Chapter 2

Education and Training on Junior Farmer Field and Life Schools (JFFLS)

Mozambique: Education on Agriculture and Life Skills Knowledge in Junior Farmer Field and Life Schools (JFFLS) in Africa by Daniela Bruni, Carol Djeddah and Paolo Israel

1. Background

Mozambique is a coastal country of south-eastern Africa, a former Portuguese colony that gained independence through war in 1975. The first 30 years of the history of independent Mozambique were turbulent and dramatic: after a 15-year long civil war (1977-1992), peace accords were signed, and the first democratic elections held (1994). Since then, Mozambique has been one of the foremost African success stories of democratization and development. The three corridors that link the main Mozambican harbours with the surrounding Anglophone countries are one of its most important colonial legacies. Since the 18th century, Mozambican people migrated seasonally to the neighbouring countries looking for work, mainly in the mines of the Copperbelt and in South Africa. In the last decade, the zone of central Mozambique has been heavily affected by the HIV/AIDS epidemics. The rural populations of those areas live scattered around the hilly lands, organized in small patriarchal family settlements living of subsistence agriculture and occasional hunting. Those activities are organized following a gendered division of work: men do the most labour-intensive tasks in the fields, whereas women fetch water, weed the fields and harvest. Because of the scattered pattern of settlement, many of the households are far from schools, health posts, main markets and other facilities. This region of central Mozambique, although united by a common history and a common cluster of languages (all related to the Shona group) are very diverse in ecology. The zone is divided in two provinces, Manica, away from the coast and Sofala, on the coast.

Even in the more remote areas, the AIDS epidemics has taken many lives, disrupting families and orphaning many children both in urban and rural areas. The orphan situation being very severe, this region of Mozambique was chosen as the site where the Government of Mozambique with the support of the Food and Agriculture Organization of the United Nations (FAO) and the World Food Programme (WFP) would implement the pilot project of Junior Farmer Field and Life School (JFFLS), an innovative educational initiative to mitigate the impact of AIDS through the agricultural sector.

2. Learning objectives

The learning aims of the JFFLS are to empower children and youth, enhance their agricultural and life skills and enable them to explore risks, solve problems and develop greater gender equity. At the end of one season, children and youth gain significant knowledge in agriculture, having been exposed to both traditional and modern techniques, are more confident in analysing and solving life problems, are better informed on health, HIV/AIDS, child rights and gender issues, and in general have a stronger self-esteem and capacity to speak out and defend their positions and ideas.

3. Training objectives and calendar

The project focuses on training orphans and vulnerable children and youth on agricultural and life skills in order for them to be better equipped to live in a HIV/AIDS affected area, minimizing their vulnerability to destitution and providing the correct coping strategies for people at high risk of HIV infection. A preliminary study on the situation of orphan and vulnerable children was carried out, showing the need for intervention in the agricultural sector, as a mitigation strategy against HIV/AIDS. During a whole agricultural season, the children/youth follow the life cycle of crops, and make links and inferences to their own life cycles. They meet once, twice or three times a week in the field during a whole afternoon and, guided by facilitators and volunteers, learn by doing and exploring.

4. Training methodology

JFFLS include two participative learning methodologies: Farmer Field Schools (FFS) and Farmer Life Schools (FLS).

Farmer Field Schools (FFS) are field-based training initiatives (existing world-wide) where a group of farmers meet regularly to study a particular topic related to agriculture and income-generating activities. The training follows the natural cycle of the topic chosen, is participatory and based on learning-by-doing and experimentation. Participants in the training will have to learn how to observe a certain crop, how to analyse the field situation and how to take proper decisions for their crop management. This process is called the Agroecosystem Analysis (AESA).

Farmers Life Schools are based on the same learning approaches as FFS, however applied to farmers' lives and livelihoods. They were conceived in Cambodia as a space where farmers might discuss the problems affecting their livelihoods, in particular the HIV/AIDS pandemic.

In JFFLS, the FFS and FLS approaches have been adapted to the needs and situations of vulnerable children and youths. The JFFLS approach is based on experimental learning, whereby children learn good agricultural and life practices through observing, drawing conclusions and making informed decisions. Knowledge

and skills not only empower children economically, but also help them become responsible citizens with positive values regarding gender and human rights.

Moreover, in JFFLS art, theatre, song and traditional dancing play a central role in encouraging self-expression and integration with peers. These cultural activities are also used when exploring sensitive issues such as psycho-social problems, children's rights, gender roles and HIV/AIDS because they help to build trust, explore risks, solve problems and develop greater gender equity.

