmental evaluation, guidelines of BOAD and other partners including the World Bank, the environmental evaluation methods, the processes and environmental evaluation tools, the control and environmental monitoring. This training workshop will be organized by the BEEEI in each region, in collaboration with the national unit environmentalist of PARR-CC Coordination.

Proposed training modules

i) Environmental and Social Impact Evaluation
Learning Objectives:
- Good knowledge of national laws and regulations on the environment;
- Good knowledge of organization and conduct of ESIA procedures;
- Good appreciation of the ESIA development methodology;
- Evaluation of the quality of the content of the ESIA reports;
- Knowledge of administrative procedures for environmental evaluation of Niger and that of BOAD;
- Knowledge of the monitoring process of the EIA implementation;
- Environmental Education.

ii) Training on environmental monitoring
Learning Objectives:
- How to check the introduction into the contracts of the contractor in charge of the works environmental clauses and check the conformity of the said clauses;
- How to respect and apply the laws and regulations on the environment;
- How to recommend appropriate measures to minimize impacts;
- How to review the general monitoring of recommendations made in the impact assessment;
- How to ensure the effectiveness of the implementation of population awareness on environmental protection and management;
- How to ensure the effectiveness of the inclusion of gender.

iii) Training modules on pesticides management
Learning Objectives:
- Information on risks and health and safety advice;
- Basic knowledge of handling procedures and risk management;
- Port of protection and safety equipment;
- Risks associated with the transport of pesticides;
- Handling procedures, loading and unloading;
- Storage-farm pesticides;
- Management of used packaging and pesticides;
- Pesticide Management in Accidental release;
- Vehicle fittings;
- Protection equipment;
- The outline of the treatment process and operation;
- The health and safety related to operations;
- The measures and emergency aid in case of poisoning with pesticides;
- The technical procedures;
- Maintenance Equipment;

- Control of emissions;
- The monitoring of processes and residues.

iv) Sensitization and mobilization programs

It will be to sensitize and train the actors involved in the implementation of the project on environmental issues to ensure performance in achieving expected results and sustainability of the process.

E & S Focal points will coordinate the implementation of information and sensitization campaigns among all actors involved in the project, including the nature of the activities to be undertaken and the environmental and social issues related to their implementation. In this process, NGOs and other local environmental associations and organizations or groups of agricultural producers will be involved in the foreground. Active NGOs in agricultural promotion, with expertise in the environmental field, should be retained to perform these services.

The topics will include:
- Information and sensitization campaigns on environmental and social issues related to the development of small-scale irrigation;
- Sensitization on good agricultural practices;
- Sensitization on safety, health and hygiene during the production of agricultural activities**.**

ACTION PLAN FOR THE MANAGEMENT OF PESTS AND PESTICIDES

The action plan for the management of pesticides include: priority problems, intervention strategy, best practices in pesticide management and monitoring, monitoring and evaluation plan.

1.1. Constraints in the Pesticides Management

The following problems and constraints have been identified as part of the current management of pesticides:

At institutional, legislative and regulatory levels

- Lack of coordination in the activities of the different actors;
- Insufficient organization of producers for the acquisition of products.

In terms of capacities of actors and awareness of populations

- Insufficient training for farmers on the use of pesticide;
- Insufficient information of populations;

In terms of technical management of pesticides

- Failure/inadequacy of product storage infrastructure;
- failure and incompetence of the technical agents with producers
- timid experimentation of alternatives to pesticides and integrated pest management;
- Lack of waste disposal systems.

At the Control and monitoring Level

Inadequate control of the use of the products (personnel and equipment);

Lack of control and monitoring of adverse effects related to pesticides (pollution, poisoning, etc.).

1.2. Intervention principles

1.2.1. Principles

The pests and pesticides management in the project should focus on the following principles:

- The precautionary principle and attention;
- Capacity building of stakeholders in the management of pesticides;
- Transparency and traceability of the products used;
- Coordination and inter sectoral cooperation
- Information and data management relating to pesticide management
- Streamlining and strengthening of monitoring structures and risk prevention
- Control and evaluation and monitoring of the health and environmental impact
- Anchoring the IPM extension systems/information of producers
- Effectiveness of the participation of all stakeholders.

1.2.2. Action Plan

Within the framework of project, the action plan focuses on four main areas including: the technical, institutional strengthening, information and awareness of producer organizations and the population, control and monitoring:

Axis 1: Training / awareness of stakeholders. It consists of:
- Raising awareness about the dangers and hygiene practices in pesticide use.
- Raising awareness, educating and informing the public on the judicious use of pesticides
- Enhancing the exchange of information on pesticide management
- Establishing pesticide management related training modules in the education system in Niger
- Raising awareness for the protection of vulnerable to pesticides
- Actively involving civil society in the information/education/communication related to pesticide management-.

Axis 2: Technical measures:
Technical measures consist of:

- Providing groups and other users with the list of approved pesticides;
- -Disseminating practices for the reduction of pesticide use;
- Establishing the management of obsolete pesticide stocks;
- Establishing a system of collection, storage and disposal of obsolete chemicals
- Developing a database on pesticide use;
- Implementing harmonized labeling system for chemicals (including translation into local languages of literate package labels);
- Supporting producers in the acquisition of personal protective equipment;
- Developing and implementing health and safety measures at the workplace (see good practice measures in the next section);
- Implementing a pesticide use surveillance plan
- Establishing incentives for the recovery of pesticide packaging

Axis 3: Institutional and legal strengthening: that is to :

- Establish national toxic vigilance and anti-poison centers;

- Strengthen legal, institutional and technical management of products protection plant;
- Develop institutional, legal and policy frameworks, pesticide management legislation in the fields of animal husbandry and fishing.
- Develop and implement a chemicals policy;
- Strengthen the capacities of plant protection products Committee;
- Regulate the production, use, storage, transport, distribution/marketing, handling use, disposal of pesticides;
- Develop a national strategy for environmentally sound management of hazardous wastes, including obsolete pesticides;
- Take the regulatory measures for the protection of vulnerable people, particularly, women, children and the elderly against the harmful effects of pesticides;
- Develop and implement a stakeholder information exchange mechanism;
- Establish consultation and coordination / structures and empower them

Axis 4: Control and Monitoring:

- Strengthen customs controls at borders and in the country (customs, inspectors PV, Security)
- Ensure better organization of control service standards and packaging of chemicals.
- Strengthen pesticide approvals procedures
- Strengthen risk assessment infrastructure.

1.2.3. Good practice measures to be adopted during the pesticides management cycle

The following best practice measures are proposed to manage pesticides in their use cycle.

Table 6 : Measures of good practice.

Step	risks	good practice
Labeling	- Health Hazard - Likelihood of confusion between products - Mixing of incompatible products - Overdose or under dosing of porridge - Unapproved product for the desired use (eg crop type) - Risk of environmental pollution.	- Give up using the product if the packaging does not carry a readable labels or if there is missing information - Use only approved protective equipment adapted to the types of products handled - Consult the label to inform all arrangements (equipment, uses, dosages, mix of possibilities ...) and risks related to the product (refer to Safety Data Sheets or his technician); - Prepare the porridge in appropriate and airy place.
Transport and handling	- Health Hazard. - Risk of creating an accident. - Possible deterioration of packaging and therefore risk of leakage and spillage of products.	- Use protective equipment; - Use appropriate mechanical devices to transport and lift products; - Well secure charges; - Insulate interior products; - Have the documents authorizing the transport of dangerous products. - Separate hazardous materials from others.
storage	- Risk of contamination by ingestion, skin or eye contact for the manager of the local, outsiders or animals. - Risk of pollution to the environment. - Fire hazard. - Risk of confusing two products which are not intended for the same purpose.	- Store products in a reserved room, ventilated and locked. - Keep products in their original packaging. - Periodically review the stored products to ensure their good condition. - For procurement, follow the method of "first in -first out". - Keep combustible materials in the room (wooden pallet, cardboard ...). - Identify and isolate unlabeled in local and inform the appropriate products - services - Identify and isolate the products classified CMR (carcinogenic, mutagenic and toxic for reproduction).
Equipment	- Mechanical hazard (cardan	- Maintain the equipment so they are always clean and in

Step	risks	good practice
Maintenance	shaft, crushing, falls ...). - -Risk of contamination if protective gear is not worn. - Risk of malfunction of the device (eg clogged nozzles or hoses). - Accidental pollution risk.	perfect condition. - Regularly change filters - Periodically check the distribution ducts rubber and nozzles. Substitute according to the manufacturer's recommendations. - Adapt the equipment to the type of treatment. - Use a check valve to prevent siphoning of the tank. - Ensure that the settings are correct. - Revise the equipment before use to monitor for leaks. - Do not use equipment with quality defects or leaks.
Preparation of porridge	- Water pollution risk and environment. - Risk to human health, animal or equipment in bad mixture. - Risk of falling if the filling is done from the top of the tank. - Likelihood of confusion between two products.	- Wear personal protective equipment. Change them if they are contaminated or used. - Carefully read the labels and do not use non-labeled product. - Monitor the filling to avoid overflow and use devices preventing any risk of accidental pollution (intermediate tank, check valve, pump meter ...). - Make the filling in an area provided for this purpose and equipped with a collection tank of dirty water. - Calculate the volumes in advance and adjust the doses of products. - Book solely for that purpose the tools used (funnel doser pot ...). - Rinse the cans 3 times then let them drain and dry
Application porridge	- - Health Hazard. - - Environmental Risk. - - Risk to bees.	- Wear protective equipment if the tractor is not equipped with a filtered air-conditioned cabin and think about changing filters regularly. - Consider the weather conditions (temperature, humidity, wind). - During hot weather, prefer treatment in the early hours or the last hours of the day. - Keep away from the treatment area and treated cultures, people and animals not involved in operations. - Avoid the maximum drift phenomenon and choose the application nozzles. - Do not treat rivers borders. The untreated zone (NTZ) varies from 5-20 m depending on the product: Read the label. - Treat in accordance with regulations on the protection of wildlife and especially bees. - Observe the application rates. - Drive gently on illegal or unknown terrain. - Do not operate the booms near power lines. - Finish the application by rinsing the vessel. - Provide feed nozzles and gloves and / or bring a can of compressed air in case of clogging.
Bottom of tanks or containers	- Risk of river pollution. - Health Hazard.	- Dilute the bottom of the tank at least 3 times with clean water. - Apply on the plot, taking care not to exceed the maximum dose or drain on a filling area equipped with a recovery system. - Remove the tank bottom remains by using equipment approved by the department or by a service provider.
Management of packaging	- Risk of environmental pollution. - Health Hazard for user, outsiders and animals.	- Do not pour the remains on the earth. - Rinse the cans to 3 times, then drain and leave to dry. - Never submerge the containers or introduce in Irrigation canals, waterways or lagoon to wash them. - - Do not burn empty packaging. - Remove empty packaging in special bags in order to entrust them later in appropriate structures - Do not leave empty containers in the treatment area or in

Step	risks	good practice
		convenient locations. - Identify unused products. The isolation in the local of phytosanitary awaiting collection by specialized services
End Application	Various contamination risks	- Wash reusable PPE. - Wash hands with water and soap, take a shower at the end of treatment and change clothes. - Wear protective equipment for cleaning spraying equipment, filters. - Never blow or draw in a nozzle. - Clean the unit on an area intended for this purpose, which can be the fill area. - Treat the cleaning water as hazardous waste.

