

**PROJECT INFORMATION DOCUMENT (PID)
CONCEPT STAGE**

Report No.:77284

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Project Name	<i>Tunisia Sustainable Agriculture Carbon Project</i>
Region	<i>MENA</i>
Country	<i>Tunisia</i>
Sector	General agriculture, fishing and forestry sector: 100%
Lending Instrument	<i>Carbon offset</i>
Project ID	<i>P129848</i>
<i>{If Add. Fin.}</i> Parent Project ID	<i>{Same as in AUS}</i>
Borrower(s)	<i>Government of Tunisia</i>
Implementing Agency	<i>National Agency for Large Crops (INGC)</i>
Environmental Screening Category	[]A [X]B []C []FI []TBD (to be determined)
Date PID Prepared	<i>01/03/13/</i>
Estimated Date of Appraisal Completion	<i>06/20/13</i>
Estimated Date of Board Approval	<i>06/20/14</i>
Concept Review Decision	Following the review of the concept, the decision was taken to postpone the project preparation until PGRN2 and PNO4 become satisfactory.

I. Introduction and Context

Country Context

01. Tunisia was one of the fastest growing economies in the MENA region and invested substantially in key social sectors before the recent global financing crisis and political revolution unfolded. The country has made a decent progress in poverty reduction, but challenges remain in particular for rural poverty, particularly in arid areas. With growth stable at 3 percent, the fiscal deficit down to 1.3 percent and official reserves equivalent to 5 months of imports at the end 2010, the Government began 2011 with the fiscal space to absorb some of the economic shock caused by the January revolution, the spillover from Libya conflict and the sharp downturn in tourism and Foreign Direct Investments (FDI). The economic situation in 2012 is likely to remain difficult, with GDP growth only moderately positive.

02. Tunisia' population is about 10,549,000 persons¹ within an area of approximately 163,610 square kilometers. The Tunisian rural population represented 33% of the total population in 2011, declining from 45 percent (1986) and 35 percent (2001). The country comprises three distinct climatic zones: (i) the northeastern flank of the Atlas Mountains, with a Mediterranean climate with relatively cold and wet winters and dry and hot summers; (ii) the semi-arid eastern and central regions, which can undergo violent convective storms in fall and spring; and (iii) the arid south-west and extreme south regions, with a significant inter-annual rainfall variability due to the interaction on the Gulf of Gabes of dry-warm air masses from the Sahara and colder air from the north. Total annual rainfall may exceed 1000 mm in the

¹ Source : www.worldbank.org, 2009 census.

northwest near Beja, decrease to about 200-300 mm near Sidi Bouzid and Gabes, and fall to less than 100 mm around Tozeur.

03. Tunisia has made good progress in fighting poverty whose rate decreased from 32.4% in 2000, to 23.3% in 2005 and 15.5% in 2010². However strong regional disparities, long hidden, were a contributory cause to the revolution. The social demands came from remote areas where poverty and unemployment rates are high. Figures for extreme poverty are also fairly high in these areas. The interim authorities in 2011 initiated a broad program of emblematic reforms to strengthen governance and social accountability, including more inclusive and participatory approach which is fundamental for shared and sustainable growth and poverty reduction.

04. The country is among the most advanced countries in Africa in terms of gender equality. The country has been able to provide real protection for women's rights, and give equal access to education and health care. However, women's presence in the workplace is limited (26.7%), putting Tunisia in 132nd place out of 142 in the World Economic Forum rankings.

05. Tunisia's unemployment rate is relatively high at 13% in 2010, affecting about 500,000 people. The overall rate masks a striking divergence by age, with younger groups of the labor force being more affected at 30.7% (between 15-24 year-old), and almost 44% among young university graduates (15-29 year-old). These figures, clearly on the rise, are swelled by the return of most Tunisian workers from Libya and the loss of jobs following the 2011 recession.

Sectoral and institutional context

06. **Agriculture is a key economic sector in Tunisia.** Its contribution to the country's GDP has been constant over the last 20 years at about 13%³. In 2008 Agriculture accounted for 9 % of exports, 7% of investments and employed 16% of the total labor force and 27% of the rural labor force. In 2005, 515,850 households (representing 23% of the total households) were involved in agriculture, amongst which 58% lived exclusively from agriculture. Farms are very fragmented. The average farm size is 10 ha. More than half of all farm households (54%) cultivate areas not exceeding 5 ha, up from 41% forty years ago. Only 5% of farms operate on areas above 50 ha. Rainfed agriculture remains dominant in terms of land use with only 7 % of arable land being irrigated.⁴

07. **Agricultural production** is dominated by Cereals and Olives. **Cereals** are key in ensuring food security in the country, as they represent 60% of the calorie intake and 71% of the protein intake of the Tunisian diet⁵. Cereals production represents 13.7% of the total agricultural production value and covers 1,200,000 ha representing 37% of cropped land⁶. The main crops are wheat, hard wheat, barley and oats, which are rotated with legumes such as alfalfa, chickpea, sulla, and forage. Cereals, legumes and forage all together cover 48% of the cropped land⁷. Cereals production has evolved with an average annual growth rate of around 2% between 1984 and 2009, reaching an average of 1,883 thousand tons for the period 2005-09.⁸ There is however a high production variability depending on climatic conditions (rainfall), which does not allow national supply to meet domestic demand. Since 1980, the production has

² http://www.ins.nat.tn/communiqués/Conference_presse_20_09_2012_FR.pdf

³ Source: Tunisia, Agricultural Policy Review (World Bank, 2006).