5. Trainers and trainees

An interdisciplinary team of facilitators accompanied children in the field during the year-long learning cycle. Each team included one school teacher (who then took the JFFLS methodology into the formal school setting), one agriculturist (extensionist, FFS facilitator or JFFLS graduate) and one social animator specialized in drama, dance and creative activities. Each team of facilitators was responsible for approximately 30 children, 15 girls and 15 boys. The children selection was a very important and delicate phase of the whole JFFLS project. Criteria of vulnerability and community involvement had been defined for the participants' selection.

In particular, JFFLS facilitators had to learn how to facilitate children's learning processes by encouraging them to ask questions and by stimulating participation and discussion. Facilitating life skills is the most difficult component of the JFFLS project and needs discussion and attention.

By taking into consideration the importance of facilitators' role a Training of Facilitators (TOF) specifically conceived for JFFLS was organized before the beginning of the school and was developed according to a previous assessment of the facilitators' skills gaps. The main task of a facilitator is organizing the school, facilitating learning activities and dealing with basic administrative issues. The training provided to facilitators included JFFLS methodology and curriculum, the links between vulnerability, HIV/AIDS, agriculture and food security, facilitators' roles, responsibilities, code of conduct and ethics, participatory and gender-sensitive facilitation skills, life skills, technical agricultural issues and business skills development. Since the year 2004, 350 facilitators have been trained and the number of trainees has been estimated around 2 624.

6. Didactic materials

Several didactic materials have been prepared for JFFLS.

A Getting Started Manual has been developed by FAO and WFP for the staff of government ministries, NGOs and faith-based organizations (FBO) working with rural communities in developing countries. The first part provides background information on the JFFLS approach, its origins and guiding principles. The second part describes how to initiate and manage a JFFLS.

In the year 2005, the video "Harvesting for Life" was filmed in Mozambique showing a JFFLS in action with interviews to children, facilitators and programme

officers. Finally, a JFFLS Facilitator's Manual was released by FAO/WFP, focused on child-centred training exercises for the field staff running a JFFLS. The manual deals with the different topics covered by a JFFLS: planning for the future, growing up healthy, diversity, protection, water, harvesting care and support, livelihoods. It shows different facilitation techniques like buzz groups, energizers, community dramas, story-telling, community maps, etc.

7. Curriculum

In the initial experimental phase, the JFFLS curriculum was centred on agricultural practices and life skills that reflected children's interests and needs. As the schools gained experience, an integrated curriculum was developed combining problems encountered in the field and problems faced in life. In other words, the JFFLS curriculum is organized according to monthly themes that link good agricultural practices (GAP) and good life practices (GLP).

The curriculum is built on four main pillars: a) the school site and field activities where children learn by doing; b) special agricultural topics; c) life skills; and d) cultural activities (theatre, dance, singing, etc). The learning field activities are all those that involve setting up and maintaining the JFFLS site. Participating children choose a crop and, with adults' help and support, the learning activities on the school site follow the agricultural cycle, from laying out the site, preparing the land, seeding or planting, weeding and thinning to constructing suitable storage units, storing harvests, making compost, managing livestock, establishing a nursery and irrigating vegetables.

By structurally integrating agriculture and life skills according to monthly topics, the curriculum helps both JFFLS facilitators and children approach life and agriculture from a holistic point of view.

The monthly topics include:

- Life cycles: participants start to know each other and the learning field and explore the similarities between plant and human life cycles.
- Planning for the future: participants undertake initial agricultural planning and explore future aspirations.
- Growing up healthy: participants explore possible ways to grow a healthy crop and how good hygiene and nutrition can help them grow up healthy.
- Diversity: participants explore how diversity in food production helps support food security and how gender equity and respect for diversity help strengthen the community.
- Protection: participants learn how to protect the crop from pests and disease and learn how to protect themselves from threats such as HIV, violence and exploitation.
- Water for life: a short module that coincides with the rainy season, exploring crop water management and revisiting the issue of hygiene.

- Care and loss: a module that coincides with the harvest and participants learn how to maximize output against agricultural losses and how to conserve and store food for the future. At the same time, they explore how to care for their own psychosocial health and plan for their future.
- Business skills and entrepreneurship: focus of the second year/agricultural cycle of JFFLS. Participants explore how to develop everything they learned about agriculture and life and transform it into livelihood opportunities.

8. Learning assessment

The assessment of children's learning is important to understand their level of knowledge and eventually correct some shortcomings in the learning process. The Facilitator's Manual provides some examples of creative ways to assess children, without necessarily grading them, in order to build their self-confidence and motivate them to continue learning.

