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**Strengthening On-Farm Conservation to Support
Farmer's Adaption to Climate Change and Improved
Livelihoods**

Executive Summary

As one of the poorest countriesxxxxx, agriculture is the backbone of the national and rural economy, contributing about x % of GDP and providing employment for more than half of active labour force in the country.

The constant abandonment of rural farming combined with the progressive introduction from abroad of commercial varieties, expansion of land use for social development, difficult situations created in the last twenty years by floods and drought, represent unprecedented threats to the local crop diversity of traditional farming systems and major causes of genetic erosion mainly in cereals beans and fruit trees.

Food security in country, especially in areas affected by climate changes, is an acute problem for the farmers. During last decades these changes have directlyaffected the productivity of the farms and the standard of living for farmer communities.

In this situation, on-farm conservation and management of local varieties of selected crop seeds and some fruit trees, which are resistant to drought, diseases, pests, as well as to whether difficult situations like flood, will create opportunities for local farmers to assurance their production, food security and increased income for their families.

Problem Description

Agriculture remains one of the most important sectors of economy and about more than fifty percent of the population is living in rural areas and deal mainly with agriculture. Small-scale farmers constitute about sixty percent of farming community and are considered survival farms which produce only for their self.

As a result of low-income levels, the poverty persists in country/project area. About more than fifteen to twenty percent of rural population live below national poverty line. The agricultural land reform, implemented in the year xxxx, produced a division of the rural sector in to thousands of small family farms, which still dominates the agricultural scene.

Agricultural productivity continues to be very low due among other factors, to climate change and biodiversity loss etc. But on the other hand, the small - scale farming systems have contributed to the conservation and development of a large diversity of highly adapted local varieties selected and maintained by farmers.

However, in recent times, the constant abandonment of rural farming combined with the progressive introduction from abroad of commercial varieties, expansion of land use for social development, difficult situations created in the last twenty years by floods and drought, especially in the rural areas of the country, represent unprecedented threats to the local crop diversity of traditional farming systems and major causes of genetic erosion.

According to estimates made by local experts, the major damages were caused in cereals (wheat, maize), in beans, fruit trees and fodder, threatening seriously food security and reducing considerably the income and standard of living of farm families.

Climate changes, especially drought and flooding have seriously damaged production and income of farmers, threatening seriously food security in targeted area.

According to study climate change in country during coming decades will have a major negative effect on agriculture, due to increased temperature and changes in rainfall regime.

Genetic erosion and lack of plant varieties resilient to drought, pests and diseases, has resulted in reduction of productivity and have direct impact on reducing the standard of living for farm families.

In this background, on-farm conservation of local varieties is a good option for farmers to face these challenges. Conservation and management of local varieties of maize, wheat, bean, and some fruit trees, which are resistant to drought, diseases, pests, as well as to whether difficult situations, will create opportunities for farmers to guarantee their production, food security and increased income.

Project Objectives

The overall objective of the Project:

To contribute to food security and improved livelihood of farming communities through on farm conservation of locally adapted varieties, helping farmers to face effects of climate change on crop production.

Specific objectives

- Strengthening of on farm conservation and management for food and agriculture through appropriate actions at the farm and community levels.
- Enhance food security by assisting farmers to adapt to climate change through the sustainable management and conservation of five target crops: maize, wheat, bean, alfalfa and apple.
- Development of seed production and dissemination systems of locally adapted varieties in the country.
- Sharing of genetic material, information and technologies between local communities and public and private institutions in the country.
- Development of strategies and national programs for the diversification of agriculture and food security systems through the use of locally adapted crops.
- Strengthening of national and local institution capacities for a better conserve, manage, improve and disseminate plant genetic resources for food and agriculture, to respond to the effects of climate change.
- Improving livelihoods of the poor farmers and farming communities

Targeted outputs, activities and related methodology of implementation

Output 1: Enhance of food security of poor farmers by development on farm conservation systems and sustainable use of plant genetic resource for food and agriculture

Activities

Planting of local crop varieties of wheat, maize, and fruits.

Total xx farms will be selected for demonstrations of on farm conservation of locally adapted crops of wheat, maize, etc. One workshop with selected farmers and specialists will be organized to explain them the techniques of planting.