⁴ Source : Financement du secteur agricole tunisien (World Bank, AFD, FAO, May 2012)

⁵ Source: Le Ble Dur en Tunisie (CIHEAM, [...])

⁶ Source: Etude d'évaluation de l'Unité de gestion par Objectifs pour la réalisation du Projet de Développement des céréales, (Ministry of Agriculture, June 2008)

⁷ Source: Financement du secteur agricole tunisien (World Bank, AFD, FAO, May 2012)

⁸ Source : Financement du secteur agricole tunisien (World Bank, AFD, FAO, May 2012)

varied from a minimum of 0.307 to a maximum of 2.894 million tons. Tunisia is therefore dependent on its imports, particularly in years of low rainfall. **The livestock sector** has grown fairly quickly. Livestock production, especially at the level of small producers, contributes significantly to GDP. Despite increased domestic demand, milk production has had a particularly high annual growth, mainly as a result of incentive measures and a large reduction in milk imports. Currently, milk local supply meets over 90% of domestic demand.⁹

08. Natural resource degradation is a major constraint for the sustainability and the development of the Tunisian agriculture, with soil degradation and water scarcity being the main environmental challenges. Despite decades of Governmental efforts to protect natural resources (over 1% of GDP in the last decade), over-exploitation and inadequate land management led to significant resource degradation. Erosion, caused mainly by water in the North and the Center, and wind in the Center and the South, affects 1.5 million ha and results in an annual topsoil loss of about 13,000-23,000 hectares¹⁰. Autumn rains, because of their intensity, contribute significantly to soil erosion in the absence of vegetative cover. Droughts now tend to be more frequent and last for longer time periods. Farmers are forced to overexploit arable lands and subsequently move to marginal ones. Encroachment by crops and fires are also provoking sizeable losses to forests and grazing areas. Additionally, the rapidly growing demand for water, mainly from economic and population growth, means that Tunisia is reaching its physical limits in terms of water collection and storage. Current estimates show that about 50% of the country's arable lands are eroded, 20% of rangelands have disappeared and 24% of shallow aquifers are overexploited. Agriculture is the major water consumer at around 80% and is therefore facing especially pressing challenges.

09. Soil degradation is particularly jeopardizing agricultural sustainability in the North Western Governorates. This region is strategic in ensuring food security as 64% of cereals are produced there and 70% of its agricultural land is covered by cereals. The region is also home to 80% of all water resources originating in the country's watersheds. It is estimated that 35% of the Tunisian population lives in the Northwest, which spreads over 11,867 km², or slightly less than 10% of the national territory. The population density in the Northwest is close to five times the country's average of 67 inhabitants per km². High population and livestock pressures on the land, coupled with inadequate land management, non-adapted agricultural practices, naturally poor soils often located on steep slopes, all combine to increasingly induce resource degradation. It is estimated that 30% of the agricultural land used for Cereal production is affected by erosion. It is also estimated that erosion is leading to nearly 25 million cubic meters of sediments being deposited annually within the main reservoirs located in the northern part of the country¹¹. An equivalent volume of water will therefore be no longer available for irrigated agriculture in a country where water resources are limited and almost already totally used.

10. Climate Change will exacerbate existing vulnerabilities. Climate change is expected to have major impacts on Tunisia's overall economy. With increased dry year's occurrence and intensity, decreased rainfalls, increased intensity of seasonal rainfalls, and reduced surface water, the agricultural sector will be hit hardest, but household welfare will be hit even harder from a global and local perspective. Tunisia's status as a net food importer exposes its people to the negative impacts of global food price volatility. Climate change is projected to increase global food prices and to hurt local agricultural yields. In particular, yields for wheat, barley and irrigated potatoes are expected to fall. Agriculture may benefit from higher world food prices, but the effects of falling yields on the sector will be greater. Global impacts (i.e. higher global food prices) and local effects (i.e. lower yields) are projected to reduce economic output in Tunisia by US\$ 2.0-2.7 billion over 30 years. Climate change is also

⁹ Source : Tunisia, Agricultural Policy Review (World Bank, 2006).

¹⁰ Source : Stratégies nationales de conservation des eaux et des sols (Ministry of Agriculture, DGACTA, 2002-2011)

¹¹ Source : Source : Stratégies nationales de conservation des eaux et des sols (Ministry of Agriculture, DGACTA, 2002-2011)

projected to reduce farm incomes by 2-7 percent annually over 30 years¹². Tunisia made strong commitments to combat and adapt to climate change. The United Nations Framework Convention on Climate Change (UNFCCC) was ratified in 1993. Tunisia has also adopted a National Strategy for Adaptation to Climate Change in 2007. The Government of Tunisia is currently preparing a National Strategy for Sustainable Development (2012-2016) which sets up the promotion of agriculture that respects ecological equilibrium and adapt to climate change as a pillar.