Each JFFLS activity has a learning objective indicating what skills children should have acquired at the end of the activity itself. Practical exercises give children the possibility of practising and remembering what they have learned and give facilitators the opportunity to observe their progress in learning. With the games, facilitators can evaluate children's learning and identify some gaps. Many JFFLS activities have an assessment component built in where participants demonstrate their level of learning through drawings, presentations, role playing.

9. Training infrastructure

At the beginning, JFFLS were implemented through faith-based organizations in the province of Manica, near the city of Chimoio. With the scaling up of the project, new sites were identified in other areas and were connected to formal education schools, mostly in remote rural areas affected by AIDS.

The site selection criteria were developed through an open and participatory process together with communities and local institutions. The learning field should be safe, near major roads (for an easy access of the community and for demonstration), near water sources or irrigation plants. In Mozambique, village leaders interviewed clearly indicated that JFFLS activities were welcomed by participating communities because the approach "makes learning easier because it is practical", as stated the village chief, Inchope.

Each JFFLS site is a living classroom, well organized, very visible, near formal schools, it has no cost for the community and is linked to already existing initiatives. The field should demonstrate technical, educational, environmental feasibility and provide measurable concrete results thence increasing community's understanding of advantages and impacts on long-term food security and protection of children.

An area measuring between 800 and 1 000 m^2 would be the best size for a JFFLS, consistent with its learning criteria. The field should have:

- staples to meet basic food needs and a nutritional garden for healthy growth;

- long-term crops such as cassava, pineapple and sweet potatoes to introduce planning for the future and investing;
- a small traditional space for indigenous and medicinal plants to include health care trees so that agroforestry can contribute to long-term livelihoods.

Each experimental plot allows children to experiment and analyse different agricultural techniques following the seasonal cycle and the agro-ecological zones. At a later stage, livestock is also introduced in the living classroom.

10. Institutional arrangements

In Mozambique, after a few months of piloting, the JFFLS have been enthusiastically adopted by the Ministry of Agriculture as a national policy and it was given a budget line. At the same time, JFFLS were included into a nation-wide project of FFS for adults (PAN II).

In the overall process of implementation in southern Africa, national entities and local authorities from the Ministries of Agriculture, the Ministries of Education and Social Welfare and local NGOs participated actively in the whole project and particularly in the training activities.

The selection of an appropriate host institution is of crucial importance and has immediate and long-term implications for implementation and potential up-scaling strategy of the JFFLS approach/model. In Mozambique, Kenya, Zambia and Namibia, JFFLS sites were implemented in cooperation with national institutions, faith-based organizations, local NGOs or linked to formal primary schools.

11. Impact

Almost 7 000 children either orphaned by HIV/AIDS or living in vulnerable conditions benefited to date from the project.

The impact of JFFLS has been assessed in many missions and is proven by the enthusiasm demonstrated by stakeholders and communities adopting the project. Children empowered through JFFLS show more resilience, self-esteem, a better vision of the future and improved livelihoods. The children often shared with their families the agricultural and life practices learned and experimented at the JFFLS fields, contributing to the sustainability of livelihoods in the communities.

In order to meet the needs of all JFFLS participants and their communities, a participatory monitoring and evaluation (PM&E) process has been developed for all stakeholders involved in the monitoring and evaluation activities of the project. A selection of these activities, adapted for the use with children, is included in the Getting Started and the JFFLS Facilitator's Manual. A thorough assessment of JFFLS impact, both quantitative and qualitative, is expected to emerge through those M&E tools, and through snapshot studies and operational research at present ongoing in this promising project.

12. Sustainability

The institutional link between JFFLS and formal (primary) schools seems to be the key to sustainability, along with spontaneous replication of the initiative. The synergies and complementarities between formal school and JFFLS activities can integrate theory with practice. Another way to sustainability is the availability of and access to Direct Support to Schools (DSS) funds through the Ministry of Higher Education, Science and Technology from central to district level, specifically dedicated to orphan-related activities.

A governmental decentralized institutional network such as the formal school system (there are many more schools than NGOs and extensionists) facilitates the expansion of JFFLS. Moreover, schools are permanently there, beyond FAO and WFP, and facilitators from schools (teachers) and agriculture (extensionists) are already paid and need no additional incentives. The training courses strengthen their capacity by equipping them with additional skills and expertise. JFFLS offer an added value in the improvement of teachers' capacity and the quality of teaching.