The activity will be conducted by experts in collaboration with farmers and local specialists. The demonstration field will have an average size about xxxxx. This activity will be done during the second year of the Project.

Characterization and evaluation of cultivated local crops

The source of the planting material for on farm conservation will be the populations collected during collecting missions, the genetic material stored in national Genebank and active collections of agricultural technology transfer centres. Characterization and evaluation. These activities will be leaded by project experts and local agricultural specialists (farmers involved) and will be done during the second year of the Project.

Identify drought-resistant, diseases and pest resistant local varieties of targeted species

During the on-farm cultivation process, project experts, about xxxx farmers and xxxx local specialists will be involved in the process of evaluation and identification of crop populations which demonstrated drought resistance, diseases and pest resistance. This will be realised through workshops and field demonstrations. The evaluation will be

done on field and will be associated with many laboratory analysis. At the end of the evaluation process, high productivity populations of selected crops will be developed. In addition, high nutritional local apple and other local fruits cultivars, will be selected. The process of on farm identification will be carried out in the second year of project implementation.

Promote on farm conservation of local crops at local community level

During the onfarm demonstration many activities will be done to promote this activity to farmers, agricultural specialists, researchers and agriculture students. This will be done through field days which will be organized on selected farms and villages. About xx field days will be organized in which xxxx farmers, xxxx local specialists, xx agriculture students will participate. In order to promote and extend the information, the local media will be used, as well as many divulgative material for on farm conservation will be distributed (leaflets, booklets, etc.). This activity will be carried out in the second year of project implantation.

Output 2: Locally adapted varieties of wheat, maize and apple successfully conserved and used

Activities

Inventory and identification of local crop varieties of wheat, maize, and apple, in area where the project will be implemented the targeted areas are: *****. A full inventory of targeted crops will be done in the areas which are vulnerable to climate change. This inventory will be done by experts who are specialised in collecting plant genetic resources. Farmers of the targeted areas will be involved. The inventory and identification will be done during the first year of the project implementation.

Select the sites and plan the survey and collection missions. The collecting missions will be carried out in xxxx villages which are located in xxx districts. This activity will be carried out by project experts during the first year of Project Implementation

Surveying and characterization of targeted crops in targeted area of the project.

For surveying and characterization, about xx collecting missions will be undertaken. At least xxxx Farmers and xxxx local specialists on the targeted villages, will take part in this process of on farm characterization and evaluation of targeted crops.

This activity will be carried out by project experts during the first year of Project Implementation.

Collection of germplasm in xx districts/project area of the country. Collection will be done in xx villages and about xx accessions (samples) of targeted crops will be identified and collected. The target of collection will be those populations which are resistant to drought, diseases and pests. The collection methodology will be based in technical guidelines by agencies. This activity will be done through xx collecting missions. Before starting the collection one workshop will be organized to explain the procedures and guidelines of the collection. Participants of the workshop will farmers and specialists who will involve in the collecting activities. The collecting of the germplasm for locally adapted crops will be leaded by project experts and project consultants and will be carried out during the first year of the Project Implementation.

Output 3: Establish and strengthen local seed system through on farm conservation of plant genetic resources for food and agriculture

Activities

Multiplication of selected locally adapted accessions of maize, wheat, bean, alfalfa and apple.

The genetic material identified, characterized, and evaluated for drought, diseases and pest resistance will be planted for multiplication, at about 200 farms distributed in 12 districts of target project area. The land cultivated for multiplication will vary from 300-1000 m², depending from the crop. The multiplication of locally adopted crops will be done under supervision of project consultants and experts and about 1000 farmers, 150 local specialists, 10 lectures and 100 students from Faculty of Agriculture, and 20 experts from the Agricultural Technology Transfer Centres will be involved. Before starting with planting, one workshop and two field days with people involved, will be

organized, in order to explain the technologies of crop cultivation and seed production. These activities will be carried out during third year of project implementation.

Distribution of locally adapted planting material to the farmers' community

The planting material selected for its drought, flood, diseases and pest, resistance, after multiplication in 200 farms as mentioned above, will be distributed to resource - poor farmers and farming communities who lives in these areas.