11. **Improving the competitiveness of agriculture while conserving natural resources is a priority of the Tunisian Government.** The Agriculture sector strategy is articulated in the Interim Economic Development Plan (2011-2014). The Country aims at increasing the average growth rate of the agricultural sector from about 2.6% to about 3.5. %. This would be achieved through (i) increasing the sector competitiveness and profitability, (ii) consolidating food security as a vector of national sovereignty, (iii) promoting exports,(iv) **protecting natural resources** and (v) improving efficiency of the irrigation systems. The annual production of wheat should reach at least 1.5 million tons, with domestic demand being at about 2.5 million tons. After the 2008 food price increases, the Government of Tunisia is even more determined to achieve this minimal production level, despite the relatively high production cost. More recently, following the Tunisian revolution, a new sector-based strategy for agriculture is being developed. First reflections identified the strong pressure on natural resources as a major risk which can lead to reaching the limits for reversibility and resilience of the ecosystems¹³.

12. Two **National Strategies for Soil Conservation** were elaborated (in 2002 and 2011). They aimed at reducing soil loss, controlling water runoff and protecting dams from silting through mechanical practices such as benches and sills. More recently, **Conservation Agriculture (CA)**, which is based on three main principles: (i) Direct seeding with minimal soil disturbance (limited or no tillage); (ii) Crops rotation and (iii) potentially soil cover, was identified as an efficient tool for land preservation¹⁴. The combination of these principles results in increased organic matter content in soils, which improves soils fertility, stability and water retention characteristics. Conservation Agriculture is also identified as an adaptation measure in the National Strategy for Adaptation to Climate Change. In recent discussions, Ministry of Agriculture¹⁵ expressed willingness to incorporate Conservation Agriculture in the coming Strategy for Cereals, as well as in the 3rd Strategy for Land and Water conservation, under preparation and in the investment code, currently being revised.

13. **Conservation Agriculture** was introduced in Tunisia through a 10-year piloting experience coordinated by INGC¹⁶ (the National Agency for Large Crops), in partnership with research institutes and farmers organizations, and financed by AFD (the PADAC¹⁷ project). INGC conducted demonstration activities, disseminated knowledge and provided technical assistance to farmers who expressed willingness to experiment conservation agriculture in the North Western region. This piloting experience showed that the adoption of CA maintains cereals and legumes crop yields with sometimes a slight increase. It also allows for a 20% decrease in mechanization costs, a time economy of 5.75 h/ha, a fuel economy of 36 to 46 l/ha leading to reduced production cost (7%) and an overall gross margin increase of 40%. In 2010, the surfaces where Conservation Agriculture techniques were adopted and maintained was

¹² Source: Une synthèse des scénarios de changement climatique et de leurs impacts pour la Tunisie (World Bank, January 2012)

¹³ Actualisation concertée de la politique agricole, Orientation pour un nouvel Agenda agricole tunisien (Ministry of Agriculture, AFD, December 2011)

¹⁴ Conservation Agriculture is mentioned in the Interim Economic Development Plan (2011-2014) as a tool for land preservation

¹⁵ DGPDA and DGACATA

¹⁶ INGC is the national institution dedicated to adapt and disseminate new technologies for cereals, legumes and forage crops

¹⁷ Projet d'Appui au Développement de l'Agriculture de Conservation

estimated at 8 775 ha, involving 99 farmers who were using 65 adapted seeders. The adoption rate¹⁸ for this new technology is around 68% and farmers are adopting these practices for their economic and environmental benefits. The PADAC project built strong capacity within INGC on both the technicalities of Conservation Agriculture and the way to transfer the knowledge to farmers and help them manage their change in practices. It also allowed INGC to identify the main barriers for large scale adoption of Conservation Agriculture. These barriers are of financial and technical nature, and need to be addressed through adequate financial support and incentives as well as substantial technical assistance to farmers.

14. **Conservation Agriculture also contributes to reducing Greenhouse Gas (GHG) emissions through carbon sequestration in agricultural soils.** Tunisia has an experience in mobilizing carbon finance sources of financing through the development of projects under the Clean Development Mechanism of the UNFCCC, mainly in the energy and waste sectors. Although agricultural soils are not yet included in the UNFCCC mechanisms, a recently approved methodology under the Verified Carbon Standard (VCS), the VM0017 - Sustainable and Agriculture Land Management (SALM) methodology, allows for the quantification of Emissions Reductions resulting from sustainable agriculture practices, including conservation agriculture. This new methodology offers an opportunity to mobilize financial resources under the voluntary carbon markets umbrella for the agriculture sector. INGC submitted a Project Idea Note to the World Bank, as the trustee of the BioCarbon Fund, to benefit from Carbon Finance to support the large scale dissemination of conservation agriculture and other sustainable agriculture practices. The project was accepted by the BioCarbon Fund in March 2011 as the second soil carbon project in the world, and the first in the MENA region, and a letter of intent was signed between INGC and the World Bank for the purchase of Verified Emissions Reductions (VERs).