JFFLS, partly in an independent way, started to be developed in 2004 in eight different African countries (Kenya, Malawi, Namibia, Sudan, Swaziland, Tanzania, Uganda, Zambia) with significant creative adaptations and innovations of the original project design, following local contexts. In the year 2006, the JFFLS approach was expanded to the Kakuma refugee camp in Kenya (and soon in Uganda), with a particular focus on orphans and vulnerable children resulting from civil violence and displacement, with the support of the United Nations System-wide Work Programme on Scaling-up HIV/AIDS Services for Populations of Humanitarian Concern. The schools in Kakuma currently reach about 180 children, both from refugee and hosting communities. A Mobile JFFLS Manual for the training of facilitators in refugee settings has been elaborated.

13. Cost

The overall cost of a JFFLS varies depending on the context and the implementing agency. The first cost to be envisaged is the training of facilitators. The estimated running costs per school per year are US$1 755, equivalent to less than 5 dollar per child per month (Table 1).

Table 1: JFFLS Running Costs per year

Item	Quantity No. of Units	Unit cost US$	Total cost US$
Learning field inputs (fertilizers, seeds, pesticides and equipment)	For 1 000 m²	292.50	292.50
Water pump	1	160.00	160.00
Small livestock (mix)	-	192.00	192.00
Fruit trees (mix)	-	100.00	100.00
Training materials	For 30 OVC	4.47	134.00
Recreation materials	For 30 OVC	3.45	103.50
Livestock infrastructure	-	80.00	80.00
Field days	1 per year	80.00	80.00
Graduation	1 per year	80.00	80.00
Transport of facilitators (per session)	1 facilit. x 150	3.00	450.00
Miscellaneous (5%)			83.00
Total running costs for one JFFLS in the first year			**1 755.00**

Chapter 3

Education and Training on Fisheries

Guinea: Improving Fish-Smoking by Daniela Bruni, Audun Lem and Yvette Diei Ouadi

1. Background

The Gulf of Guinea, in West Africa is a traditional fishing ground for its bordering coastal countries, especially as far as small-scale fisheries are concerned.

In Guinea, the fisheries sector represents an important sector in the national economy. It generates more than 10 000 direct jobs and provides about 40 percent of the food consumed locally by people.

Women play a central role in the fisheries sector of Guinea and are involved in both fish processing and fish marketing. In particular, they are responsible of preserving the local catch by smoking the fish over open fires, traditional round barrels or mud ovens. It is a time-consuming tiring job and the result is often of poor quality because the fish dries unevenly or becomes charred. Women represent 70 to 80 percent of fish workers involved in this activity and the majority of them are illiterate.

To address this issue, the FAO TeleFood Programme identified the fish-smoking women in Guinea as eligible for TeleFood funds and decided to support the local cooperatives of fish-smoking women in Bonfi and Temenetaye villages.

The two villages are important fishing communities situated in a rural area not far from the national capital, Conakry. Women working in smoking activities in Temenetaye and Bonfi are organized in cooperatives significantly contributing to the socio-economic development of the country.

In Guinea, like in most West African countries, fish-smoking is mainly used for fish preservation combining three effects:

- the extraction of moisture by the heat generated by fire causes drying and consequent unavailability of water for microbial activities that may alter the quality of fish;
- the smoke from burning wood preserves the fish because it contains a large number of compounds, e.g. phenols, an antioxidant, that can also kill bacteria causing spoilage;
- the cooking of the fish flesh at a high temperature kills bacteria and destroys harmful enzymes.

The preservation effects are actually ensured by the drying and the anti-microbial action of the phenols.

To facilitate and support the activities of fish-smoking women, the TeleFood Project initiated an education/training programme to replace the old ovens with an improved version more fuel efficient and with increased capacity, thereby conserving the scarce wood and reducing leakage of heat and smoke (with subsequent exposure of women) by increasing heat concentration.
Realizing the inefficiency of the old open ovens, the FAO project promoted the Chorkor fish-smoking technique that had proven to be more efficient in terms of cost and energy utilization than the others used in West Africa. This technique comes from the traditional cylindrical oven made from compacted clay. The cylindrical oven became rectangular and then further developed into the now famous Chorkor oven with mud, cement, red-brick walls with stokeholes for fuel wood inlet and fire control.

2. Learning objectives

The aims of the Improving Fish-Smoking project were to empower local women and enhance their fisheries and life skills.

At the end of the education and training courses, the women, exposed to a modern technique, gained more knowledge about fisheries, they became more confident in managing the Chorkor oven, better informed on health and strengthened their self-esteem and capacity in literacy and numeracy.