The quantity of multiplied planting material will be: 10,000 kg of wheat, 3000 kg of maize, 2000 kg of bean, 250 kg of alfalfa, and 2000 apple seedlings. The new identified and multiplied genetic material, will be distributed to at least 3000 farmers. This activity will be leaded by experts of the project, local agricultural experts, private companies and will be carried out during third year of project implementation.

Output 4: Increased capacities, of resource-poor farmers in targeted areas, national Gene banke and Department of Crop Production, to face climate changesthrough conservation and management of PGRFA.

Activities

Awareness raising on-farm conservation and effect of climate change to productivity of crops.

In order to increase the awareness to on-farm conservation and effect of climate change, some trainings (two in total) with farmers and specialists will be organized.

Technology transfer techniques related to on farm conservation and use of PGR for food security.

Two workshops on technology transfer of techniques related to the on-farm conservation and use of PGRFA, will be organized. These workshops aim at providing opportunities for exchange of experiences on technology transfer among all stakeholders. This activity will be carried out during second year of project implementation (June-December 2016).

Strengthening technical knowledges on PGRFA collection and on farmconservation through the use.

Under the responsibility of project expects a 4-days course/training will be organized in two main districts xxxxxx and xxxxx under the responsibility of project experts. These courses will have two components a theoretical one with presentations and a practical one organized direct on the field. The course will be based on parameters how to identify, collect and conserve through the use of targeted local crop varieties.

This activity will be carried out during the first year of Project Implementation.

Output 5:Building capacities and skills of national institutions, farmer community and private sector in participatory breeding methodologies, andprovide them with a pool of genetic material for further improvement.

Activities

Conventional and modern breeding strategies and methods including issues related to the collection and use of locally adapted varieties.

Two workshops on methods of plant breeding will be organized. presentations from project experts and consultants (plant breeders) will be held. The presentations will be focused on breeding strategies and methods related to collection and use of locally adapted varieties. This activity will be carried out during the third year of project implementation

Treatment and handling of the locally adapted genetic material to be used for further improvement and breeding.

One workshop leaded by project consultants and experts will be organized with interested people (farmers, researchers and agricultural experts) on methods of handling the genetic material for further improvement and breeding. Some study tours and visits of farmer communities and agricultural experts to gen banks and other national or international plant genetic resources centres will be organized. These activities will be carried out during third year of project implementation.

Methodology of project implementation

The project will be implemented with the help of agriculture university and expert of the agriculture fields. Organization will tie up with agriculture university and other research organization for the technical know-how. The project stakeholders will be some selected farmers interested on plant breeding, researchers and students of Agricultural University, experts as well as participants from private sector.

Four key factors define the proposed approach of this project:

- It targets the global, national and local levels through interlinked activities.
- It is based on participatory approach thought.
- It builds directly on previous/ongoing interventions and established partnerships.
- It has a strong capacity building component.

Referring to the main activities to be carried out, the methodology of project implementation for each of them will be as following:

Collecting missions for targeted crops in the unexplored project area

The collection methodology will be based in technical guidelines published by FAO and other agencies for collection of PGRFA. Collection will be done in all villages of the project area and many accessions (samples) of targeted crops will be identified and collected. The target of collection will be those populations which are resistant to drought, diseases and pests.

The collection will be done by experts of the project together with some selected local farmers, Genebank staff and agricultural experts of the region. The collecting of the germplasm for locally adapted crops will be carried out during the first year of the Project Implementation.

On-Farm of collected material and field demonstration with all stakeholders

The selected genetic material of locally adapted crops of wheat, maize and apple etc will be planted on farm to demonstrate the technology of cultivation and the advantages of these locally adopted populations/varieties. During the on-farm demonstration many activities will be done to promote this activity to farmers, agricultural specialists, researchers, students and private companies.

Multiplication of selected locally adapted accessions of maize, wheat, bean, alfalfa and apple, in different ecological zones and distribution of planting material to the farmers' community.

The genetic material identified, characterized, and evaluated for drought, diseases and pest resistance will be planted for multiplication, at some selected farms, distributed in the project area. The multiplication of the material will be done according to the manuals and technologies suggested by experts, who will be part of this activity.

The multiplication of locally adapted crops will be done under supervision of project consultants with active participation of farmers, local specialists, Agriculture students, and experts.