15. The proposed project is in line with the natural resource preservation policies in Tunisia. Its objective is to scale-up sustainable agriculture practices in the north-western and central governorates of Tunisia. These sustainable agricultural practices will lead to increased carbon content in the soils, therefore contributing to reduction in soil erosion and nutrient depletion. The project will contribute to climate change mitigation through the sequestration of soil and over the ground Carbon and fuel savings, while facilitating the adaptation of the Tunisian agriculture to climate change.

Relation to CAS

16. Support to Agricultural sector competitiveness is a key component of the Country Partnership Strategy (CPS 2010-2013). The proposed program together with the other Bank supported program in the agricultural sector (PNO4 and PGRN2) and with other donors supported programs (FCBG/AFD and PDAI Siliana/IFAD) will contribute to the achievement of the 2010-2013 CPS' first objective "**Employment, Growth, and Competitiveness**" by improving agriculture productivity through the introduction of new sustainable agriculture practices, and stabilizing farmers' income. It will also contribute to the third objective: "**Sustainable Development in a changing climate**" by improving soil conservation and helping the Tunisian agriculture adapt to climate change.

17. The proposed project is also in line with the IBRD/IFC Interim Strategy Note for 2013-2014, particularly in the 1st area "**Laying the foundations for sustainable growth and job creation**", in the agriculture sector, through insuring sustainable land use and stabilizing farmers income. The project is in line with the 1st driving objective of the Interim Strategy "**Supporting macroeconomic stability and economic recovery**", targeted to support additional analytical work to promote policies for sustainable growth and a stronger private sector. The project is also in line with the Interim Strategy Driving Objective 5 "**Improving access to basic services for underserved communities**" by disseminating

¹⁸ i.e. the ratio between the number of farmers who tested the package and the number of farmers who decided to maintain its application.

knowledge that will help farmers, including the smallholders, access new technological packages leading to land preservation and sustained yields.

18. The project takes into consideration the recommendations on adaptation to climate change in MENA¹⁹, which emphasize the vulnerability of Agriculture and the need for urgent action to help address the already existing climate change effects. The project also offers a pragmatic demonstration of how to contribute to achieving an inclusive green growth. It is in line with the World Bank « Inclusive Green Growth » strategy which states that « Sustainable management of natural capital underlies green growth in key sectors—such as agriculture, manufacturing, and energy— and is vital for resilience and welfare gains. »

19. The project is of particular interest for the Government of Tunisia in the context of the UNFCCC negotiations on Agriculture and Climate Change. It provides an illustration of where climate change mitigation and adaptation issues are simultaneously addressed in the agriculture sector. This illustration can more broadly inform countries with similar agro-ecological conditions (such as Algeria and Morocco). The project also offers the Government of Tunisia to experiment a new source of financing for its agriculture sector through the mobilization of carbon finance revenue streams from the voluntary carbon markets.

II. Proposed Development Objective(s)

20. The Development Objective of this project is to sustain agricultural yields in the North-Western and Central Governorates of Tunisia by scaling up sustainable agriculture practices. This objective will help leverage carbon finance revenue streams.

21. This objective will contribute to increase carbon content in the soils, therefore to improve soil structure and characteristics, with corresponding reduction in soil erosion and nutrient depletion, as well as improvement of water retention. The increased organic content in soils or above the ground, together with fuel savings will allow for generating high quality GHG Emissions Reductions and therefore mobilize carbon finance resources. Based on initial estimations, the project could generate 60,172 Emissions Reductions by 2017 and 240,688 cumulated Emissions Reductions by 2022

Key Results

22. The Table below summarizes the main expected PDO outcomes and related indicators.

EXPECTED KEY OUTCOMES	KEY INDICATORS
Extension of areas under conservation agriculture	Areas adopting conservation agriculture (ha)
Development of new technological packages of conservation agriculture and other sustainable agriculture practices (agro-forestry, pasture lands...)	Number of farmers trained on new technological packages.
Monitoring, Reporting and Verification (MRV) system put in place, in compliance with the VCS and the SALM methodology	Number of Emissions Reductions generated under the VCS

23. The *general beneficiaries* of the project are:

¹⁹ Worldbank, MENA Development Report, « Adaptation to a Changing Climate in the Arab Countries” A Case for Adaptation Governance and Leadership in Building Climate Resilience, Dorte Verner, Editor, 2012, A Policy Matrix for Arab Adaptation to Climate Change p. 46

- the farmers and related households in the North-Western and Central Governorates of Tunisia who will adopt the proposed sustainable agriculture packages
- institutions and organizations such as INGC who will be in charge of coordinating the project, and its main partners in the context of the project. These include research institutes, administrations or institutions related to partner development projects (such as ODESYPARNO²⁰, OTD²¹), as well as various private sector entities (such as seeders suppliers, local banks and financing institutions,...).