3. Training objectives and calendar

Eighty percent of the 140 women participating in the project were illiterate. For this reason, before the beginning of the technical training programme, a basic literacy course was developed for the participants. All the women were keen to be involved in the basic education course because they realized that through education they would be able to have access to information and improve their skills in management, planning and commercial operations.

The educational needs as identified by the women themselves were:

- functional reading and writing;
- simple calculations;
- understanding of credit mechanisms; and
- training in appropriate fish-processing technologies.

The basic literacy courses were developed by using modules of reading, writing and calculations. Each class was conceived for 20 people following a rotation programme that allowed all participants to attend the courses. The organization of the classes and the timetable (twelve hours per week) were decided by the participants themselves. This type of organization fitted well with their jobs both at the cooperatives and at home with their families. The course of basic literacy lasted 45 days. After its completion, the women started to follow the second training activity concerning implementation of the fish-smoking new techniques.

The aim of the project was to improve the oven technology used in the villages and increase the nutritional and economic value of fish. Another aim was to improve women' s working conditions and reduce the amount of wood consumed. An additional benefit is that the new oven is less expensive to build when local materials are used, is also durable when sheltered and can produce a high-quality and uniform product.

The success of this technology in Guinea attracted considerable interest from technologists and processors in the region. Practitioners testified to its merits like the reduction of adverse health effects (eye, nose and bronchial problems) associated with the traditional open banda oven. Fuel wood consumption, which is increasingly becoming a major concern for the processors, is also reduced by this technique.

4. Training methodology and curriculum

The methodology was a step-by-step participatory methodology for basic skills and training and it was arranged and planned by using two different modules.

The first module for the basic literacy course provided an opportunity for women to develop their understanding, knowledge and skills in the three areas of reading, writing and calculations, taking into account their own development and learning needs.

The second module concerned the application of the new fish-smoking technique and the construction of the ovens using local materials. The construction of the modified Chorkor ovens was explained step by step by a group of bricklayers and masons previously trained in Ghana.

5. Trainers and trainees

The trainers were selected by the NGO Entraide universitaire pour le développement (EUPD), specialized in basic literacy training and located in Conakry.

EUPD trained staff from the Comité de coordination et de formation des actions de développement (CCFAD), also involved in the project.

The trainers of CCFAD participated to the whole project, training 140 women both in literacy and numeracy and in the use of new smoking racks and ovens.

6. Didactic materials

Two didactic materials were designed for the project. A Getting Started Manual was developed in local language and included notions of basic education. It was used before the Technical Manual which explained step by step the use of the Chorkor oven. Women were taught new smoking techniques by using new smoking racks and ovens built with local materials. A short video to facilitate dissemination of information related to the project was also developed.

7. Learning assessment

The assessment of the women's learning was important to understand how they were integrating the new technique and this was demonstrated by its immediate application, by using smoking racks and ovens built with local materials as well as by the improvement of working conditions.

8. Training infrastructure

The training took place in the local cooperatives situated in the Temenetaye and Bonfi villages and involved about 140 women. The ovens used for the training were constructed with local materials and remained in the villages after the training was completed. The new ovens were used as a practical example for the training

9. Institutional arrangements

The Government, with the support of the FAO Representative in Guinea, chose the local cooperatives as recipients for TeleFood funds based on their organizational set-up, the importance and distribution of fish-smoking in the local economy and the importance of fish as a vital component to cover nutritional needs.

10. Impact

The implementation of the project had a very positive and significant impact on the life of local people in Temenetaye and Bonfi villages. It resulted in a reduction of production costs thanks to a more efficient use of wood for smoking, less damage to the environment as a result of the reduced consumption of fuel wood, an improved utilization of fish with less spoilage and waste and, mostly important, an improvement in the health of women doing the smoking, some of whom are among the poorest in the community.

This positive impact on local people is clear when examining both social and economic aspects. The participation of communities and the involvement of women in the whole process of smoking techniques were increased. It is interesting to note that the basic skills learnt and the techniques acquired facilitated a new way of thinking now used also for the marketing of fish. Indeed, it is the evidence that women can have a much stronger bargaining power when they are well organized and better informed, a very strong indicator of local people empowerment.

11. Sustainability

The best indicator of sustainability is the fact that women formed cooperatives on their own initiative and requested to extend the training to other villages. Such a level of empowerment was rarely observed in rural areas, especially among fishing communities. The women's commitment was impressive and in their presentations

they demonstrated their high degree of assimilation of the new knowledge and their familiarity with the new fish-smoking process.

The new smoking technique with improved ovens has also promoted exchange of experiences between Guinea and other West African countries like Mali, Senegal and Burkina Faso where the project was replicated.