1.3. Best Management Practices Guide and pesticide management measures

1.3.1. Measures required to reduce pesticide risk.

- ***Safe use of pesticides***

Pesticides are toxic to pests but also for humans. However, if we take adequate precautions, there should not be a threat neither to the people nor to non-target animal species. Most of them can be harmful if swallowed or if they remain in prolonged contact with the skin. When spraying a pesticide as fine particulates, we risk to absorb it with the air we breathe. There is also a risk of contamination of water, food, and soil. Special care must be taken during transport, storage and handling of pesticides.
We must regularly clean application equipment and maintain it well to prevent leakage. People who use pesticides must learn to use them safely.

- ***Approval of insecticides***
  - Strengthen insecticides approval procedure by ensuring on:
  - Harmonization between the national registration system of pesticides and other products used in public health;
  - Adoption of WHO specifications for pesticides for national approval procedure;
  - Strengthening the regulatory lead agency;
  - Collection and publication of data on imported and manufactured products;
  - Periodic review of the approval.

It is also recommended, when pesticides purchases are envisaged to combat vectors to draw on the guidelines set by WHO. For the acquisition of insecticides for public health the following guidelines are recommended:

- Develop national guidelines for product purchases for vector control and ensure that all purchasers organizations comply scrupulously;
- Use synthetic *Pyrethroids*: *Deltamethrin SC*, *Permethrin EC*, *Vectron*, *Icon*, *Cyfluthrin* as recommended by the national policy;
- Refer to guidelines set by WHO or FAO concerning the tenders, the FAO recommendations for labeling and WHO recommendations regarding products (for housing intra sprays);
- -Include in the tendering details of technical support, maintenance, training and recycling of products that will be part of after-sales service commitment manufacturers; apply the principle of return to sender;
- Monitor the quality and quantity of each batch of insecticides and impregnated supports before receiving orders;
- Ensure that the products are clearly labeled in French and if possible in local language and in strict compliance with national requirements;
- Specify what type of packaging will ensure effectiveness, the shelf life and the human and environmental safety in the handling of packaged products in strict compliance with national requirements;

- Ensure that pesticide donations for public health meet the requirements of the approval procedure of Niger and can be used before their expiration date;
- Establish a consultation before receiving a gift, among ministries, relevant structures and donors for the rational use of the product;
- Require users the wearing of protective clothing and equipment recommended in order to minimize their exposure to insecticides;
- Obtain from the manufacturer a physicochemical analysis report and certification of product acceptability;
- Require from the manufacturer a product analysis report and formulation with an indication of what to do in case of poisoning;
- Make conduct a physical-chemical analysis of the product by the procuring agency at shipment and arrival at the scene

- ***Precautions***

Labelling
Pesticides must be packaged and labeled in accordance with WHO standards. The label must be in English and in the language of the place; it must indicate the content, safety instructions (warning) and all arrangements if swallowed or in case of accidental contamination. Always leave the product in its original container. Take necessary precautions and wear protective clothing as recommended.

Storage and transport
Store pesticides in a place where we can lock into and which is not accessible to unauthorized persons or children. In no event pesticides should be kept in a place where one might take them for food or drink. We must keep them dry and protected from the sun. Avoid transporting in a vehicle serving also for the transport of foodstuffs. To ensure safety in the storage and transport, public or private entity responsible for the management of insecticides and insecticide impregnated supports that have been acquired will have to respect the regulations in force in Niger and the recommended storage conditions by the manufacturer in relation to

- The preservation of the original labeling,
- Prevention of accidental spills or overflows,
- The use of suitable containers,
- The proper marking of stored products,
- Specifications relating to premises,
- The separation of the products,
- Protection against moisture and contamination with other products,
- The restriction of access to local storage,
- The locked up the warehouse to ensure the integrity and safety of products.

The warehouse of pesticides must be located away from human habitation or animal shelters, water sources, wells and canals. They must be located on a height and secured by fences, access is limited to authorized persons.

Do not store pesticides in places where they may be exposed to sunlight, water or moisture, which would effectively undermine their stability. Stores should be well ventilated and secure. Avoid transport in the same vehicle pesticides and agricultural products, foodstuffs, clothing, toys or cosmetics as these may become dangerous in case of contamination.

Pesticide containers should be loaded into the vehicle so that they do not suffer damage during transport, their labels are not torn and they do not come to slip and fall on a road whose coating can be irregular. Vehicles carrying pesticides must wear a warning sign placed prominently and indicating the nature of the load.

Distribution

- The distribution must be guided by the following guidelines:

- The packaging (original packaging or new packaging) must ensure safety during distribution and prevent the sale or distribution of unauthorized products for vector control;
- The distributor must be informed and be aware of the danger of its load;
- The distributor must make deliveries within the agreed time;
- The distribution system and insecticides impregnated supports should reduce the risks associated with the multiplicity of manipulations and transport;
- If the purchaser department is not able to ensure the transport of products and materials, it must be stated in the tender that the supplier is required to provide transportation of insecticides and impregnated supports until warehouse;
- - All distributors of insecticides and spraying equipment must be in possession of an operating license in accordance with regulations in force in Niger.
-

Elimination (comply with the procedure in Niger)

Cleaning of empty pesticide packaging and containers

Re-use empty pesticide containers are presents risks and you should not do it. However, it is estimated that some pesticide containers are too useful to throw them altogether after use.

So can we clean and reuse empty containers? This depends on both the material and the contents. In principle, the label should indicate the possibilities for reuse of containers and how to go about cleaning. Do not, under any circumstances reuse containers that have contained pesticides classified as extremely hazardous. Under certain conditions, pesticide containers classified as dangerous or which should not in principle present a danger in normal use, can be reused provided that it is not to hold food, drinks or animal feed. Containers made of materials such as polyethylene, which preferentially absorb pesticides, must not be reused if they contained pesticide whose active material is classified as moderately, very or extremely dangerous, regardless of the formulation. Once a container is empty, rinse it and fill it completely with water and let stand for 24 hours. Next, empty it and repeat the operation twice.

General Hygiene

Do not eat, drink or smoke while handling insecticides. The food should be stored in tightly closed cans. The measure, dilution and transfer of insecticides should be done with the proper equipment. Do not shake or collect liquid with bare hands. If the nozzle is clogged, act on the valve of the pump or release the opening with a flexible rod. After each filling, wash hands and face with soap and water.

Eat and drink only after having washed hands and face. Take a shower or bath at the end of the day.

Personal Protection

- *Adapted combination covering the entire hand and the whole foot.*
- *Anti-vapor dust or respiratory masks depending on the type of treatment and the product used.*
- *Gloves.*
- *Goggles.*
- *Hoods (face shield).*
- *Protection of population*
- *Minimize exposure of local people and livestock.*
- *Cover the wells and other water supplies.*
- *Raise awareness about the risks**.***

Protective Clothing

Treatments indoors

Operators must wear coveralls or long-sleeved shirt over pants, a wide-brimmed hat, turban or other type of head covering as well as boots or heavy shoes. The sandals are not suitable. You have to protect your mouth and nose with a simple mean, such as a disposable paper mask, a disposable or washable surgical mask or a clean cotton cloth. Once the fabric is wet, it must be changed. Clothing should also be in cotton for easy washing and drying. They must cover the body and with no openings.. In hot, humid

climates, it can be uncomfortable to wear extra protective clothing, so we seek to spread pesticides during hours when the heat is less strong.

Preparation of suspensions

People who are responsible for bagging insecticides and prepare suspensions, particularly in terms of net treatment units must take special precautions.
In addition to the protective clothing mentioned above, they should wear gloves, apron and eye protection, such as a face shield or goggles. Face shields protect the entire face and keep cooler.
One should cover the mouth and nose as indicated for the treatment indoors. We also take care not to touch any part of our body with the gloves while handling pesticides.

Impregnation of fabrics
To treat mosquito nets, clothing, fences or tsetse traps with insecticides, it is imperative to wear long rubber gloves. In some cases, additional protection is needed, for example against vapors, dust or the spraying of insecticides that can be dangerous. These additional protective accessories must be indicated on the product label and may include aprons, boots, face masks, overalls and hats.

Maintenance
Protective clothing should always be kept immaculate and we must carry out periodic checks to ensure that there is neither wear nor tear of the fabric that could lead to contamination of the skin. Clothing and protective equipment should be washed daily with soap and water, separately from other laundry. Gloves should be subject to special attention and should be replaced as soon as they are torn or if they show signs of wear. After use, you must rinse with water before removing them. At the end of each working day, outside and inside should be washed

Security Measures
During spraying
The jet from the spray should not be directed to a body part. A sprayer that leaks must be repaired and you have to wash the skin if it was accidentally contaminated.

The occupants of the house and the animals must stay outside for the duration of operations. Avoid treating a room in which a person is a patient who we cannot carry out. Prior to the start of spraying, it must also leave all cooking utensils, dishes and anything containing drinks or food. It is also possible to gather them in the center of a room and covered with a plastic sheet. Hammocks and tables or drapes should not be treated. Whether to treat low furniture and the side located next to the wall, it will be ensured that the other surfaces are effectively treated. We must sweep the floor or wash it after spraying. Occupants should avoid contact with the walls. Clothing and equipment should be washed daily. Avoid spraying organophosphates or carbonates' more than 5 to 6 hours a day and wash hands after each filling. If using *Fenitrothion* or old stocks of *Malathion*, all operators must wash their blood cholinesterase every week.

Monitoring of exposure to organophosphate

There are on the market campaign kits to control the activity of blood cholinesterase. If this activity is low, it can be inferred that there has been excessive exposure to organophosphate insecticide. These dosages should be performed every week in all people who handle such products. Anyone whose cholinesterase activity is too low must be put off work until it returned to normal.
Impregnation of fabrics When handling concentrates of insecticides or when preparing suspensions, one must wear gloves. Be careful especially with the projections in the eyes. You have to use a large bowl not too high and it is necessary that the room is well ventilated so that there is no risk of inhaling fumes.

Training of stakeholders involved in pests and pesticides management

Some training modules

- *Information on risks and health and safety advice;*
- *Knowledge of a harmonized labeling system for chemicals;*
- *Basic knowledge on handling procedures and risk management*
- *Port of protection and safety equipment*
- *Risks related to the production, use, storage, transport, distribution/marketing, handling use, disposal of pesticides*
- *Vehicle Equipment*
- *Protective Equipment*
- *Outline of the treatment process and operation*
- *Health and safety related operations*
- *Emergency procedures and rescue*
- *Technical procedures*
- *Maintenance of equipment*
- *Emissions control*
- *Monitoring the process and residues*
- *Biological monitoring of pesticide exposure*

1.6. Information and awareness of users and population

The awareness must apply first to the users of chemicals, including farmers and speculator traders about the risks of use of certain chemical preservatives dangerous to health. This awareness must strive to seek and popularize modern methods of conservation and even traditional methods of highly efficient attics and organic and natural methods against insect pests.

To the importers and traders, it is essential to impose accompanying detailed prospectus and simple products, informing on the best use and risks. Also consumers should be warned about the quality of those products and packaging forms.

To the public, media outreach programs should be organized regularly. The risks of poisoning by chemicals are a serious public health problem.

Indeed, even if information and awareness on environmental and health risks are advanced in the country, specific actions taken by public services and the will of regulation through legal texts remain marginal.