24. A benefit sharing scheme for the carbon revenues to be generated by the project will need to be put in place. The benefit sharing scheme will have to avoid creating expectations. It should be kept in mind that carbon revenues are paid ex-post against delivered VERs and that their amount is likely to be very small in the specific case of this project (they would represent less than 1 USD/ha/year). Consultations on the topic have been conducted by INGC with 14 farmers who have already adopted conservation agriculture as part of the piloting experience. The outcomes of the consultation are summarized below:

- The farmers confirmed their interest in having such project developed as a carbon finance operation for the leverage effects it would bring.
- At the same time, they recognized that due to the small amount, direct distribution to farmers wouldn't be the best option.
- They highlighted 3 principles that would need to be applied for the benefit sharing scheme: (i) recognition of each farmer's effort (in participating to the project), (ii) preference for grouped use of these revenues for community projects and (iii) possible use as an incentive for farmers to comply with their reporting obligations.

25. The project will establish strong partnership with other development projects covering the same area, including on-going Bank-funded projects, namely: (i) the 4th Northwest Mountainous & Forested Areas Development Project (PNO4), whose objective is the improvement of the socio-economic conditions of rural populations and promotion of better protection and management of natural resources in the North Western governorates, and (ii) The Second Natural Resource Management Project (PGRN2) whose objective is the improvement of the livelihoods of rural communities in three North Western governorates. The proposed project will disseminate knowledge amongst the beneficiaries of PNO4 and PGRN2. It will provide technical assistance (through INGC) to help farmers understand the value they can get from applying the proposed packages and have these packages included in their Participatory Development Plans (PDPs) where relevant²².

III. Preliminary Description

26. The project results from the 10-year piloting experience coordinated by INGC. Following the positive economic and environmental results of the pilot, and in response to farmers demand, INGC decided to scale up the adoption of Conservation Agriculture practices, and potentially develop additional sustainable agriculture packages to address specific needs. INGC will help farmers address the main barriers for large scale dissemination. This will be achieved through (i) the extension of dissemination and technical support efforts to cover larger areas and reach out a larger number of farmers, including small and medium size farms, (ii) developing partnerships with other institutions and development projects to

²⁰ Office de Développement Sylvo-Pastoral du Nord-Ouest

²¹ Office des Terres Domaniales

²² Development projects that are relevant for the proposed project (PNO4, PGRN2, PDAI Siliana, FCGBV, PGRN2) adopt a participatory approach under which rural communities (composed mainly of farmers) are requested to express their needs through Participatory Development Plans (PDP) .

reach out a larger number of farmers and (iii) supporting farmers in accessing or acquiring adapted seeders. New technological packages to extend the range of sustainable agriculture practices and address specific needs will be developed through Research and Development activities.

27. INGC will target large, medium and small size farms in the six North-Western Governorates of Tunisia, i.e. Bizerte, Jendouba, Béja, Siliana, El Kef and Zaghouan, and two Central Governorates (Benarous and Manouba). It will be developed in two phases. The first phase (2012-2017) will build upon the piloting experience and disseminate technical packages starting with areas where CA benefits are most visible. In parallel, additional packages will be developed in partnership with other institutions and development projects to include new activities (e.g. agroforestry, pasture land) and reach out new ecosystems. The second phase (2019-2022) will expand the areas under sustainable agriculture, building upon the first phase. INGC's objective is to achieve 24,000 ha adopting conservation agriculture in phase 1 and additional 102,000 ha in the second phase. INGC's objective is therefore to achieve 126,000 ha by 2022, representing 8% of the total arable land and 10% of the arable land dedicated to large crops (cereals rotated with legumes).

28. The proposed project will be made up of the following components:

- **Component 1: Strengthening capacities**
- **Component 2: Support to farmers in accessing to or acquiring seeders**
- **Component 3: Research and Development**
- **Component 4: Monitoring and Evaluation**

Component 1: Strengthening capacities (\$US 1,400,000)

29. Activities under this component will strengthen capacities for adoption and management of sustainable agriculture practices including conservation agriculture. This will include dissemination of knowledge through demonstration initiatives, trainings and technical support to interested farmers in selected areas, as well as to Government officers and extension specialists at the national, regional and local levels. Partnerships between INGC and existing development projects (including PNO4 and PGRN2) and other institutions will help target a wider range of farmers and include other sustainable agriculture practices. The objective is to sensitize farmers and encourage them to adopt these new technical packages (and include them in their local development plans where relevant).

Sub-component 1.1: Training and sensitization

30. INGC will provide trainings on conservation agriculture, building upon its piloting experience, and will coordinate with identified partners to provide trainings on the new technological packages to be developed (e.g. agroforestry, pasture land,...). The objective is to disseminate knowledge, help farmers understand the value they can get from the proposed technological packages (and eventually include them in their PDPs where relevant²³), and ensure ownership. The targeted audience will include:

- **Farmers:** Large crops farmers (cereals under rotation) of all sizes who are usually covered by INGC as well as farmers covered by other development projects.
- **Officers and technicians** from relevant Ministries and public institutions.
- **Consultants and facilitators** who are involved in the awareness campaigns and training programs within partner development projects.