12. Project evaluation

The impact of the project has been considerable, both at local level in the involved villages and at regional level in Western Africa. The project has been replicated a number of times and the Chorkor oven has firmly established itself as the oven of choice. However, smoking technology has been further developed and more advanced ovens than the Chorkor are now available.

The women's group in Bonfi, for example, was supported by FAO in 1984 and is still in operation. This spirit of self-help and independence is confirmed by the president of a local non-governmental organization: "You really need to know the Bonfi area in order to appreciate how much work has been done here. Before the TeleFood project we, as an NGO, were already working on the ground and, frankly, we knew that there was a great deal to be done."

Future projects will therefore build on the positive outcomes resulting from the project including interaction with stakeholders and active stakeholder involvement.

13. Cost

The cost of the training was US$10 000.

Chapter 4

Education and Training on Land and Plant Nutrition

Niger: Promotion of the Use of Agricultural Inputs by the Organizations of Producers (GCP/NER/041/BEL) by Daniela Bruni, Bruno Poitier and Walter Burgos Léon

1. Background

Niger is a vast land-locked country with a total area of 1 267 000 km² in West Africa. Only 15 percent of its land is suitable for cultivation. The semi-arid Sahelian zone of West Africa is one of the poorest regions on earth and shows one of the lowest human development index. The climate is extremely harsh, with an annual rainfall ranging from 350 to 800 mm. Niger's economy is dominated by subsistence agriculture and informal economic activities. Its dependence on agriculture makes the economy extremely vulnerable to climate change (low rainfalls, high temperature and soil aridity). The main agricultural activities are normally divided into two categories according to the seasons. Millet and sorghum are the main crops in the winter season and they essentially provide for family needs. Only when the production is more than needed, it is possible to sell on the market.

Moreover, Niger often has to face food crises owing to poor soil fertility and drought. When plants are malnourished, their poor root systems cannot benefit from the small quantities of rainwater. Increased food needs in the region, driven by considerable population growth, have put further pressure on the fragile land system. Although livelihoods in Niger are based on subsistence agriculture and animal husbandry, agriculture production and its value do not meet the needs of the majority of rural families.

To address this issue, the Government of the Niger, with FAO technical support, started in the year 1999 the project Promotion of the Use of Agricultural Inputs by the Organizations of Producers (GCP/NER/041/BEL), called *Projet Intrants* or Inputs Project, financed by Belgium and implemented in collaboration with the Ministry of Agriculture of the Niger.

The Inputs Project was launched to face the major challenges of rural development in Niger. Indeed, farmers and rural populations in general always have to face the same problems:

a. Access to technical knowledge. Farmers' training and capacity building was one of the pivotal areas of the project. The enhancement of quality of learning outcomes and their impact on agricultural development were closely related to the training given to all beneficiaries. In 2004, after years of "traditional" agricultural extension

activities, the project wanted to go further by introducing the innovative concept of Farmers Field Schools to reveal and promote farmers' traditional knowledge and experience and to let skilled farmers become themselves trainers.

b. Access to affordable and quality fertilizers. To facilitate access to agricultural inputs, two kinds of demands were identified:

1. "Structured" or "predictable" demand: it concerns Farmers or Producers' Organizations with working capital to purchase in bulk and generate an economy of scale;
2. ."Diffuse" or "poor" demand: it concerns individual producers who purchase a small quantity of agricultural inputs according to their financial availability. The diffuse demand is now satisfied by a network of 330 shops of agricultural inputs, an idea also developed by the FAO Inputs Project.

The inputs shops, owned by farmers' organizations, are managed by qualified farmers, previously trained by the project on marketing and technical aspects relating to the agricultural inputs sold in the shops. They offer different services such as selling agriculture fertilizers, seeds, pesticides and renting agricultural tools. In rural areas, inputs shops also act as an important focal point for exchanges of technical information among farmers.

c. Access to funding opportunities through warrantage (or inventory credit). To promote "access to credit", FAO strengthened and developed a system of warranting credit facility. This is an interesting technique of credit which consists in farmers securing loans by putting in guarantee their agricultural production later sold at a higher price during the lean season. These loans enable them (1) to meet their immediate family cash needs, (2) to carry out income-generating activities during the dry season, and (3) to purchase fertilizers (and other agricultural inputs) for the following agricultural campaign.

2. Learning objectives

The Inputs Project aimed at strengthening the capacities of farmers' groups to play an important role in inputs supply for farm production as well as to enhance their agricultural and life skills. At the end of the training courses, farmers were more knowledgeable in agriculture, having been exposed to a modern technology, more confident in managing micro-dosing fertilizer technique, better informed on credit access and had a strengthened self-esteem and marketing capacity. Their level of competence in job performance was emphasized and their personal creativity was fostered through the enhancement of their abilities required for learning in the context of lifelong education and training.