It is necessary to develop long-term strategies and effective approaches to inform and educate all stakeholders (vendors stall keepers, wholesalers, agricultural users, rural populations, etc.), by turning to the following areas of intervention:

- Development and dissemination of documents videos, and posterson the various risks and good pesticide use practices;
- Raise awareness of the stakeholders through radio and television talk shows;

- Provide support to unions operating in different sectors to raise awareness of their members on occupational hazards associated with chemicals in their respective area;
- Support consumer associations for raising public awareness;
- Strengthening the training of rural trainers and extend their action through rural radios;
- Set up a national committee and local committees of standards both in terms of agricultural and industrial production;
- Set up a commission on chemical safety for chemicals.

The information and awareness programs especially towards the general public and decision makers in particular, are essential to reduce the risk of disease and pesticide poisoning, and ultimately lead to a real change in behavior. These programs must be of a multifaceted nature and rely on multiple media. Public media can play a relatively important role in raising awareness of the population and users. Agricultural federative structures, NGOs and Associations/Groups of farmers, but also community health structures must also be put to contribution in the sensitization of the populations

Appendix 6:

Procedures to resolve a grievance in the framework of the PRRA-CC

Procedures to resolve a grievance in the framework of the PRRA-CC

This manual defines the policy and guidelines at the company level on grievance. These guidelines include the following:

- **Filing of Application:** The affected party shall file an application with one resident missions or headquarters of BOAD for receipt of complaints. Upon receipt, the complaints will be transferred to the appropriate Organizational Unit at the Bank's headquarters.
- **Registration and acknowledgment of receipt of the request:** Within five working days of receipt of the request, the resident mission or relevant headquarters service logs the request and sends an acknowledgment to the applicant and a copy to the project sponsor and the Bank's headquarters.
- **Consideration of the admissibility of the application:** Within twenty working days of registration of the application, the Organizational Unit in charge of policy and grievance procedure at the headquarters of the Bank will inform the applicant and the public if the application meets the eligibility criteria.
- **Assessment of the feasibility of resolving the dispute:** Within twenty-five working days of the determination of the admissibility of the request, the Organizational Unit shall transmit to the applicant, the resident mission and other relevant stakeholders an assessment of the feasibility of grievance resolution activities. The evaluation will also include recommended actions, if any, that BOAD will be willing to undertake or facilitate to encourage the resolution of the dispute considered, or it will conclude on the inutility of the resolution of the dispute and will close the case. This assessment will also determine whether the applicant first must submit a request to one of the grievance process established by the project proponent or the government of the resident mission.
- **Obtaining consent for the resolution of the dispute:** Any dispute resolution efforts based on the consent of key stakeholders, including eg applicants, affected communities, the promoters of the project, the Government of the resident mission and / or the headquarters of the Bank. A dispute resolution process cannot move forward without the voluntary consent of the main parties.

- **Dispute resolution process:** Assuming that major stakeholders have agreed on a course of action to try to resolve their dispute or remedy the concerns of applicants, the grievance process will implement the agreed course of action. Some flexibility will be necessary as the appropriate approach will necessarily be adapted to the individual application and consent. In the absence of consent, the possibilities of dialogue and consultation will necessarily be reduced. If the consultation process works all parties can continue the process until an agreement is reached.
- **Obtaining or not an agreement**: Once complete the dispute resolution process, organizational unit responsible for compliance and regulation to the Bank will submit its report, including the settlement agreement (if applicable) and any recommendations for further action by BOAD to the President of the Institution and to all stakeholders.
- **Stopping the consultation process:** All parties to the consultation may at any time terminate the dispute resolution process if they are not in agreement with the adopted course of action. In certain circumstances, the consultation process will end with no resolution. In such circumstances, a detailed report will be submitted to the President of BOAD, summarizing the application, the measures taken to try to resolve the issues raised by the application, and recommendations for further action by BOAD, if applicable. This final report will also be forwarded to the Head of the resident Mission of BOAD concerned and the applicant, the project sponsor, the government of the country of the resident mission and the public. If for any reason the indicated timetable cannot be respected in a particular case, the applicant and the public will be informed of the delay, the reasons thereof and the new schedule. The person responsible for the grievance mechanism is the head of the Division of Compliance and Regulatory.

APPENDIX 7

Part of list of consulted persons

Annex 7a : Example of the municipalities of Dogon kiria and Loga demonstrating taking account of its kind in the public consultation

(2)

Liste de présence des Groupements

Commune de : Dogon Kiria (suite) (2/2)

1er Groupement	NOMBRE HOMMES	NOMBRE FEMMES	ACTIVITES DU GROUPEMENT	RESPONSABLE	
				NOM ET PRENOMS :	CONTACT ET SIGNATURE :
5ème Groupement	NOMBRE HOMMES	NOMBRE FEMMES	ACTIVITES DU GROUPEMENT	RESPONSABLE	
Talabanni	00	25	AGR	NOM ET PRENOMS :	CONTACT ET SIGNATURE :
				Naïzamo Barda	
6ème Groupement	NOMBRE HOMMES	NOMBRE FEMMES	ACTIVITES DU GROUPEMENT	RESPONSABLE	
Naraba Da Kiria	00	25	Dpt les cultures AGR	NOM ET PRENOMS :	CONTACT ET SIGNATURE :
				Hadiza Saley	97-19-27-91
7ème Groupement	NOMBRE HOMMES	NOMBRE FEMMES	ACTIVITES DU GROUPEMENT	RESPONSABLE	
Niya Tounka	00	17 gpts	Embouche ovine	NOM ET PRENOMS :	CONTACT ET SIGNATURE :
				Mme Djimaou Tarana	89.37-70-19

(d)

Liste de présence des Groupements

Commune de : Dogon Kiria

1er Groupement	NOMBRE HOMMES	NOMBRE FEMMES	ACTIVITES DU GROUPEMENT	RESPONSABLE	
				NOM ET PRENOMS :	CONTACT ET SIGNATURE :
Zaman Lahiya	01	29	-Activités Agricoles -Entre-aide	Mme Djimraou Talana	89.37-70.19
2ième Groupement	**NOMBRE HOMMES**	**NOMBRE FEMMES**	**ACTIVITES DU GROUPEMENT**	**RESPONSABLE**	
				NOM ET PRENOMS :	CONTACT ET SIGNATURE :
Nassara	08	35	-Entre-aide -A.G.R	Mme Karoua Zara	97-23.31-16
3ième Groupement	**NOMBRE HOMMES**	**NOMBRE FEMMES**	**ACTIVITES DU GROUPEMENT**	**RESPONSABLE**	
Mutachi da Kamu				NOM ET PRENOMS :	CONTACT ET SIGNATURE :
	12	09	AGR-Embouche	Moussa Nakantchi	96041027
4ième Groupement	**NOMBRE HOMMES**	**NOMBRE FEMMES**	**ACTIVITES DU GROUPEMENT**	**RESPONSABLE**	
				NOM ET PRENOMS :	CONTACT ET SIGNATURE :
Dadin Zutchia		27	AGR Extraction Huile d'arachide	Makonti Kalka	

(9)

Liste de présence des Groupements

Commune de : Loga

1er Groupement	NOMBRE HOMMES	NOMBRE FEMMES	ACTIVITES DU GROUPEMENT	RESPONSABLE	
				NOM ET PRENOMS :	CONTACT ET SIGNATURE :
Kandé Gomni	0	10	- A-G-R. - Amélioration des conditions de vie des ménages.	Fati Tondo.	96002612
2ième Groupement	**NOMBRE HOMMES**	**NOMBRE FEMMES**	**ACTIVITES DU GROUPEMENT**	**RESPONSABLE**	
				NOM ET PRENOMS :	CONTACT ET SIGNATURE :
Amana	0	10	- A-G-R - Maraîchage.	Mme Nabey Zeinabou.	99972738
3ième Groupement	**NOMBRE HOMMES**	**NOMBRE FEMMES**	**ACTIVITES DU GROUPEMENT**	**RESPONSABLE**	
				NOM ET PRENOMS :	CONTACT ET SIGNATURE :
Wadata	0	15	- A-G-R	- Boumouna Hinssa -	91617101
4ième Groupement	**NOMBRE HOMMES**	**NOMBRE FEMMES**	**ACTIVITES DU GROUPEMENT**	**RESPONSABLE**	
				NOM ET PRENOMS :	CONTACT ET SIGNATURE :
Kneyizéyé	0	15	- A-G-R	. Salmou Anza -	

Soudji 0 20 A-G-R. Biba Abdou

Farha 0 21 - A-G-R - Kadi Abdou.

Tangami 8 13 - A-G-R - Salmou Tagza.

Groupement féminin "Haské" de Moulléla (Abala)

N°	NOM ET PRENOMS	PROFESSION	CONTACT	SIGNATURE
1	Rabi Sala	presidente	96.25.87.73	
2	Fatchima Koumantoura	Vice-presidente		
3	Zeinabou Abdou	Secretaire général		
4	Zara Ali	S.A adjointe		
5	Sadi Zakari	T. Générale		
6	Haboun Oumarou	T. G. Adjointe		
7	Amina Houssèini	Membre		
8	Mariama Mahamadou	Membre		
9	Sara Issa	Membre	96.21.56.82	
10	Halsou Moussa	Membre		
11	Fatchima Oumarou	Membre		
12	Zalia Issoufou	Membre		
13	Fati Sadi	Membre		
14	Za-ida Lamine	Membre		
15	Mariama Boubacar	Membre		
16	Hasna Samaila	Membre		
17	Kassoua Goma	Membre		
18	Amina yahaya	Membre		
19	Hasna Issa	Membre		
20	Zalha Alkassoum	Membre		
21	Salia Issaka	Membre		
22	Biba Assoumane	Membre		
23	Ahara Chaibou	Membre		
24	Balki Hasseine	Membre		
25	Lantana Abass	Membre		
26	Halima Assoumane	Membre		
27	Hassana Massalatchi	Membre		
28	Zalia Issoufou	Membre		
29	Salia Abou	Membre		
30	Rabi Mahamane	Membre		

Groupement féminin "Haské" de Maullela (Abala)

N°	NOM ET PRENOMS	PROFESSION	CONTACT	SIGNATURE
1	Rabi Sala	presidente	96.25.87.73	
2	Fatchima Koumandowa	Vice-présidente		
3	Zeïnabou Abdou	Secrétaire général		
4	Zara Ali	S.A adjointe		
5	Sadi Zakari	T. Crénchale		
6	Habsou Oumarou	T. G. Adjointe		
7	Amina Houssèini	Membre		
8	Mariama Mahamadou	Membre		
9	Sara Issa	Membre	96.21.56.82	
10	Halsou Moussa	Membre		
11	Fatchima Oumarou	Membre		
12	Zalia Issoufou	Membre		
13	Fati Saddi	Membre		
14	Za-ida Laminou	Membre		
15	Mariama Boubacar	Membre		
16	Hadiza Samaila	Membre		
17	Kassama Goma	Membre		
18	Amina yahaya	Membre		
19	Hadiza Issa	Membre		
20	Zalika Alkassoum	Membre		
21	Salia Issaka	Membre		
22	Biba Assoumane	Membre		
23	Ahadza Chaïbou	Membre		
24	Balki Hadiza	Membre		
25	Lantana Abass	Membre		
26	Halima Assoumane	Membre		
27	Hassana Massalatchi	Membre		
28	Zalia Issoufou	Membre		
29	Salia Abdou	Membre		
30	Rabi Mahamane	Membre		

Gpt « Tondiki windi Antani »