The new planting material selected for its drought, flood, diseases and pest, resistance, after multiplication in targeted farms as mentioned above, will be distributed to resource - poor farmers and farming communities who live in the project area. This activity will be carried out during third year of project implementation.

Strengthening technical knowledge on genetic material and technology transfer techniques related to on farm conservation and use of PGR for food security.

Technology transfer of techniques related to the on farm conservation and use of PGRFA, will be organized through trainings and workshops. Many presentations will be held by consultants and experts of the project. All stakeholders will be actively involved in the workshops and trainings. Conventional and modern breeding methods, including issues related to the collection and use of locally adapted varieties, and handling of the

genetic material to be used for further improvement and breeding. These methods will be explained through workshops and field activities on experimental fields. During the workshops some presentations from plant breeders will be held. The presentations will be focused on breeding strategies and methods related to collection and use of locally adapted varieties.

Beneficiaries

Direct beneficiaries will be:

Farmer communities, specifically those living in areas which are threatened by climate change and with underdeveloped agriculture. About xxxxfarmers is expected to benefit; Specialists of agriculture who are engaged in crop production in targeted areas.

Indirect beneficiaries will be:

About xxxx households with an average of xx person/ household, totalizing around xxxx farmers; About xxxx small and medium seed traders, which are interested to buy qualitative locally adapted crop seeds, and to sell them to the other groups of interest. The geographic extension of the project will be about xxxxxx, in xxxx main districts and xxx villages.

Project Impact

The project implementation will have a great impact in many aspects such as food security, adaption to climate change, scientific impact and capacity development. The changes that will occur by the end of the project will be as following:

Food security and poverty alleviation

The selection of new locally adapted populations of crops and fruits will contribute considerably to increase the food security capacities as well as the level of production for targeted crops. Introduction of about 1x new crop populations/varieties with high

nutritional value will have direct impact to increased income for farmers and improved livelihood in targeted area.

Adaptation to climate change and environmental sustainability

The selected crops and practices of on farm cultivation will have a great positive impact, to give farmers possibility to face climate changes in agriculture. At the end of the project, it is expected that adaption to climate change and environmental sustainability will change as following:

The availability of resilience and adaption through better management of high-resistant genetic material of crops will be increased at least xx %. Farmers will be the direct beneficiaries as they will have at their disposal a high resistant genetic material.

The protection and sustainable management of natural resources for targeted farm families, will create much more security for farmers to use local crops which are resistant to climate change. Sustainable management of these resources will be improved at least xx %.

Scientific Impact

In the implementation of the project will participate many students from agricultural university and experts including researchers. Information exchange and technology transfer knowledges will be increased compared to the existing situation. This will be realised through trainings, workshops and direct communication during field days, demonstrations and other activities.

Novel and relevant scientific findings related to PGRFA will be available and disseminated widely. This indicator will be improved. About xx new population/varieties of the targeted crops will be identified and used.

The range of available technological options for adaption to climate change will be considerably improved. Farmers and agricultural experts will be the direct beneficiaries

of these new technological options, which will be spared through plot demonstrations direct on field, and through on farm conservation.

Capacity development and empowerment

Number of people empowered and equipped with skills, knowledges and capacity related to PGRFA will be increased. Direct beneficiaries of increased skills and knowledges related to PGRFA will be farmers, agricultural experts, researchers, students and other stakeholders. They will take part actively in field activities (collecting, evaluation, selection, on farm conservation, field demonstrations) as well as in trainings, workshops, lectures, publications, media etc.

Capacities of poor farmers to develop new varieties/ populations resistant to climate change effects, and relevant technologies for climate change adaption and food security will be increased. Farmers will be directly involved in the characterization and evaluation of the new genetic material which will be planted on farm. The farmers will be actively involved in the process of selection of new forms, populations and varieties of crops, which will be used to produce high-quality seeds. They will take part in field days which will be organized to demonstrate the results and outputs of project activities.

Project Sustainability

The project will ensure sustainability of its outputs, by strengthening the capacities of national partners and stakeholders. Development of resistant new varieties and selected seeds to be used by farmers, will create a good base for farmers to use effectively these resources after the project termination.

This project by providing new locally adapted crops, new technologies and practices for on farm conservation, trainings and workshops, publishing local information etc, is expected to stimulate the government and other institutions to carry out the elements of the development programme started in the project.

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