²³ To date, farmers covered by identified partner projects have not included conservation agriculture in their PDPs even where there is an explicit diagnosis of land degradation and climate change impact. This is mainly due to lack of knowledge.

31. Trainings will rely on demonstration units run by INGC for illustration and sensitization purposes. INGC will also select farms where conservation agriculture was adopted that will serve as dissemination poles from which neighboring farms can learn. This model of dissemination relying on a network of demonstration units and dissemination poles was tested in the piloting phase and proved to be successful²⁴. A specific communication strategy to reach out farmers will build on INGC's experience but could also benefit from AVFA's²⁵ facilities (TV, rural radio channels).

32. Trainings will also be provided to INGC staff to support their extension activities. This includes:

- **Training to new staff** who will be hired to support the extension activities.
- **Specific trainings to INGC staff to strengthen existing capacity** in specific areas such as machinery, weed science, pesticide management, animated cooperative structures, farm business management, physiology ...). This will be achieved through partnerships with national research institutes²⁶ as well as study tours and exchanges with regional and international research and development institutes or specialized institutions²⁷.

33. Trainings will also be provided to address the specific needs of carbon asset development (leading to carbon payment) :

- **To INGC staff** : The World Bank will assist INGC in building its capacity to understand the methodology and standard requirements. The World Bank will also support INGC in preparing the requested design documents (including baseline and GHG accounting protocol), in putting in place and implementing its MRV system in accordance with these requirements.
- **To farmers and partners (public institutions and development projects)** : INGC will in turn train relevant partners and farmers participating in the project and on the requirements in terms of information reporting for the purposes of proper implementation of the MRV system.

Sub-component 1.2: Intensification of INGC's support to farmers in scaling up conservation agriculture Practices

34. INGC will reinforce its support to farmers who decide adopt the proposed technological packages. This includes assistance for the use the adapted seeders, types of crops rotations to be applied, ways to deal with technical issues (weeds, fungal diseases, subsidence,...). The network of demonstration units and dissemination poles proved to be very efficient in providing such technical assistance during the piloting phase. "Leading" farmers (who run the farm serving as a dissemination pole) who cumulated experience from their early adoption of conservation agriculture provided useful advice to neighboring farmers who start adopting conservation agriculture. This network will be reinforced to enlarge the geographical coverage and reach out more farmers. The number of dissemination poles will be doubled to 20 farms under INGC's coordination. INGC will also increase the number of demonstration plots from 65 to about 120.

35. The partnerships with development projects will be the basis for providing technical assistance to farmers covered by these projects. INGC will rely on the institutional set-up of each project to support

²⁴ INGC currently supervises 9 dissemination poles covering all the agroecological conditions of the north-western governorates.

²⁵ Agence de la Vulgarisation et de la Formation Agricoles. INGC has already a partnership agreement with AVFA

²⁶ INGC has already cooperation agreement with IRESA (Institution de la recherche et de l'enseignement supérieur agricole), INRAT (Institut national de recherche agronomique de Tunis), INAT (Institut national agronomique de Tunis), ESAK (École supérieure d'Agronomie du Kef), ESAM (École supérieure d'agriculture), ESIER (École supérieure des ingénieurs en équipement rural M'djez el beb), CBBS (Centre biotechnologique Borj Cedria), ISBB (Institut supérieur de biotechnologie de Béja)

²⁷ INGC is a member of the Mediterranean Crops Network and was designated as the Tunisian implementing entity for a regional project across the Maghreb, financed by the Australian Government. Field trips are also planned as part of this project, in collaboration with ICARDA (International Center of Agricultural Research in Dry Area).

farmers, who are likely to be of smaller size. In the context of these partnerships, INGC will also develop and implement adapted packages to address specific needs (small farms, slopes, agro-forestry, pasture land,...). INGC will also build a specific partnership with OTD²⁸ and interested SMVDA²⁹ to reach large-size farms.

36. The extension strategy will be based on needs expressed by farmers. The expressions of needs will be channeled to INGC through CRDAs³⁰, dissemination poles and PDPs developed within the partner projects. In establishing new demonstration units, priority will be given to areas that are subject to erosion and with higher sequestration potential, or where there is a high potential of limiting dams siltation. The existence of a form of farmers association (GDA³¹ or SMSA³²), or farmers willingness to adopt a coordinated approach will also be a parameter.

Sub-Component 1.3: Partnerships with development projects

37. The proposed project addresses land degradation issues that are exacerbated by the effects of climate change. Other existing development projects overlap with the proposed projects, with regard to their geographical coverage and their overarching objective of natural resource preservation. Partnerships with these projects will allow for reaching out more farmers, developing further technological packages and accessing the available financial resources.