N°	NOM ET PRENOMS	PROFESSION	CONTACT	SIGNATURE
1	Moumaye Souley	Présidente	96211864	
2	Gomni Hamane	vice Présidente		
3	Moumaye Issa	Secretaire G.	97987719	
4	Biba Chaibou	Trésorière		
5	Biba Niandou	Trésorière Adjte		
6	Saleye Mouna	Membre		
7	Zongo Yacouba	Membre		
8	Fadi Mouna	Commissaire Cpte		
9	Hadamatou Abdou	Membre		
10	Balki Kodu	"		
11	Fatouma Soumana	"		
12	Zaki Sanda	Commissaire Cpte		
13	Fadi Boubacar	Membre		
14	Azematou Lamido	"		
15	Fadi Boulal	"		
16	Roukaya Takou	"		
17	Maimouna Marou	"		
18	Biba Abdou	"		
19	Biba Mamoudou	"		
20	Zouzou Moussa	"		
21	Biba Goudane	"		
22	Kadi Balla	"		
23	Safi Abdou	"		
24	Fadi Hima	"		
25	Katimi Niandou	"		
26	Oumou Saley	"		
27	Mariama Yacouba	"		
28	Ramatou Ayouba	"		
29	Hawa Hama	"		
30	Aima Mana	"		
31	Aki Issa	"		
32	Amitatou Hama	"		
33	Mariama Seyni	"		
34	Amina Yacouba	"		
35	Safi Mounkaila	"		

Groupement "Kaibarey Mazada"
Tenditkiwindi

N°	NOM ET PRENOMS	PROFESSION	CONTACT	SIGNATURE
	Bello Yayé	Producteur	89399650	
	Gambi Issaka	Présidente	96657922	
	Hamma Karimoune	Secretaire		
	Abdou Adamou	Trésorier		
	Aïssa Saley	Producteur		
	Saoudi Yayé	Productrice		
	Zazi Dauda	Producteur		
	Sani Issaka	"		
	Bachirou Adamou	"		
	Zazi Djibo	"		
	Hamma Sambo	"		
	Nouri Djibo	"		
	Hamza Issaka	"		
	Zali Mourikoye	Productrice		
	Anuifatou Hassane	"		
	Hadiza Hima	"		
	Ladi Adamou	"		
	Mari Yayé	Productrice		
	Mari Hassaye	"		
	Sauda Yaye	"		
	Zakou Doungro	"		
	Karimou Halidou	"		
	Yaou Seini	"		
	Mamoudou Zado	"		
	Djamila Moumouni	"		
	Bouli Djibo	"		
	Hamsa Halidou	"		
	Hima Yayé	"		
	Idé Soumana	"		
	Mamoudou Younoussa	"		
	Adamou Hassane	"		

Annexe 7 b: List of autorities and representatives groups of producers met in the municipalities taken as examples

LISTE DE PRESENCE DES PERSONNES RENCONTREES (1/2)

Commune de : Dogon Kirin

N°	NOM ET PRENOMS	PROFESSION	CONTACT	SIGNATURE
1	Moussa Daouda	CSC E/SG/DD	90.55.31.32	
2.	Lawali Nahantchi	SG/Mairie	96334041	
3-	Sani Maïdama	Conseiller de	96228957	
4	ADAMOU GANDI	CONSEILLER	[illegible]	
5	Saba Massalatchi	Conseiller	96.32.5546	
6	Adamou Moussa	DD.GR/Dtchi	96665191	
7	Kiemou Cillabaton	Conseiller	96482600	
8	[illegible]	[illegible]	[illegible]	
9	Salissou Abdou	ADA	96423131	
10	Ramane Tourba	Maire	96225430	
11	Hamadou Idé	DDESU/DD/D	90205809	
12	Adamou Diafarou	DRESU/DD	96802737	
13	Mahaman Sitou Hamidou	CDA	96.06.33.48	
14	Sani Harouna	Rep. chef KIRIN	96345834	
15	Boubacar Dari	Rep chef	96565730	
16-	Harouna Bakobé	chef Issakitchi	98744591	
17	Moussa Amlakon	chef Sabon Gari	96360713	
18	Mahamadou Maïdagi	chef Kaïwa	96847366	
19	Maïdagi Kancho	Tounoun dounka	96565730	
20	Issifou Sambo	chef Issakitchi	97566308	
21	Danladi Halidou	chef Kossari H.	96853095	
22	Issia Yacoubou	Resp. Etat civil	96615235	
23	Ibrahima Alio	Etat civil Adjoint	96919843	
24	Ibrahim Daoura	Conseiller de	96412458	
25	Boubacar Sani	CP (OGTS)	99466950	
26	Lawaly Saifou	[illegible]	[illegible]	
× 27	Mme Djimraou Tarana	gpt Zaman Lahiya	89377019	
× 28	Mme Kiemou Amina	gpt Zama Lafia	97120415	
× 29	Mme Karama Zara	gpt Nassara	99233176	

LISTE DE PRESENCE DES PERSONNES RENCONTREES (2/2)

Commune de : Dogon Kiria

	N°	NOM ET PRENOMS	PROFESSION	CONTACT	SIGNATURE
	30	Hamza Mahamane	cultivateur	96.03-03-68	
X	31	Zainabou Souley	Dadin Zutikia		
X	32	Maïgamo Bando	Talabanni		
X	33	Halima Saley	Maraba Da Kiria	97-19-27-31	
X	34	Saâdatou Hamidou	Maraba Da Kiria	90-42-67-16	
X	35	Makonti Kalka	Presidente	—	

LISTE DE PRESENCE DES PERSONNES RENCONTREES (1/2)

Commune de : Loga

N°	NOM ET PRENOMS	PROFESSION	CONTACT	SIGNATURE
1	Issoufou Ibrahim	DDESU/DD	96289136	
2	Issoufou Abdoul. Hayou	DDGR	98526667	
3	Seyni Saley	CD	96424771	
4	Abdou Wali	CC	96125969	
5	Soumana Assane	CC	96585551	
6	Daouda Soumaila	CC	90561331	
7	Mamoudou Mali	CC	90564165	
8	Moussa Mallam	C.C/M. Adjoint	90635385	
9	Ibrahim Boubacar Rep/Chef Canton		90020638	
10	Issaka Harouna	Chef du Village	90625919	
11	Amadou Hassane	SG Mairie	96235615	
12	Elh. Oumarou Allo	Maire	94505458	
13	Saïdou Oumarou	CC	96971604	
14	Ali Marou	Sm	90561204	
x 15	Aïssa Boubacar	CC	92895778	
16	Habibou Algouma	CC	91555905	
17	Harouna Ibrahim	CC	90013494	
x 18	Mme Assoumane Hadiza Hamani	CC	96873185	
19	Souleymane Moussa	Union groupement	96578139	
20	Halidou Moussa	Animateur	90184815	
21	Ladan Soumana	Président union	96460489	
22	Hamidou Garba	CC	90025006	
x 23	Fati Tondo	OP	96002612	
x 24	Zeinabou Dogari	OP	99972738	
x 25	Maïmouna Hinssa	OP	91617101	
x 26	Salmou Anza	OP	"	
x 27	Djamilla Amadou	OP	"	
x 28	Kadi ABdou	OP	97743574	
x 29	Mme Zakari Kadi Seybou	CC/M.Adjte	91303617	

LISTE DE PRESENCE DES PERSONNES RENCONTREES (2|2)

Commune de : Loga

N°	NOM ET PRENOMS	PROFESSION	CONTACT	SIGNATURE
	Youssouf Hamani	Agronome	96509333	
	Boureima Sidikou	Zootechnicien	97507380	
X	[redacted]	[redacted]	[redacted]	

Noms et prénoms	structures
Maman Souradjou Ado	**DRGR/DO**
Adamou Djafar	**DRE/AU/DO**
Adamou Moussa	**DDGR/ Doutchi**
Salissou Abdou	**DDA/ Doutchi**
Hamadou Idé	**DDE/SU/Doutchi**
Mahaman Sitou Hamidou	**CDA/Dogon Kiria**
Abdoul Hayou Issoufou	**DDGR/Loga**
Issoufou Ibrahim	**DDE/AU/ Loga**
Hamani Issoufou	**DDA/Loga**
Boureima Sidikou	**DD/Elevage/Loga**

Appendix 8:

The mode of financing proposed for the implementation of the Small scale irrigation strategy of Niger (SPIN)[59]

[59] See page 66-67 of the SPIN.

In short and medium terms, the different modes in effect above are applicable. The funding envisaged by the SPIN mode comes in two forms: subsidy and auto financing. The following table shows the modes of funding proposed in the SPIN.

Table: Mode of financing of the SPIN

Investment (I)	Subvention Rate (%)	Services accessible
Social (vulnerable populations)	100	Aménagement collectif notamment les sites villageois de femmes ou mixtes
I < 5 000 000 FCFA	≤ 75	Studies and development of project files, equipment and materials for irrigation, equipment protection of sites, inputs, provide services to support Council
I ≥ 5 000 000 FCFA	75 on the slice of 5 000 000 FCFA	Access to credits institutions of financing through guarantee funds, bonus or a system of compensation in the event disaster
Structural works	100	Application thresholds, thresholds of infiltration, mini dams, ponds landscaping, ABF

Long term, it is planned to promote the system of provision of funds to the municipal level, in the form of transfer of grants to municipalities or agencies to run as the regional chambers of agriculture. This option has the advantage of empowering stakeholders at the base of the fact of their involvement in the implementation of the SPIN being actors in planning, programming and technical and financial monitoring. Local authorities will therefore fully play their role of project management and execution agencies will ensure financial independence that gives them their status of public institution professional. This option will be necessarily by a strengthening of the capacity of management of local authorities and implementing agencies. In all cases, the mode of financing to remember must conform to the guidelines of WAEMU.

The terms of use of the contributions of people target the hydro-agricultural landscaping (AHA) and the accompanying infrastructure

Les exploitants individuels ou en association ont l'entière responsabilité de la gestion et de l'entretien courant des aménagements productifs et de protections des sols. Leur contribution (25%) aux études, à l'investissement et aux activités liées à la mise en valeur et la valorisation des produits peut être utilisée comme suit :
Individual operators or in combination have the full responsibility for the management and productive facilities servicing and soil protections. Their contribution (25%) studies, investment and activities related to the development and enhancement of products can be used as follows:

- Be used to co-finance the first diagnostics and preliminary studies of SPAC for the validation of the application with municipalities, departments and regions;
- Be used to pay the company through the project owner or the delegated prime contractor;
- Establish a guarantee fund, a venture fund or a solidarity fund for access to credit for producer organizations (credit campaign or equipment);
- Reinjection form of a loan or grant to fund the first seasonal credit;
- Be used to pay a company to perform some additional work for the development and / or in preparation for routine maintenance of the AHA.

On the other hand, if operators are unable to make a financial contribution to various development investments they can contribute by:

- A contribution to the construction site materials (gravel, rubble, sand). Transportation costs are dependent on them;
- Physical participation in the provision of labor under the direction of the business;
- Full support for the work entrusted entirely certain operators previously defined in the technical specifications under the responsibility of the work control office.

It should be noted that prior steps must be taken to establish tripartite agreements between the company, the supervisor and the beneficiaries before the start of the work to define the roles.

Relative contributions valued for various support and training, beneficiaries do support in their place of residence (accommodation + travel + accommodation of costs) and participate at a flat rate in training costs. These different modes of financing and the terms of use of the contributions of the target populations are related to the means of execution.