3. Training objectives and calendar

Training is a key element in ensuring the sustainability of the technology and dynamics initiated in this project. In order to define the training topics on the basis of an agreement with the target population of farmers, the project staff first undertook some baseline surveys to identify the farmers learning needs.

The trainees expressed the wish to be involved in agriculture and microfinance activities because they knew that through training they would have access to information and improve their skills in agriculture, planning and commercial operations.

The training objective was to improve fertilizers' use in order to increase the agricultural production and prevent food crisis. The training started in five regions of Niger: Dosso, Maradi, Tahoua, Tillabery and Zinder. These regions are situated in the arable dryland zones where soils are generally sandy with low inherent fertility and moisture holding capacity, except in river valleys where clay soils are found. About 70 percent of the population of Niger resides in these regions.

Farmers were usually trained on micro-dosing technique and warranting activities, inputs shops management, marketing techniques, etc.

The micro-dosing technique developed by research institutes consists of placing small doses of fertilizer directly into the soil at the time of sowing rather than spreading it all over the field. In this way, the soil composition (mainly phosphorus deficiency) can be rectified and the plants can better resist to drought when a shortage of water occurs. With just one sixth or less of what is used in the developed countries, micro-doses technique allows the plants to develop a better root system and capture more water, increasing millet yields by 70 percent on average.

The training sessions on micro-dosing consisted in demonstrating this new technique of fertilization (conventional demonstrations in rural areas) with the hope that positive effects will convince farmers to adopt it.

After several tests with proactive farmers' organizations (in the years 1999 and 2000), training sessions on warrantage were developed to teach the necessary marketing operations: storing grains during the harvest period, contacting a microfinance institution ready to provide cash loans for 80 percent of the actual value of the warranty (harvest stock), helping farmers to develop economic activities enabling them to pay back the loan including interest, organizing collective fertilizer purchase for the next season with part of the warrantage operation benefits.

The organization of the training course and the timetable are always decided together with farmers according to daily unloading and field activities. These training programmes are usually short, never exceeding three or four days together and six hours a day. One of the reasons is the fact that farmers cannot leave their work for long periods to attend training programmes and have problems in concentrating more than few hours a day. Field work or demonstration always improves the impact of a training session with farmers.

In the year 2004, in order to make farmers' capacity building more participative, the project adopted an innovating programme based on the Farmer Field Schools

concept. Farmer Field Schools are a form of adult education, which evolved from the concept that farmers learn best from field observation and experimentation. Therefore Field Schools are oriented to provide basic agro-ecological knowledge and skills in a participatory manner so that the farmer experience is integrated into the programme.

Both Farmer Field Schools and training for trainers are usually based on fertilization, improved seeds variety, pesticides, biological pests control, marketing issues, etc.

Farmers Field School groups usually include 20 farmers and meet on a weekly basis during the whole agricultural season (from field preparation to crop and marketing). The gender ratio is set according to local context, i.e. it can be 100 percent men or 100 percent women, but in most cases it is balanced with an average of about 48 percent of women.

4. Training methodology

The training assessment was first based on the experience of the project regional staff posted and working closely with regional agricultural services. Backstopping was ensured by the project technical staff based in Niamey and on some occasions additional support of external teachers was searched to face the large number of training sessions organized. In any cases, it was necessary to investigate into the socio-economic organization at village level and to use appropriate communication channels and specific modules in order to mobilize the communities.

The selection of the communities was done following well-defined criteria:

- existence of a core of literates;
- mobilization and motivation of the village;
- community participation in training activities; and
- possibility of strengthening the farmers' organizational capacity making them capable of using available resources. .

A multi-disciplinarily team (educationists, technicians in agriculture and in new technologies) was in charge of the training. They demonstrated the suitability of the native languages for the training and established links between them and a modern scientific knowledge.

It was developed a participatory methodology for basic skills in agriculture techniques although the training programme was not organized on a regular basis. It was arranged and planned by using different modules covering all sectors of agriculture production, from inputs supply to products marketing.

During the first phase, farmers learned the importance of the use of nutrient and fertilizer techniques. They obtained an overview of the available natural resources and products, defined problems and opportunities and short-listed a range of fertilizers, seeds and products.

In the second phase, participants gathered information and techniques for analysing the products and fertilizers and learnt how cooperatives and inputs shops could be developed.