38. Amongst the projects that have been identified at this stage, two are World Bank financed projects:

Project	Description
PNO4 (2011-2016 \$57,2 million EU/WB)	<p>Objectives: Improve the socio-economic conditions of rural populations and promote better protection and management of natural resources in the project areas through the implementation of a participatory community based approach. Activities include the support to local communities for agricultural and pastoral production and income-generating activities, including through providing agricultural technical assistance.</p> <p>Geographical scope: 5 Governorates of Beja, Jendouba, El Kef, Siliana and Bizerte. 65,000 ha are under cereals and 14,000 ha dedicated to agro-forestry. The project aims at improving 12 000 ha of pasture land.</p> <p>Institutional set-up: ODESYPANO is the implementing agency. The project relies on a participatory approach through the preparation by local communities of Participatory Development Plans.</p>
PGRN2 (2010-2015, \$ 67 million EU/WB/GEF)	<p>Objective: Improve local communities' livelihoods through enhancing access to infrastructure and basic services, increasing and sustaining income and encouraging best practices for natural resource management.</p>

²⁸ Office des Terres Domaniales

²⁹ Société de Mise en Valeur des Domaines Agricoles

³⁰ Commissariats Régionaux au Développement Agricole

³¹ Groupement de Développement Agricole

³² Société Mutuelle de Service Agricole

	<p>Geographical scope: Governorates of Jendouba, Kasserine and Medenine. In Jendouba, 109,000 ha are agricultural, of which 50,000 ha of cereals and 6,000 ha of pasture land.</p> <p>Institutional set-up: Directorate of Finance, Investments, and Professional Organizations (DGFIOP) of Ministry of Agriculture is the implementing agency. The project relies on a participatory approach through the preparation by local communities of Participatory Development Plans.</p>
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39. Two other projects financed by other donors have been identified:

Project	Description
<p>FCGBV (2008-2013, EUR 54.2 million AFD/FFEM)</p>	<p>Objective: Promote sustainable management of natural resources through a participatory approach, integrated at the level of the watersheds, in order to sustain agricultural yields, enhance livelihoods and secure access to water at the national level by protecting watersheds from erosion, flooding and siltation.</p> <p>Geographical scope: Governorates of Bizerte, Zagouan, Le Kef, Siliana, Béja as well as Kairouan, Madhia, Kasserine, Sidi Bouzid et Gafsa.</p> <p>Institutional set-up: DGACTA is the implementing agency. The project relies on a participatory approach through the preparation by local communities of Participatory Development Plan.</p>
<p>PDAI Siliana (2012-2016 FIDA)</p>	<p>Objective: Contribute to the sustainable improvement of incomes and living conditions of rural communities, targeting the poorest areas and small and medium-sized farms.</p> <p>Geographical scope: Governorate of Siliana.</p> <p>Institutional set-up: The Directorate of Finance, Investments, and Professional Organizations (DGFIOP) of Ministry of Agriculture is the implementing agency. The project relies on a participatory approach through the preparation by local communities of Participatory Development Plan (PDP). The project has already experimented conservation agriculture practices.</p>

40. The partnership would be formalized through a cooperation agreement between INGC as the implementing agency for the proposed project and the coordinating agency of the partner project. The areas of partnership and distribution of roles would be as follows:

TSACP/ INGC	Partner project/ implementing agency
<ul style="list-style-type: none"> - Training and sensitization to farmers on conservation agriculture - Development of new technological packages (for agro-forestry, pasture land, pasture land, slopes,...) - Support farmers in implementing the technological packages selected by farmers as expressed in their PDPs - Training on the MRV requirements to farmers and partner project's implementing agency 	<ul style="list-style-type: none"> - Facilitation of trainings and sensitization campaigns (also through financing) - Facilitation of interaction with local communities - Financing of seeders acquisition - Data collection (for MRV) and transfer to INGC

Component 2: Support to farmers in accessing to or acquiring seeders (\$ 2,500,000).

41. Application of the proposed conservation agriculture package requires the use of adapted seeders. The cost of these adapted seeders is the major barrier for a large scale dissemination of CA. Small and medium size farmers cannot afford individual investment. Their preference is for renting seeders from other (large) farmers, where the number of available seeders is limited.

42. It is estimated that 80 to 100 seeders would be required to reach the objectives of phase 1 (24,000 ha). The unit cost of such seeders is currently around USD 40,000. Low cost seeders are also available and being used at large scale in countries such as Turkey, with a cost around USD 4,500. In the context of scaling up, the following options would be available for farmers who want to apply the proposed technological packages:

- Individual investment: An initial analysis made by INGC based on the piloting experience showed that farmers with farm sizes of more than 100 ha can acquire adapted seeders through their own capital potentially combined with loans. The gain in operating margin allows for investment amortization within 2 years. Below that threshold,, farmers have limited capital and access to bank loans, which makes individual investments difficult.
- Grouped investments: This would require that a group of farmers be willing and able to constitute a group to invest in a seeder and share it (it is estimated that one seeder could cover 300 ha per season, but no more than 8 farms, due to the seeding campaign being concentrated in 1 to 1.5 months). Such grouped investments would benefit from a 40% subsidy on agricultural investments. In the context of the Investment Code revision, the Ministry of Finance is considering the possibility of raising the level of subsidies to 60% for certain investments that would include investments in adapted seeders. However, apart from irrigated areas where experience of farmers association exist (mainly driven by access to and management of water resources), there is neither real willingness nor the capacity for making a grouped investment and managing it.
- Renting seeders from a third party: The cost of renting would be slightly higher than for a conventional seeder, but the incremental cost is compensated by the operating margin gains. This is the preferred option expressed by farmers. However, it is limited by the availability of seeders

43. Under the proposed project, INGC will assist farmers in finding the right solution that is adapted to each specific context. Technical assistance will be provided to farmers who are willing to make a grouped investment (in creating the associative structure, making the investment, operating the seeder and sharing it). INGC will also help farmers access to sources of finance when available (submission of bank loan applications, access to subsidies, preparation of PDPs,...). This major constraint and the way to address it will be further assessed during the preparation phase.