COMPOSANTE 1 : 1. Enhancing stakeholders' technical and institutional capacities and dissemination of lessons learned during the project execution

Topics	Unit	An 1	An 2	An 3	An 4	An 5	Quantity	Unit cost (thousands of FCFA) excluding	Basic costs (thousands FCFA)							Financing (Thousand FCFA)		
									An 1	An 2	An 3	An 4	An 5	Total		FA	BOAD	STATE
														excluding tax	including VAT			
COMPONENT 1 : Enhancing stakeholders' technical and institutional capacities and dissemination of lessons learned during the project execution																		
1.1. Support for the studies, control and supervision of worl	_																	
1.1.1. Support for the formulation of project documents (fea	FF								370					370	370	0	370	0
1.1.2. Support for the implementation of the Proposed Draf	5 ha						200	2.00	400		0	0	0	400	472	0	400	72
1.1.3. Control and monitoring of development works and op	5 ha						200	1.70	68	68	68	68	68	340	401	0	340	61
1.1.4. Validation of ESIA or impact records of sub-projects	_																	
Review and validation of the ESIA reports ar	FF								50	30				80	94	0	0	94
Environmental and social monitoring of sub-p	FF								0	50	75	75	80	280	330	0	168	162
Sub Total 1.1.									**888**	**148**	**143**	**143**	**148**	**1,470**	**1,668**	**0**	**1,278**	**390**
1.2. Strengthened capacities of technical services decentra	_																	
1.2.1. Capacity building of local service development of the	_																	
Training workshop on climate change and its	Nbre	1					1	16.00	16	0	0	0	0	16	19	16	0	3
1.2.2. Training of officers of technical services of the State i	_																	
GIS training workshop	Nbre	1					1	16.00	16	0	0	0	0	16	19	16	0	3
Training workshop on the monitoring of grou	Nbre	1					1	16.00	16	0	0	0	0	16	19	16	0	3
Training workshop on the monitoring and ma	Nbre	1					1	16.00	16	0	0	0	0	16	19	16	0	3
1.2.3. Technical capacity building of stakeholders in the imp	_																	
Support for the preparation of good sustaina	Nbre	1					1	20.00	20	0	0	0	0	20	24	0	20	4
Technical capacity building workshop for stat	Nbre	5					5	4	19	0	0	0	0	19	22		19	3
Setting up a database of environmental and	_																	
Technical capacity of Support Services Cour	Nbre	5					5	8.00	40	0	0	0	0	40	47	0.0	40	7
Sub Total 1.2.									**143**	**0**	**0**	**0**	**0**	**143**	**168**	**64.00**	**78.60**	**25.67**
1.3. Capacity building of stakeholders to understand and ac	_																	
1.3.1. Awareness and training of grassroots communities o	_																	
Training workshop on adaptation to climate c	Nbre de participants		76	76			152	0.29	0	22	22	0	0	45	53	45	0	8
Information and awareness campaigns on ec	Nbre de campagnes	1		1			2	30.00	30	0	30	0	0	60	71	0	36	35
1.3.2. Training of producers to agricultural practices that pr	_																	
Training workshops on farming techniques	FF	1	0.3	0.25			1	50.00	25	13	13	0	0	50	59	50	0	9
Training workshops on innovative irrigation tech	FF	1	0.3	0.25			1	60	30	15	15	0	0	60	71	60	0	11
Training workshop Surle operation and mana	sessions		5	5			10	4	0	19	19	0	0	37	44	37	0	7
Seed Control the training workshop	sessions		5	5			10	4	0	19	19	0	0	37	44	37	0	7
Training workshop on conducting nurseries	sessions		5	5			10	4	0	19	19	0	0	37	44	37	0	7
Support-Board	**FF**	0	0.2	0.2	0	0.2	1	40	8	8	8	8	8	40	47	40	0	7
1.3.3. Training local technicians in installation and repair of i	_																	
Training workshops of local artisans on the ir	Sessions	2	2	2			6	12	25	25	25	0	0	74	87	74	0	13
Support for local equipment operators	Opérateurs	9	10	9			28	2	18	20	18	0	0	56	66	56	0	10
1.3.4. Training of producers and health centres on the appli	_																	
Producers of capacity building for the applica	Sessions		5	5			10	7	0	35	35	0	0	70	83	0	42	41
Capacity building of health centers on toxicol	Sessions		5	5			10	7	0	35	35	0	0	70	83	0	42	41
Capacity building for destruction of obsolete	FF						1	100	40	15	15	15	15	100	118	0	60	58
1.3.5. Development of plans for adaptation to climate chan	_																	
Support for the development of municipal de	Nbre			4	4	4	12	8	0	0	32	32	32	96	113	96	0	17
Sub Total 1.3.									**176**	**243**	**303**	**55**	**55**	**832**	**982**	**532**	**180**	**270**
1.4. Sharing of knowledge and dissemination of good pract	_																	
1.4.1. Development of specifications for innovative irrigation	Nbre de fiches			2	2	1	5	9	0	0	18	18	9	45	53	45	0	8
1.4.2. Knowledge sharing workshops with decision makers	Réunions			1	1	1	3	40	0	0	40	40	40	120	142	60	60	22
1.4.3. National strategies and texts overhaul facility to broad	Ateliers				1		1	50	0	0	0	50	0	50	59	30	20	9
1.4.4. Development of a large-scale project integrating the	FF				1		1	300	0	0	0	300	0	300	354	0	300	54
Sub Total 1.4.									**0**	**0**	**58**	**408**	**49**	**515**	**608**	**135**	**380**	**92.7**
TOTAL 1.									**1,206**	**391**	**504**	**606**	**252**	**2,960**	**3,426**	**731**	**1,917**	**778**

385000 ###

105.64 158.28 188.28 40.00 40.00
70.00 85.00 115.00 15.00 15.00 300.00
42 51 69 9 9 180.00

838 68 68 68 68
0 30 45 45 48
838 98 113 113 116

50
112

COMPONENT 2: CONSOLIDATION AND DEVELOPMENT OF IRRIGATED PERIMETERS

Rubriques	Unit	Quantity	Unit cost (thousands of USD) excluding	basic cost (X 1000 USD)							Distribution by donors		
											FA	BOAD	STATE
COMPONENT 2: CONSOLIDATION AND DEVELOPMENT	_			An 1	An 2	An 3	An4	An5	**HT (X 1000 USD)**	**TTC (X 1000 USD)**			
2.1. Development of peri-urban and villages areas	ha												
Installation work of Drop by drop units (Module 5 ha) header	ha	600	**10.3**	772	3,087	2,315	0	0	**6,174**	**7,285**	**4,034**	**2,140**	**1,111**
Installation work of Californian network units (Module 5 ha) h	ha	400	**2.6**	128	512	384	0	0	**1,024**	**1,208**	**269**	**755**	**184**
Realization of boreholes	5 ha	200	**5.9**	147	588	441	0	0	**1,176**	**1,388**	**1,176**	**0**	**212**
Realization of tanks	5 ha	133	**8.4**	140	560	420	0	0	**1,120**	**1,322**	**0**	**1,120**	**202**
site close protection work (fences, planting, etc.)	ha	1,000	**4.2**	525	2,101	1,576	0	0	**4,202**	**4,958**	**1,300**	**2,902**	**756**
Treatment of sites and surroundings (stone bunds, crescent	ha	1,500	**0.3**	47	189	142	0	0	**378**	**446**	**378**	**0**	**68**
Promotion of agroforestry	ha	1,000	**0.2**	19	76	57	0	0	**151**	**178**	**0**	**151**	**27**
Promotion of manure pits (14,13m3 per unit)	ha	400	**0.2**	8	34	25	0	0	**67**	**79**	**67**	**0**	**12**
Sub Total 2.1.				**1,787**	**7,147**	**5,360**	**0**	**0**	**14,293**	**16,866**	**7,224**	**7,069**	**2,573**
2.2. Support for reducing energy bills related to water p	_												
Small irrigation kits drip Network (Power)	5 ha	120	**39.0**	585	2,340	1,755	0	0	**4,680**	**5,522**	**0**	**4,680**	**842**
Kits of small irrigation Californiannetwork (Power)	5 ha	80	**39.0**	390	1,560	1,170	0	0	**3,120**	**3,682**	**0**	**3,120**	**562**
Sub Total 2.2.				**975**	**3,900**	**2,925**	**0**	**0**	**7,800**	**9,204**	**0**	**7,800**	**1,404**
TOTAL 2.				**2,762**	**11,047**	**8,285**	**0**	**0**	**22,093**	**26,070**	**7,224**	**14,869**	**3,977**

30000

COMPONENT 3. SUPPORT FOR ALTERNATIVE LIVELIHOODS AND IMPROVEMENT OF FARMERS INCOME

(milliers USD)

Topics	Unit	Quantity						Unit cost excluding tax (X 1000 USD	Basic costs (thousands FCFA)							Distribution by donors		
									An 1	An 2	An 3	An 4	An 5	Total		FA	BOAD	STATE
COMPONENT 3. SUPPORT FOR ALTERNATIVE LIVELIHOODS AND IMPROVEMENT OF FARMERS INCOME														excluding tax	including VAT			
		An 1	An 2	An 3	An 4	An5												
3.1.Support for access to quality agricultural inputs	5 ha	25	100	75	0	0	200	**1**	25	100	75	0	0	**200**	**236**	**60**	**140**	**36**
3.2. Support for the development of off-farm income generati	Groupement		0.25	0.5	0.25		31	**26**		8	15	8		**808**	**953**	**100**	**708**	**145**
Sub Total 3.1									**0**	**108**	**90**	**8**	**0**	**1,008**	**1,189**	**160**	**848**	**181**

