

**Executive Summary**

Current dryland production systems of the Sahel are unsustainable, causing land degradation and poverty. The ICRISAT-Namny research station in Niger has developed three promising tree-crop-livestock land management systems for the Sahel: the Sahelian Eco-Farm (SEF), the Dryland Fruit Tree (DFT) system, and the Bioreclamation of Degraded Lands (BDL) system. These tree-crop-livestock systems deliver markedly higher farm incomes while increasing food production, enhancing food security, increasing labor opportunities, improving soil fertility, and generating important additional products such as fuelwood and fodder.

This document proposes a three-year first phase of a project to establish the methods and infrastructure for a participatory and speedy mass dissemination of these three systems, through the support of USAID’s food-for-work program or other appropriate mechanisms. The mass dissemination program will plant hundreds of thousands of hectares with these new tree-crop-livestock systems over a 15-year period.

Food-for-work has had major impact in reforestation efforts, and this concept note proposes an innovative credit dimension that rewards farmers for long-term care of tree-crop-livestock systems. The project will be executed by ICRISAT-Namny with technical support from IUC Davis, and with administration of the funding and credit mechanisms by partners to be determined in the course of this study. The outputs of the work proposed herein squarely address the NEPAD Pillars as articulated in the Comprehensive Africa Agriculture Development Programme (CAADP), which emphasizes sustainable land management, trade-related capacity for market access, increasing food supplies, and agricultural research and technology dissemination. It also fits directly within the UN Millennium Development Goals to eradicate extreme poverty and hunger, empower women, ensure environmental sustainability and develop global partnerships for development.

The first phase described here will require three years and a budget of US$3.5 million.

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**Demographics**

According to the United Nations, the population of Sahelian countries and that of the entire Sahel region of North Africa is projected to increase at an annual rate of 3% between 1995 and 2015, then at an annual rate of 2.2% between 2015 and 2025, after which it will stabilize at a rate of 1.8% between 2025 and 2050. By 2050, 80% of the Sahel’s population will live in the rural areas of the Sahel. The Sahel region includes 15 countries: Algeria, Chad, Egypt, Ethiopia, Eritrea, Ghana, Kenya, Libya, Mali, Mauritania, Niger, Nigeria, Senegal, Somalia, and Sudan.

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**Conclusion**

For Africa to escape its ongoing tragedy of poverty and land degradation, on which the survival of millions of people (including 80% of the population; some 200 million people) derives its income from agriculture and related activities, a new system is needed that rebuilds the soil while increasing incomes. Our research has found that these systems are highly potential for the drylands—defined as areas having less than 500 mm of annual rainfall. Our approach is holistic, combining the sustainability principles of integrated tree-crop-livestock management with the economic principles of market-driven development.

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We believe this project can lead to major change to reduce poverty and hunger in the Sahel, one of the poorest and least-suffering areas of Africa.
3. Bioreclamation of Degraded Lands System
Gum arabic is an especially drought-tolerant, hardy tree that can grow on extremely poor soils—rehabilitating them in the process, while yielding a commercial product. The following work, this phase I, will therefore focus on exploiting the potential of gum arabic trees to provide quick income until Acacia senegal and other trees are old enough to yield economic products.

Phase I objectives
Phase I will be carried out in two countries—Burkina Faso and Niger.

1. Develop partnerships, mechanisms and modalities for mass dissemination of these tree-crop-livestock systems to pave the way for mass dissemination of these systems
2. Develop the physical infrastructure (nurseries, seed multiplication systems, training materials etc.) needed for the up-scaling of these systems
3. Train and prepare a core cadre of field operators in participatory methods and management of dissemination, seed multiplication and farmer training.
4. Establish demonstration plots of the three tree-crop-livestock systems in diverse locations within the Sahel
5. Conduct research to optimize these systems and to solve problems encountered in farmers’ fields.
6. Develop market outlets for the products of the new systems
7. Develop a master plan for the large-scale dissemination of these systems in preparation for the follow-up project

Partnerships will also be built with national research programs of the two countries, and with NGOs and farmers’ groups (also elaborated later).