In the third phase, the training was organized in order to be able to manage the warranting technique.

In the last phase, FFS were used to train selected farmers as interns in the targeted areas and from neighbouring villages on various agricultural subjects. These farmer trainees, who formed farmer research groups, served as extension agents and field technicians during farmer field days.

5. Trainers and trainees

At the beginning of the project, the trainers were technicians from the Ministry of Agricultural Development who had acquired a broad experience in the field of agricultural techniques and in microfinance. They were based in Niamey and wanted to share their knowledge and expertise with farmers. Today seven regional staff of the ministry are trained to attain a multiplier effect, that is to enable them to share their experiences and train others at a lower level. Many local NGOs were also involved in the project to provide training to farmers.

Between 1999 and 2006, the project trained more than 33 000 farmers and collaborated with about 1 850 Organizations of Producers gathering 60 000 farmers and about 50 other partners (NGOs, bilateral and multilateral cooperation agencies, private sector, banks, etc.).

6. Didactic materials

The quality of the training was enhanced by using appropriate modules to improve and implement farmers' skills in power plant, fertilizers and warranting. These modules were teaching-learning resources, well designed and helped the trainers to ensure standards of effective training.

The materials included a statement of learning objectives focusing on:

1. plant nutrition and soil fertilization;
2. inputs shops management;
3. pests control;
4. accounting and bookkeeping;
5. inventory credit and microfinance;
6. conservation and transformation of products; and
7. marketing.

The materials used during the training were complemented by messages, examples and illustrations related to the interests, expectations, previous knowledge and experience of trainees.

7. Learning assessment

The assessment of the farmers' learning was important to understand how they were managing the new techniques. Facilitators demonstrated the farmers' capability of organizing and conducting the application of the new fertilizers, the management of producers' organizations, the inputs shops and warranting credit.

The assessment of the trainees' achievements as regards to changes in attitudes, skills and awareness were determined by the effectiveness of the training in producing immediate learning outcomes which allowed farmers to transfer the new knowledge to the community and its application to their daily life.

8. Training infrastructure

During the first phase of the project, the training took place in the FAO premises in Niamey. Later, with the collaboration of some NGOs, other structures such as official buildings or field houses were used to train farmers.

9. Institutional arrangements

FAO as Technical Agency implemented the project with the executive support of the Ministry of Agricultural Development of the Niger.

10. Impact

The implementation of the project had a very positive and significant impact on local people's lives. Farmers skills and knowledge were upgraded and now they are able to run their activities by and for themselves. The income of farmers using micro-doses of fertilizer and the inventory credit system increased from 52 to 134 percent.

Farmers' access to credit and inputs was greatly improved by the warranting system. Moreover, farmers who were involved in warranting activities used the credit to undertake income-generating activities and purchase fertilizers and seeds of improved varieties for the next cropping cycle.

It is also interesting to note that the basic skills and the techniques acquired have initiated a new way of thinking now used also for the marketing of agriculture products. Indeed, it is the evidence that farmers have a much stronger bargaining power when they are well organized and better informed. This is a very strong indicator of empowerment of local people.

The impact of the project has been considerable, both at local and national level. A network of 330 inputs shops managed by and for the farmers is currently operational. Investigations show that in villages where inputs shops were implemented, the utilization of fertilizers has increased up to six times within the two years following the opening of the shop.

The extension of the techniques has improved the quality of crops while the warranting technique has become an appreciated strategic tool for rural development, officially encouraged by the Government of the Niger.

11. Sustainability

The Kingdom of Belgium financed the whole project and, after having analysed the successful results obtained between 1999 and 2006, showed great interest in extending the activities at a regional level including Mali, Burkina Faso and Senegal. The programme Management of Agriculture Inputs for Food Security in Western Africa has been designed and will be executed by FAO from 2008 to 2011.

The European Union (EU) has also appreciated the development and positive effects of the inputs shops network in Niger and considers them useful tools to fight hunger and poverty in rural areas. The EU already allocated 3.8 millions of euros for the networking of inputs shops in the country.

The inputs shops have modified the use of agriculture fertilizers in the country. More than 330 inputs shops have been opened gathering 100 000 members.

The extension of the techniques has improved the quality of crops while the warranting technique has become a financial strategy for rural development officially encouraged by the Government of the Niger.

12. Cost

The total cost of the project was US$6 848 019.

The project was developed in three phases as follows:

Phase 1 from January 1999 to June 2001:	US$1 195 299
Phase 2 from July 2001 to November 2003:	US$1 186 640
Phase 3 from December 2003 to November 2007:	US$4 466 080