			113,025	15	30	15
			226	25	50	25
0.125	0.500	0.375				

COMPONENT 4: INVESTMENT, COORDINATION AND PROJECT MANAGEMENT

Topics	Unit		Quantity						Unit cost (thousands of FCFA) excluding tax	Basic costs (thousands FCFA		Financing (Thousand FCFA)		
										Total		FA	BOAD	State
			An 1	n 2	3	n 4	5			excluding tax	including VAT			
4.1. Investissements														
4.1.1. Furnishing / rehabilitation of local														
Project Management Unit (PMU)	FF		1					1	20.00	20	24	0	0	24
Offices Focal Points	FF		4					4	3.00	12	14	0	0	14
4.1.2. Equipment and logistics														
Vehicle - Coordinator	Véhi		1					1	44.00	44	52	0	44	8
All terrain vehicle double cab pickup - Focal Points	Véhi		6					6	50.00	300	354	0	300	54
all terrain motorbikes	Moto		1					1	6.00	6	7	0	6	1
Office Machines	FF		1	0	0	0	0	1	100.00	100	118	0	100	18
Audio visual equipment (cameras, video projector, CD-DVD)	FF		1	0	0			1	20.00	20	24	0	20	4
4.1.3. Financial management and auditing														
Elaboration of procedures manuals	FF		1					1	20.00	20	24	0	20	4
Acquisition of management software	FF		1					1	10.00	10	12	0	10	2
Implementation and support of monitoring and evaluation system	FF			1				1	10.00	10	12	0	10	2
Audit of accounts	Unité		1	1	1	1	1	5	16.00	80	94	0	80	14
Sub-total 4.1.										**622**	**734**	**0**	**590**	**144**
4.2. recurring cost														
4.2.1. Salary / Bonus of staff														
PMU														
Coordinator	H/month	12	12	12	#	12	#	60	1.80	108	127	108	0	19
Rural Engineering Technical Coordinator in Specialist Monitoring	H/month	12	12	12	#	12	#	60	1.20	72	85	72	0	13
Responsible for the Development of Rural Engineering in speciali	H/month	12	12	12	#	12	#	60	1.10	66	78	66	0	12
Accountant, specialist in procurement	H/month	12	12	12	#	12	#	60	1.10	66	78	66	0	12
Executive secretary	H/month	12	12	12	#	12	#	60	0.30	18	21	18	0	3
Drivers	H/month	24	24	24	#	24	#	120	0.20	24	28	24	0	4
Plantons	H/month	12	12	12	#	12	#	60	0.20	12	14	12	0	2
Keepers	H/month	24	24	24	#	24	#	120	0.15	18	21	18	0	3
Regions											0			0
4 Focal Points rural engineering specialist in agriculture or agronor	H/month	48	48	48	#	48	#	240	0.40	96	113	96	0	17
Drivers focal points	H/month	48	48	48	#	48	#	240	0.18	43	51	43	0	8
4.2.2.Missions fees											0			
PMU											0			
Coordinator	H/day	24	24	24	#	24	#	120	0.09	11	13	11	0	2
Technical Coordinator	H/day	60	60	60	#	60	#	300	0.09	27	32	27	0	5
Drivers	H/day	60	60	60	#	60	#	300	0.05	14	16	14	0	2
Regions										0	0			
Focal Points	H/day	120	##	##	#	##	#	600	0.07	39	46	39	0	7
Drivers	H/day	120	##	##	#	##	#	600	0.05	27	32	27	0	5
4.2.3. Maintenance and Operation											0			
Vehicle Operation Coordinator	Véhi	1	1	1	1	1	1	5	4.00	20	24	0	20	4
Vehicle Operation double cabin pick-up	Véhi	6	6	6	6	6	6	30	10.00	300	354	0	300	54
motorbike operation	Moto	1	1	1	1	1	1	5	2.50	13	15	0	13	2
Office supplies	Mois	12	12	12	#	12	#	60	2.50	150	177	66	84	27
General expenses (water, electricity, telephone ...)	Mois	12	12	12	#	12	#	60	0.80	48	57	0	48	9
Sub-total 4.2.										**1,171**	**1,382**	**707**	**465**	**211**
4.3. Planning, monitoring and evaluation, equity, gender and communication														
Organization of meetings and supervision of CNP			2	2	2	2	2	10	**10.00**	100	**118**	0	100	18
Mid-term and final evaluation	FF/year		0	0	1	0	1	2	**14.00**	28	**33**	28	0	5
Impact Assessment	FF						1	1	**20.00**	20	**24**	0	20	4
Various trainings (monitoring evaluation and capitalization, gende	FF		1	1	1	0	0	3	**10.00**	30	**35**	0	30	5
Working missions at BOAD	FF/year		1	0	0	1	0	2	**8.00**	16	**19**	0	16	3
Study trips	FF/year		1	0	1	1	0	3	**10.00**	30	**35**	0	30	5
Communication	FF/year		1	1	1	1	1	5	**5.00**	25	**30**	25		5
Sub-total 4.3.										**249**	**294**	**53**	**196**	**45**
Total										**2,042**	**2,410**	**760**	**1,251**	**399.560**

0.440

COUT PREVISIONNEL DU PROJET

(X 1000 USD)

COMPOSANTES	Total excluding tax (X 1000 USD)	Tax (X 1000 USD)	Total including VAT (X 1000 USD)
COMPONENT 1 : Enhancing stakeholders' technical a	**2,960**	**466**	**3,426**
1.1. Support for the studies, control and supervision of wo	**1,470**	198	**1,668**
1.2. Strengthened capacities of technical services decentr	143	26	168
1.3. Capacity building of stakeholders to understand and a	832	150	982
1.4. Sharing of knowledge and dissemination of good prac	515	93	608
COMPONENT 2: CONSOLIDATION AND DEVELOPMEI	**22,093**	**3,977**	**26,070**
2.1. Development of peri-urban and villages areas	14,293	2,573	16,866
2.2. Support for reducing energy bills related to water pum	7,800	1,404	9,204
COMPONENT 3. SUPPORT FOR ALTERNATIVE LIVEL	**1,008**	**181**	**1,189**
3.1.Support for access to quality agricultural inputs	200	36	236
3.2. Support for the development of off-farm income gene	808	145	953
COMPONENT 4: INVESTMENT, COORDINATION AND	**2,042**	**368**	**2,410**
4.1. Investissements	622	112	734
4.2. recurring cost	1,171	211	1,382
4.3. Planning, monitoring and evaluation, equity, gender a	249	45	294
BASIC COST	**28,103**	**4,992**	**33,094**
physical contingencies	281	51	332
Contingency for rising of prices	562	101	663
TOTAL COST (No including agency fees)	**28,946**	**5,144**	**34,089**
IMPLEMENTATION ENTITY (BOAD) MANAGEMENT FEES	**768**	**768**	**768**
PROJECT COST	**29,714**	**5,912**	**34,857**

physical contingencies	1.0%
Contingency for rising of prices	2.0%

Plan de financement prévisionnel X 1000 USD)

COMPOSANTES	Total excluding tax (X 1000 USD)	Total including VAT (X 1000 USD)	FA (X 1000 USD)	BOAD (X 1000 USD)	Niger republic (X 1000 USD)		
					total excluing tax	TAXES	total including VAT
COMPONENT 1 : Enhancing stakeholders' technical and institutional cap	**2,960**	**3,426**	**731**	**1,917**	**232**	**546**	**778**
1.1. Support for the studies, control and supervision of works	**1,470**	**1,668**	**0**	**1,278.0**	**112**	**278**	**390**
1.2. Strengthened capacities of technical services decentralized state	143	**168**	64.0	78.6	**0**	26	**26**
1.3. Capacity building of stakeholders to understand and adopt agricultural pr	832	**982**	532.2	180.0	**120**	150	**270**
1.4. Sharing of knowledge and dissemination of good practices	515	**608**	135.0	380.0	**0**	93	**93**
COMPONENT 2: CONSOLIDATION AND DEVELOPMENT OF IRRIGATED F	**22,093**	**26,070**	**7,224**	**14,869**	**0**	**3,977**	**3,977**
2.1. Development of peri-urban and villages areas	14,293	**16,866**	7,224	7,069	**0**	2,573	**2,573**
2.2. Support for reducing energy bills related to water pumping	7,800	**9,204**	0	7,800	**0**	1,404	**1,404**
COMPONENT 3. SUPPORT FOR ALTERNATIVE LIVELIHOODS AND IMPR	**1,008**	**1,189**	**160**	**848**	**0**	**181**	**181**
3.1.Support for access to quality agricultural inputs	200	**236**	60	140	**0**	36	**36**
3.2. Support for the development of off-farm income generating activities	808	**953**	100	708	**0**	145	**145**
COMPONENT 4: INVESTMENT, COORDINATION AND PROJECT MANAGE	**2,042**	**2,410**	**760**	**1,251**	**32**	**368**	**399.56**
4.1. Investissements	622	**734**	0	590	32	112	**144**
4.2. recurring cost	1,171	**1,382**	707	465	0	211	**211**
4.3. Planning, monitoring and evaluation, equity, gender and communication	249	**294**	53	196	0	45	**45**
BASIC COST	**28,103**	**33,094**	**8,875**	**18,884**	**264**	**5,072**	**5,336**
physical contingencies (1%)	281	**332**	89	189	3	51	**53**
Contingency for rising of prices (2%)	562	**663**	179	381	5	101	**107**
TOTAL 1	**28,946**	**34,089**	**9,143**	**19,454**	**272**	**5,224**	**5,496**
IMPLEMENTATION ENTITY (BOAD) MANAGEMENT FEES	**768**	**768**	**768**				
TOTAL COST	**29,714**	**34,857**	**9,911**	**19,454**	**272**	**5,224**	**5,495.597**
Percentage		**100%**	**28.43%**	**55.81%**			**15.77%**

PLANNING DES DECAISSEMENTS FONDS D'ADAPTATION (X 1000 USD)

COMPOSANTES	Pre-tax amount	An 1	An 2	An 3	An 4	An 5
COMPONENT 1 : Enhancing stakeholders' technical	**731**	**170**	**158**	**246**	**68**	**89**
1.1. Support for the studies, control and supervision of wo	**0**	**0**	**0**	**0**	**0**	**0**
1.2. Strengthened capacities of technical services decent	64	64	0	0	0	0
1.3. Capacity building of stakeholders to understand and	532	106	158	188	40	40
1.4. Sharing of knowledge and dissemination of good pra	135	0	0	58	28	49
COMPONENT 2: CONSOLIDATION AND DEVELOPME	**7,224**	**903**	**3,612**	**2,710**	**0**	**0**
2.1. Development of peri-urban and villages areas	7,224	903	3,612	2,710	0	0
2.2. Support for reducing energy bills related to water pur	0	0	0	0	0	0
COMPONENT 3. SUPPORT FOR ALTERNATIVE LIVEI	**160**	**0**	**40**	**80**	**40**	**0**
3.1.Support for access to quality agricultural inputs	60	0	15	30	15	0
3.2. Support for the development of off-farm income gene	100	0	25	50	25	0
0						
COMPONENT 4: INVESTMENT, COORDINATION AND	**760**	**159**	**133**	**167**	**133**	**167**
4.1. Investissements	0	0	0	0	0	0
4.2. recurring cost	707	154	128	148	128	148
4.3. Planning, monitoring and evaluation, equity, gender a	53	5	5	19	5	19
BASIC COST	8,875	1,232	3,943	3,203	241	256
BASIC COST	**8,875**	**1,232**	**3,943**	**3,203**	**241**	**256**
physical contingencies (1%)	89	12	39	32	2	3
Contingency for rising of prices (2%)	179	25	80	65	5	5
TOTAL	**9,143**	**1,269**	**4,062**	**3,300**	**248**	**264**
Percentage	**100%**	**14%**	**44%**	**36%**	**3%**	**3%**

IMPLEMENTATION ENTITY (BOAD) MANAGEMENT FEES	768
TOTAL COST	**9,911**

PLANNING DES DECAISSEMENTS BOAD (X 1000 USD)

COMPOSANTES	Pre-tax amount	An 1	An 2	An 3	An 4	An 5	
COMPONENT 1 : Enhancing stakeholders' technical a	**1,917**	**959**	**149**	**182**	**502**	**125**	1,917
1.1. Support for the studies, control and supervision of wo	1,278	838	98	113	113	116	1,278
1.2. Strengthened capacities of technical services decentr	79	79	0	0	0	0	79
1.3. Capacity building of stakeholders to understand and a	180	42	51	69	9	9	180
1.4. Sharing of knowledge and dissemination of good prac	380	0	0	0	380	0	380
							0
COMPONENT 2: CONSOLIDATION AND DEVELOPME	**14,869**	**1,858**	**7,435**	**5,575**	**0**	**0**	14,868
2.1. Development of peri-urban and villages areas	7,069	883	3,535	2,650	0	0	7,068
2.2. Support for reducing energy bills related to water pum	7,800	975	3,900	2,925	0	0	7,800
							0
COMPONENT 3. SUPPORT FOR ALTERNATIVE LIVEL	**848**	**191**	**268**	**226**	**162**	**0**	848
3.1.Support for access to quality agricultural inputs	140	0	35	70	35	0	140
3.2. Support for the development of off-farm income gene	708	191	233	156	127	0	708
							0
COMPONENT 4: INVESTMENT, COORDINATION AND	**1,251**	**674**	**141**	**141**	**155**	**141**	1,251
4.1. Investissements	590	516	26	16	16	16	590
4.2. recurring cost	465	110	85	85	101	85	465
4.3. Planning, monitoring and evaluation, equity, gender a	196	48	30	40	38	40	196
							0
BASIC COST	**18,884**	**3,682**	**7,993**	**6,123**	**820**	**266**	**18,883**
							0
physical contingencies (1%)	189	37	80	61	8	3	189
Contingency for rising of prices (2%)	381	74	161	124	17	5	381
							0
TOTAL COST	**19,454**	**3,793**	**8,234**	**6,308**	**844**	**274**	19,453
Percentage	**100%**	**19%**	**42%**	**32%**	**4%**	**1%**	1