Component 3: Research and Development (\$ 600,000)

44. Within the third component, INGC will conduct Research and Development activities covering:
- Crops and cultural associations;
 - New packages to address specific agro-ecological and specific needs: the areas identified at this stage are specific packages for agro-forestry and pasture land;
 - Adaptation of seeders to specific conditions (e.g. slopes) and access to low cost seeders;
 - Weeds and pest control methods, to find alternatives to the use for glyphosates;

- Modelization of carbon dynamics in the soils, which is necessary to use the SALM methodology.

45. These activities will be conducted in partnership with national and international research institutes with whom INGC has already cooperation agreements in place. These include IRESA (Institution de la recherche et de l'enseignement supérieur agricole), INRAT (Institut national de recherche agronomique de Tunis), l'INAT (Institut national agronomique de Tunis), ESAK (École supérieure d'Agronomie du Kef), l'ESAM (École supérieure d'agriculture), ESIER (École supérieure des ingénieurs en équipement rural M'djez el beb), CBBS (Centre biotechnologique Borj Cedria), ISBB (Institut supérieur de biotechnologie de Béja) and ICARDA (International Center of Agricultural Research in Dry Area).

Component 4: Monitoring and Evaluation (\$ 500,000)

46. In addition to the monitoring activities that will be required to follow the progress of the project, strong monitoring and evaluation frameworks will be put in place to monitor the carbon assets and the other environmental and socio-economic benefits generated by the project.

47. Carbon asset MRV: dedicated staff will collect, archive and process the required data to conduct the VERs calculations, based on the Project Design Document and in accordance with the SALM methodology. For large crops farmers, INGC will collect data directly. The nature of data to be collected is not different from what INGC monitors as part of its standard activities (production by nature of crops, inputs used,...). For farmers that are covered by partner projects, data will be collected by the implementing agency of the partner project and will be transferred to INGC. Based on initial estimates³³, the volume of ERs to be generated would total 20,000 tCO₂eq over the period 2012-2017 and 105,545 tCO₂eq over the period 2018-2022.

48. In addition, even if it is not required by the methodology, INGC plans to continue and complete the monitoring of data collected directly in the soil (organic matter content, nitrogen, phosphorus, potassium), to feed-in ongoing research works with its partners. The monitoring unit will place permanent plots on which analyses of the sequestered carbon will be performed. 30 additional plots will be installed to complete the 20 plots already in place.

49. Monitoring of environmental and socio-economic benefits: The economic and environmental benefits of conservation agriculture practices constitute the main motivation for farmers to adopt them. The monitoring of these benefits is therefore essential. INGC already monitors the following data: (i) yields (ii) losses, (iii) amount of residue (iv) income (v) rate of water infiltration (vi) moisture at key stages, (vii) post-harvest parameters: quality of the grain size, weeds, (viii) impact of different diseases and weeds. INGC is also work in partnership with research institutes to further analyze the (reverse) correlations between carbon sequestration erosion. Based on these data, and additional data to be determined, a specific monitoring framework will be designed and implemented in partnership with the BioCF. The objective is to demonstrate, quantify and monitor the correlation between the activities undertaken and some environmental benefits and socio-economic factors such as the fight against erosion, management of water resources (soil moisture, watersheds), improving the living conditions of rural communities, the organization of the agricultural profession, ...

³³ Based on FAO EXACT tool, and using IPCC default values for the sequestration rate. Fuel savings are accounted for in these estimations.

IV. Safeguard Policies that might apply

Safeguard Policies Triggered by the Project	Yes	No	TBD
Environmental Assessment (OP/BP 4.01)	X		
Natural Habitats (OP/BP 4.04)		X	
Pest Management (OP 4.09)		X	
Physical Cultural Resources (OP/BP 4.11)		X	
Involuntary Resettlement (OP/BP 4.12)			X
Indigenous Peoples (OP/BP 4.10)		X	
Forests (OP/BP 4.36)		X	
Safety of Dams (OP/BP 4.37)		X	
Projects in Disputed Areas (OP/BP 7.60)*		X	
Projects on International Waterways (OP/BP 7.50)		X	

V. Tentative financing

Source:		(\$m.)
Borrower/Recipient		
IBRD		0.50
IDA		
Others (Other ongoing projects)		2.11
	Total	2.60

VI. Contact point

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* By supporting the proposed project, the Bank does not intend to prejudice the final determination of the parties' claims on the disputed areas

VII. For more information contact:

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