2. Tree and seed multiplication facilities
This phase I project (subsequent to this phase I) will require the annual production of millions of tree seedlings. The fruit trees and most likely also the gum arabic trees will need to be grafted. To set the stage for this, mother nurseries will be established in different locations to supply seeds, cuttings and scions to train personnel.

Phase I will also introduce new high-yielding, high-quality varieties of annual field crops. These will be propagated together with traditional leafy vegetables and medicinal plants as well as native forage species. Seeds of these leafy vegetables, medicinal plants, and native forage species will be produced in a central seed multiplication facility for all of the two countries.

Initially the nurseries and seed multiplication facilities will be owned and operated by the phase I project on a non-profit, break-even basis. As the implementation phase progresses they will be transferred to private sector entities after carefully assessing their capabilities. They will be mostly run by women. They will be trained in nursery methods with emphasis on grafting.

3. Training
The new production systems will require training and technical backup for farmers. The first step is to train the trainers. Phase I project technicians will be trained on a range of subjects such as agronomy, silviculture, fruitculture, soil and water management, economics, and participatory evaluation. These phase I technical staff will subsequently train farmers. Training materials (mostly illustrated) will be created for all agricultural (including nursery) activities. The use of rural radio for extension and marketing will also be explored.

4. Establishment of demonstration plots
Demonstration plots of the three systems will be established at the beginning of the phase I project in selected study areas. These plots will be planted in fields of innovative and leading farmers who serve as role models for the general farming population. The demonstration plots will help farmers visualize and gain understanding and comfort with these novel systems, and learn how they are established and managed.

5. Research
All these tree-crop-livestock systems were devised and refined through research. Research will continue to be critical to further adapt and improve these systems, including learning from farmer feedback and experimentation. Research will also address any socio-economic problems that arise.

6. Marketing
The sale of large volumes of high-value food products produced through tree-crop-livestock systems will require special marketing arrangements. Some of the products such as fruit will require processing for conservation or for transformation.

7. Development of a Master Plan for dissemination
All the activities carried out through activities 1-6 will provide the information needed for the production of a Master Plan for large-scale dissemination of these systems. The Master Plan will be developed in coordination with regional agencies. Modalities for the dissemination program will be elaborated, targets will be identified, management mechanisms will be defined and an infrastructure will be put in place for the up-scaling of the project.

A unique ‘food-for-work’ approach
We propose a new approach to ‘food-for-work’, as one financing option for this phase I project. Traditionally, food has been paid through this program on a daily basis for work performed. This approach was successful in a wide range of public works initiatives such as well-digging, construction of public buildings, the construction of terraces on farmland, and the planting of forestry trees. Additionally, some of the grains/commodities were sold in internal markets by the implementing organizations to fund their operations.

The use of food as a means of direct payment for land reclamation and agricultural tree planting does not always succeed, though. This is because, especially those involving orchard trees and other cultivated species, require continued skill maintenance for years following planting. Since the workers do not acquire a long-term stake in the outputs of these programs if they are only paid for each day’s work, the trees are often not maintained after the project ends. Younger trees are soon destroyed by animals or harvested for fuel wood by the poor.

Successful ‘food-for-work’ projects have provided longer-term incentives. For example, a REST project in Tigray, Ethiopia in which ICRAF/FAO/GAC/PALACI participated, ensured that farmers had rights to the timber from trees they cared for, and the grass and grazing areas between trees. That project has rehabilitated more than 50,000 hectares of degraded hillsides in 10 years, planting more than 1 million trees per year.

In the present project, we propose to use the grain as a source of credit for loans to farmers. Farmers will start reimbursing the loans four to five years after planting the tree-crop systems, i.e., at the time when those systems begin yielding profits. Since the future profits provide the means to pay back the loans, they will have an incentive to continue to care for the trees within tree-crop-livestock systems that also provide a range of other food, fodder and income needs. The authorities may even choose to forgive a significant portion of the loan to farmers who kept and tended their systems. This could be an additional, powerful incentive.

Principles and modalities of land-user participation
The phase I project will be based on new modalities of participatory development, customized for each of the tree-crop-livestock systems.

• Village and inter-village committees will be established to monitor and authorize the credit/savings arrangements involved.