DISBURSEMENT OUTLOOK AND
TABLE OF ESTIMATED AMORTIZATION OF BOAD LOAN

Amount	19,454
BOAD Interest rate	7.60%
Bonification	2.60%
Borrower Interest rate	5.00%
Duration	10 years including 3 years of delay

Probable date of signature of the AP: first half of 2016

PREDICTION OF DISBURSEMENT

2nd semester	2016	3,793
1st semester	2017	8,234
2nd semester	2017	6,308
1st semester	2018	844
2nd semester	2018	274
		19,453

ESTIMATEDTABLE OF AMORTIZATION

SEMESTER	OUTSTANDING CREDIT	REPAYMENT OF PRINCIPAL	INTERESTS BOAD	BONIFICATION	BORROWER INTERESTS
31.10.2016	3,792.95		48.04	16.44	31.61
30.04.2017	12,027.02		352.73	120.67	232.06
31.10.2017	18,335.39		576.89	197.36	379.53
30.04.2018	19,179.80		718.14	243.85	474.29
31.10.2018	19,453.32		734.03	251.12	482.91
30.04.2019	19,453.32		739.23	252.89	486.33
31.10.2019	18,063.80	1,389.52	686.42	234.83	451.59
30.04.2020	16,674.27	1,389.52	633.62	216.77	416.86
31.10.2020	15,284.75	1,389.52	580.82	198.70	382.12
30.04.2021	13,895.23	1,389.52	528.02	180.64	347.38
31.10.2021	12,505.71	1,389.52	475.22	162.57	312.64
30.04.2022	11,116.18	1,389.52	422.41	144.51	277.90
31.10.2022	9,726.66	1,389.52	369.61	126.45	243.17
30.04.2023	8,337.14	1,389.52	316.81	108.38	208.43
31.10.2023	6,947.61	1,389.52	264.01	90.32	173.69
30.04.2024	5,558.09	1,389.52	211.21	72.26	138.95
31.10.2024	4,168.57	1,389.52	158.41	54.19	104.21
30.04.2025	2,779.05	1,389.52	105.60	36.13	69.48
31.10.2025	1,389.52	1,389.52	52.80	18.06	34.74
30.04.2026	0.00	1,389.52	0.00	0.00	0.00
		19,453.32	**7,974.02**	**2,726.12**	**5,247.90**

BOAD answers references to AF comments on 11 September 2015

Review Criteria	Questions	Comments on 11 September 2015	
Project Eligibility	2. Does the project /programme support concrete adaptation actions to assist the country in addressing adaptive capacity to the adverse effects of climate change and build in climate resilience?	CR3: Not addressed. The budget allocated (US$200,000 in the excel sheet budget table; however this output is not presented in the budget table of the proposal) for the development and implementation of a large scale project does not seem adequate. The proponent should clarify if this output relates to the development of a proposal for a large scale project that will build on the lessons from this project.	Please see excel sheet budget table “COMP-1” item 1.4.4. ***Output 1.4.4: Development of a large-scale project integrating the results of lessons learned*** From the 1990s, growth of investments in Small Irrigation allowed installation of approximately 500 ha/year of new irrigable land. The analyses conducted in the context of the implementation of the strategy of the small-scale irrigation in Niger (SPIN)[1] have concluded the extension of the simple techniques and controllable by the villagers, such as pedals pumps, small moto pumps that reduce the painfulness of irrigation, the introduction of the solar pumping, extension kits of Drip system and the Californian networks system. It is also requested to improve the cropping practices in offering to farmers, packages with the use of seed of short cycle, the winter gardening, the rotation crops. With its action plan, the SPIN predicts to boost the irrigation sub-sector with an increase of 5 600 ha of irrigated perimeters annually or 56 000 ha by 2025. For the Niger, the pilot project on “Enhancing resilience of agriculture to climate change to support food security in Niger, through modern irrigation techniques” should help to draw lessons that will better guide the small-scale irrigation with the solar pump, drip system and the California network. So, to contribute to the objectives of the SPIN, a large scale project will be developed to reach the majority of vulnerable populations able to use modern irrigation techniques. This large scale project proposal will build on the lessons learned from the execution of the present project. The solutions proposed by the lessons learned will be taken into account in the preparation of the large scale project.

[1] Stratégie de la Petite Irrigation au Niger

<table>
<tr><td></td><td></td><td></td><td>Please see page 37 of the Full project proposal</td></tr>
<tr><td></td><td>9.Has a consultative process taken place, and has it involved all key stakeholders, and vulnerable groups, including gender considerations?</td><td>CR14: Addressed. However gender-related information is not available.</td><td>During these series of consultations, the gender element was very present. Given that in Niger, women and children are generally regarded as vulnerable groups. The public consultation has particularly targeted female or mixed producer groups.

As well, interviews were conducted with female producer groups in different areas of intervention to incorporate their concerns into the design and implementation of the project. Annex 7 reflects a broad consultation of women's groups and mixed groups.

The two examples of following municipalities show the consideration of gender in the series of public consultation

Tableau : Example of the municipalities of Dogon kiria and Loga demonstrating taking account of its kind in the public consultation

<table>
<tr><th>Municipalities</th><th>Name of group</th><th>Number of mem</th><th>Number of women</th><th>Total mem</th></tr>
<tr><td rowspan="7">Dogon kiria</td><td>Zaman Lahia</td><td>01</td><td>29</td><td>30</td></tr>
<tr><td>Nassara</td><td>08</td><td>35</td><td>43</td></tr>
<tr><td>Dadin Zutchia</td><td>00</td><td>27</td><td>27</td></tr>
<tr><td>Talabanni</td><td>00</td><td>25</td><td>25</td></tr>
<tr><td>Mutachi da Kamu</td><td>12</td><td>09</td><td>21</td></tr>
<tr><td>Maraba Da Kiria</td><td>00</td><td>25</td><td>25</td></tr>
<tr><td>Niya Tourka</td><td>00</td><td>17</td><td>17</td></tr>
<tr><td>Loga</td><td>Kandé Gomni</td><td>00</td><td>10</td><td>10</td></tr>
</table>
</td></tr>
</table>

				Amana	00	10	10	
				Wadata	00	15	15	
				Tangani	08	13	21	
				Yneyijéy2	0	15	15	
				Soudji	00	20	20	
				Farha	00	21	21	
				Total of the two municipalities	14 producers groups	29	263	292	

In the municipality of Dogon kirina, over 7 producer groups consulted, there are four (04) women's groups and three (03) mixed groups the majority of women. In these 7 groups (female and mixed), 188 producers were consulted including 167 women (or 88.83%) and 21 men (or 11.17%). In the municipality of Loga over also 7 producer groups consulted, 6 groups are female and 1 group is mixed. These 7 groups gather 104 producers including 96 women or approximately 92.3% (see annex 7a for details).

At the level of decision-making including during the meetings of consultation of administrative officials in the various areas of intervention, women took part and producer groups were represented (see annex 7b.)

Please see pages 59 and Appendix 7

	13. Does the project /	**CR16**: Partly addressed. Criteria for the definition	

	programme provide an overview of environmental and social impacts / risks identified?	of marginalized and vulnerable groups should be clarified. Gender equity and women's empowerment should be ensured above the bonus system suggested in the subproject selection criteria. Also, the capacity of the beneficiaries to assess the risks and submit ESIA reports is not demonstrated. Support from relevant services and/or NGOs should be clarified.	Definition of marginalized and vulnerable groups : Please see page 5 According to the strategy of Reduction of poverty of Niger, 2002-2015, 63% of the population would fall below the poverty line and 34 per cent below the threshold of extreme poverty. However, the situation is variable according to the area, gender and the socio-professional category. Thus, the incidence of poverty in the urban areas is 52% compared to 66% in rural areas. In rural areas, the least affected households by poverty are those whose head of household is employed, small trader or retired but these three categories represent only 5% of the population of this area. The groups most affected by poverty in rural areas are those directed by a house wife or an inactive. In both groups, the incidence of poverty is 75%. Analysis of vulnerability to food insecurity by gender of head of household in rural areas shows that people living in households headed by women are the most vulnerable to food insecurity. Indeed, severe food insecurity affects 3.4% of people living in households headed by a woman against 2.4% of people living in households headed by men. As for moderate food insecurity it relates to 12.3% of people living in households headed by men and 20.4% of people living in households headed by women. There is food insecurity affecting fewer people living in households headed by a man[2]. The results of the same survey showed that in rural areas, food insecurity (moderate and severe) concerns much more people living in households headed by widows/widowers (24.6%) and divorced (26%).

[2] Report of the joint investigation on vulnerability to household food insecurity in Niger, December 2014-January 2015P. 23-24

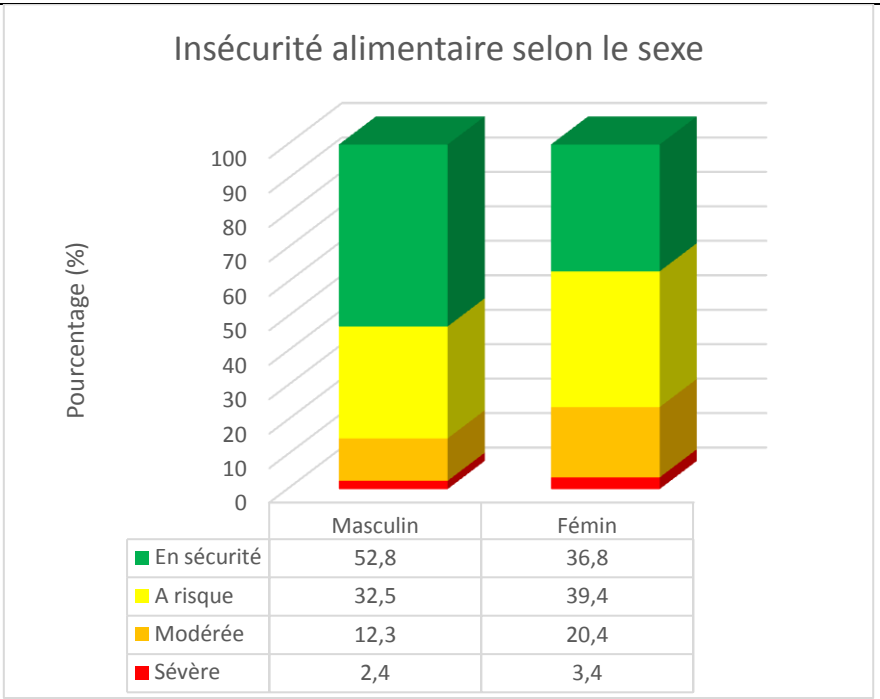

Figure 1: Food insecurity by gender of head of household Page 5 Full Project

The Niger population is approximately 50.6% of women[3]. In the definition of the selection criteria, the project management unit will ensure that at least 51% of the direct beneficiaries of the project are women. Please see pages 67-69 ; 74

[3] Presentation of preliminary results of the fourth (4th) general census of population and housing **(RGP/H) 2012.**

			Capacity of the beneficiaries to assess the risks and submit ESIA reports / Support from relevant services and/or NGOs Pease see page 30 ***Output 1.1.2.*** Support for the realization of detailed preliminary projects, studies or notice of environmental and social impact of sub-projects There is support in the design of sub-projects, the studies of studies of preliminary detailed project (DPA), studies of environmental and social impact of sub-projects and tender documents. Thus, producer groups will benefit from technical support in the montage of the sub-projects of which they are initiators. This support will be in accordance with the guidelines of the strategy of small Irrigation in Niger (SPIN). Indeed, according to the SPIN, the needs (sub-projects) must be translated in the form of formal requests, with or without the support of Private support Council Services (SPAC) on the basis of the demand expressed by the farmer[4]. As such, the studies of the detailed preliminary project as well as studies or notice of environmental and social impact will be conducted by the SPAC having competence in the field[5]. Studies and notice of impact on the environment will take into account the systematic identification of the environmental and social risks and their management. The Project management unit will support the beneficiaries for the choice of the SPAC helping to prepare by region or municipality, after a call for applications, a list of SPAC which have the required technical capabilities to conduct such studies. The beneficiaries on the basis of a shortlist of 3 to 6 SPAC of their region or municipality may after analysis of the proposals of these award the contract to the SPAC with the best bid. Please see page 74 : **APPROACH OF THE PROJECT** **Step 1: Information and sensitization on the Project approach** This step is the process of dissemination of information on investment opportunities among target populations, the intervention strategy, and formulation of applications by operators, technical and

[4] See Strategy of Small Irrigation of Niger (SPIN) P.41.
[5] See Strategy of Small Irrigation of Niger (SPIN) P.42.

			administrative pre-validation (mayor and SAC or SPAC). Every year (for three years), two calls for proposals will be launched for communities which can be involves in the project to encourage them to propose projects. **Step 2: Montage des dossiers, formulation des demandes:** This step relates to (i) the studies and the elaboration of the technical file, (ii) the formulation of requests and (iii) their registration by the municipality (municipality visa) before their transmission to the Regional Secretariat of the SPIN (SR-SPIN). The technical studies are conducted by the Producer Organization's or Peasant organization (PO), through their skills if they have or support-consulting services (SPAC). According to the SPIN, the SPAC are: Economic interest groups (GIE), groups of Service Council (GSC), the Non-governmental organizations (NGOs)[6].
Resource Availability	2. Is the implementing Entity Management Fee at or below 8.5 per cent of the total project/programme budget before the fee?	**CAR3**: Addressed. However it is not clear whether the budget has been revised to US$ 9,990,000. Please clarify and correct the budget amount in the first page of the proposal accordingly.	The budget of Adaptation fund is revised to US$ 9,911,000 corresponding the initial budget of the PCN approved. Please see page 1, 27, 133, 134, 140. Please see Excel sheet budget table "Financing Plan" ; "AF Planning disbursement"
Implementation Arrangeme	1. Is there adequate arrangement for project /	CR17: Addressed. However, the capacity of the beneficiaries to prepare ESIA reports is	The capacity of the beneficiaries to prepare ESIA reports is not demonstrated. Involvement of "technical services" and decentralized services" or NGOs Pease see page 30

[6] See Strategy of Small Irrigation Niger (SPIN) page 35.

nts	programme management?	not demonstrated. Involvement of "technical services" and decentralized services" or NGOs not clear.	***Output 1.1.2.*** Support for the realization of detailed preliminary projects, studies or notice of environmental and social impact of sub-projects There is support in the design of sub-projects, the studies of studies of preliminary detailed project (DPA), studies of environmental and social impact of sub-projects and tender documents. Thus, producer groups will benefit from technical support in the montage of the sub-projects of which they are initiators. This support will be in accordance with the guidelines of the strategy of small Irrigation in Niger (SPIN). Indeed, according to the SPIN, the needs (sub-projects) must be translated in the form of formal requests, with or without the support of Private support Council Services (SPAC) on the basis of the demand expressed by the farmer[7]. As such, the studies of the detailed preliminary project as well as studies or notice of environmental and social impact will be conducted by the SPAC having competence in the field[8]. Studies and notice of impact on the environment will take into account the systematic identification of the environmental and social risks and their management. The Project management unit will support the beneficiaries for the choice of the SPAC helping to prepare by region or municipality, after a call for applications, a list of SPAC which have the required technical capabilities to conduct such studies. The beneficiaries on the basis of a shortlist of 3 to 6 SPAC of their region or municipality may after analysis of the proposals of these award the contract to the SPAC with the best bid. Please see page 74 : **APPROACH OF THE PROJECT** **Step 1: Information and sensitization on the Project approach** This step is the process of dissemination of information on investment opportunities among target populations, the intervention strategy, and formulation of applications by operators, technical and administrative pre-validation (mayor and SAC or SPAC). Every year (for three years), two calls for proposals will be launched for communities which can be involves in the project to encourage them to propose projects. **Step 2: Montage des dossiers, formulation des demandes:**

[7] See Strategy of Small Irrigation of Niger (SPIN) P.41.
[8] See Strategy of Small Irrigation of Niger (SPIN) P.42.

			This step relates to (i) the studies and the elaboration of the technical file, (ii) the formulation of requests and (iii) their registration by the municipality (municipality visa) before their transmission to the Regional Secretariat of the SPIN (SR-SPIN). The technical studies are conducted by the Producer Organization's or Peasant organization (PO), through their skills if they have or support-consulting services (SPAC). According to the SPIN, the SPAC are: Economic interest groups (GIE), groups of Service Council (GSC), the Non-governmental organizations (NGOs)[9].
	2.Are there measures for financial and project/programme risk management?	CR21: Addressed. However, the capacity of the beneficiaries to design sub-project documents is not demonstrated.	Pease see page 30 ***Output 1.1.2.*** Support for the realization of detailed preliminary projects, studies or notice of environmental and social impact of sub-projects There is support in the design of sub-projects, the studies of Avant-Projet Détaillé "preliminary detailed project (DPA)", studies of environmental and social impact of sub-projects and tender documents. Thus, producer groups will benefit from technical support in the montage of the sub-projects of which they are initiators. This support will be in accordance with the guidelines of the strategy of small Irrigation in Niger (SPIN). Indeed, according to the SPIN, the needs (sub-projects) must be translated in the form of formal requests, with or without the support of Private support Council Services (SPAC) on the basis of the demand expressed by the farmer[10]. As such, the studies of the detailed preliminary project as well as studies or notice of environmental and social impact will be conducted by the SPAC having competence in the field[11]. Studies and notice of impact on the environment will take into account the systematic identification of the environmental and social risks and their management. The Project management unit will support the beneficiaries for the choice of the SPAC helping to prepare by region or municipality, after a call for applications, a list of SPAC which have the required technical capabilities to conduct such studies. The beneficiaries on the basis of a shortlist of 3 to 6 SPAC of their region or municipality may after analysis of the proposals of these award the contract to the SPAC with the best bid.

[9] See Strategy of Small Irrigation Niger (SPIN) page 35.
[10] See Strategy of Small Irrigation of Niger (SPIN) P.41.
[11] See Strategy of Small Irrigation of Niger (SPIN) P.42.

		3. Are there measures in place for the management of environmental and social risks, in line with the Environmental and Social Policy of the Fund?	CR22: Partly addressed. The project-level Environmental and Social Management Plan seems to be more focused on the E&S risks of the subprojects under component 2 and do not seem to include components 1 and 3. The Plan should provide a framework for systematic risk screening and management for the whole project. Also, initial risk identification and impact assessment is to be carried out by the sub-project beneficiaries, who need to hire the services of a professional for this purpose. It is suggested that these may be provided by the 'Environmental Service Representative in the Region', which may constitute a conflict of interest with BEEEI contracted to review the risk identification and	Please see pages 90 to 110, Impact and risks identification and measures Support for the realization of ESIA or Impact Notice of sub-projects There is support in the realization of environmental and social impact assessment of sub-projects. Thus, producer groups will benefit from technical support in the montage of the sub-projects of which they are initiators. This support will be in accordance with the guidelines of the strategy of small Irrigation in Niger (SPIN). Indeed, according to the SPIN, the needs (sub-projects) must be translated in the form of formal requests, with or without the support of Private support Council Services (SPAC) on the basis of the demand expressed by the farmer[12]. As such, the studies of the detailed preliminary project as well as studies or notice of environmental and social impact will be conducted by the SPAC having competence in the field[13]. Studies and notice of impact on the environment will take into account the systematic identification of the environmental and social risks and their management. The Project management unit will support the beneficiaries for the choice of the SPAC helping to prepare by region or municipality, after a call for applications, a list of SPAC which have the required technical capabilities to conduct such studies. The beneficiaries on the basis of a shortlist of 3 to 6 SPAC of their region or municipality may after analysis of the proposals of these award the contract to the SPAC with the best bid. There will be no conflict of interests between the BEEEI and the environment of the region. The latter is a dismemberment of the BEEEI, therefore, it is a service that represents the BEEEI at the regional level.

[12] See Strategy of Small Irrigation of Niger (SPIN) P.41.
[13] See Strategy of Small Irrigation of Niger (SPIN) P.42.

		assessment. It is unclear if potential beneficiaries have the capacity and resources to carry out this risk identification and assessment.	
	5. Is an explanation and a breakdown of the execution costs included?	CAR4: Addressed through the excel sheet provided, however the total execution costs do not match	Please see page 1, 27, 133, 134, 140. Please see Excel sheet budget table “Financing Plan” ; “AF Planning disbursement”
	6. Is a detailed budget including budget notes included?	CR29: Partly addressed. The budget tables provided in the excel sheet do not match with the budget table in the proposal and contain total amounts that are confusing and do not match with the requested funding i.e. 9.99 million.	The budget of Adaptation fund is revised to US$ 9,911,000 corresponding the initial budget of the PCN approved. Please see page 1, 27, 133, 134, 140. Please see Excel sheet budget table “Financing Plan” ; “AF Planning disbursement”
	7. Are arrangements for monitoring and evaluation clearly defined, including budgeted M&E plans	CR31: Addressed. However the costs incurred by the E&S monitoring systems, i.e. 600 million CFA francs	Activities related to capacity-building, technical support and sensitization in the field of the project environmental and social management are integrated in component 1, under the outcomes 1.1, 1.2 and 1.3. (Especially: Output 1.1.4 ; Output 1.2.3. ; Output 1.3.1. ; and Output 1.3.4.). The total cost of Environmental and social issues (Capacities building, Sensitization, the support to realization of the ESIA report, Review and approval of the sub-project ESIA report, Technical

	and sex-disaggregated data, targets and indicators?	or US$ 1 million, are very high and it should be demonstrated how those costs will be covered and by which stakeholder and reflected in the overall budget. Alternatively, a more realistic monitoring plan should be considered, or the capacity building components should be integrated in the relevant project components such as outputs 1.1. and 1.2. See comments on budget below.	support of pesticides management, supervision and monitoring, etc.) is revised to US$ 739 against US$ 1200 initially planned (US$ 1 = 500 FCFA).
	9. Does the project/programme's results framework align with the AF's results framework? Does it include at least one core outcome indicator from the Fund's results framework?	CAR5: Not addressed. The proposal should include at least one core outcome indicator from the Fund's results framework. See: https://www.adaptationfund.org/wpcontent/uploads/2015/01/AF%20Core%20Indicator%20Methodologies.pdf	Indicators of adaptation funds are marked + at the end Please see page 119-127