The TIPA Project
Empowering Small-holder Farmers in Senegal

MASHAV
Israel's Agency for International Development Cooperation
At the Millennium Summit in September 2000 world leaders adopted the UN Millennium Declaration, committing their nations to a new global partnership to reduce extreme poverty. This Summit laid the foundation for the formulation of what would become the Millennium Development Goals (MDGs).

The MDGs are the most broadly supported, comprehensive and specific development goals the world has ever agreed upon. The UN Millennium Declaration and the MDGs are an important point of reference for MASHAV – Israel’s Agency for International Development Cooperation.

MASHAV is dedicated to providing developing countries with the best of Israel’s experience in development and planning. As a country that moved from an underdeveloped state in the 1950s to recently becoming a new member of the OECD, we feel that we can share with others our firsthand experience in development.

We are proud to be one of the first established international development agencies in the world. Founded in 1957, MASHAV is responsible for the design, coordination and implementation of the State of Israel’s development cooperation programs. Since its inception, over 270,000 professionals from around the world have participated in MASHAV’s professional programs.

MASHAV’s activities concentrate on institutional and human capacity building and focus primarily on areas in which Israel has a comparative advantage based on its own development experience and expertise including agriculture and rural development; water resources management; micro-enterprise development; community development; medicine and public health; empowerment of women and education. This is done by training both in Israel and on-the-spot, short- and long-term consultancy missions, and projects such as demonstration farms and advisory centers in target countries.

MASHAV operates according to the needs and demands of the partner countries, rather than programs initiated by Israel that might not be relevant and effective elsewhere. Our approach is to ensure social, economic and environmental sustainable development, joining the international community efforts of implementing the MDGs by 2015 and providing a better livelihood for millions across the world.

Although a modest player in the international assistance arena, MASHAV provides fast, flexible, hands-on, pragmatic, original and practical solutions to development challenges, thus becoming a significant contributor to sustainable development.
Most of Senegal lies within the drought prone Sahelian region, typified by irregular rainfall and generally poor soils. With only about 5% of the land under irrigation the heavy reliance on rain fed cultivation results in large fluctuations in production. About 75% of the working population is involved in farming. The vast majority of crops are rain fed, making water availability one of the country’s biggest agricultural challenges. Successive droughts and mismanagement of natural resources have led to declining yields as soils have become degraded mostly due to erosion. Intensification of agriculture through the production of irrigated high-value crops (particularly in dry regions) is a way to overcome the constraints of climate and soil in the Sahel while significantly increasing farmers’ income. In much of semi-arid Africa, gardens for the production of vegetables, tubers, and fruit for the family and for the markets, are usually the only form of irrigated agriculture.

The relative advantage for vegetables that are labor intensive lies in small-scale family units where the smallholder can both specialize and utilize family labor to achieve better results. The rural Senegalese reality is especially suitable for the implementation of TIPA. The traditional culture of cooperation and mutual commitment in Senegal facilitates one of the main conditions for the success of TIPA: Adaptation of the cooperative culture by the local community.

In Sub-Saharan Africa between 70-80% of small-holder farmers are women. As a means to empower women, the TIPA project fits well into the gender sensitive policies of MASHAV. This approach creates a context for promoting gender mainstreaming related to the role of women in society, creating a ripple effect for sustainable development.

The TIPA project was started in Senegal in 2006, as an initiative of the Embassy of Israel in Dakar and of MASHAV. Together with the collaboration of the Senegalese Water Services and two local partners, three communities and locations were chosen for the establishment of the first TIPA projects in Senegal. The results were impressive: 60 families, most of them headed by women tripled their agricultural income in less than two years. A new source of income was created.
What is TIPA?

TIPA is based on the concept of the African Market Garden (AMG). It was first presented by MASHAV at the World Summit for Sustainable Development in Johannesburg in August 2002. The AMG is a small-scale horticultural production package developed by the International Program for Arid Land Crops (IPALAC) at Ben Gurion University of the Negev and world renowned Israeli irrigation companies. It was later on enhanced by MASHAV in cooperation with the International Crops Research Institute for the Semi Arid Tropics (ICRISAT). It is based on low-pressure drip-irrigation, a mix of vegetables and tree crops, and a management package that leads to optimization of the production system. The biggest benefit of TIPA is the decreased labor requirements for irrigation and weeding. Benefits of using the system include water saving, higher yields of improved quality vegetables and fruits, the ability to produce crops year round and greater likelihood of maintaining the productive capacity of the soil.

Several models of the TIPA were developed. The hardware components of the basic model comprises of a concrete reservoir, the plastic drip irrigation kit, and a water pump. The mix of crops allows households to meet their own needs and sell excess in local markets. The size of individual market gardens ranges from tens of square meters to a few thousand square meters. The most common size is 500m². Since the minimal pressure needed for operation of the drip system is only one meter, TIPA can use low-energy water sources such as surplus water from village water towers (most common in Senegal), solar energy and artesian energy.
**Technical Requirements**

In order to establish a TIPA project of 100 units (100 farmers) the following technical requirements are needed:

- An area of 5 hectares divided into 100 plots of 500m² each (20 x 25 meter), a 500m² plot per farmer
- Sustainable water-resource for the daily supply of up to 400 m³ of water to the project with pressure not lower than 3.5 meter (0.35 Atmosphere)
- Basic water infrastructure for distribution of the water to the plots: each plot with access to a water tap
- Protection / fence of the area allocated for the project
- A building which will supply the project with a storage space, packing space, sanitation services and other elementary needs of the project.

The estimated cost for installation is around US$1.5 per m². The estimated annual profit is about $2.0/m² per year with a pay-back period of 6 months.

**TIPA’s Community Requisites**

In order to ensure a successful implementation of the TIPA projects, the following requirements are needed:

- A development organization accepted by the community for coordinating and managing the project in its first phase
- The establishment of an association by the community members participating in TIPA, following a traditional structure including a President, a Secretary and a Treasurer
- The Association will sign an agreement with the development agency as a pre-condition for a project.
Implementation

In Senegal, the TIPA project is being implemented in three sectors:

- Projects located in medical institutes (Fann Hospital.)
- Projects located in educational institutes (Cours Sainte Marie de Hann, Dakar; UCAD, Dakar; Lycee Technique, Thies; Peace Corps Thies). The goal of this model is to strengthen agriculture studies by exposing the students to innovative technology.
- Projects which are located in the fields near the villages (Ngoe, M’bassis, Daptior, Keur Yaba, and Mbisau.)

The TIPA project is currently being implemented in several countries of West Africa including: Cape Verde, Mali, Burkina Faso, Ghana, Benin and Niger; and also in South Africa. Everywhere it was tested it was successfully proven to be an effective means to considerably increase the income of Africa’s smallholders in a most sustainable manner.

Trilateral Cooperation Israel-Senegal-Italy

International Partnerships:
MASHAV shares the goals set by the international community for greater synergy among donor and partner countries, including the creation of partnerships for development. Consequently, and promoting their bilateral relationship, the governments of Israel and Italy signed in May 2010 a cooperation agreement to further the international community’s efforts to achieve the Millennium Development Goals by promoting poverty reduction and sustainable development in Africa.

TIPA in Senegal:
Following the success of the model, the Senegalese Government decided to expand the TIPA project, adopting it as a National Program to be implemented throughout the country. Within this framework, a trilateral partnership was established between the governments of Israel, Italy and Senegal, to address the issue of food security and enhance income generation, including the installation and operation of about 500 hectares of TIPA that will directly benefit a population of about 10,000 people in rural Senegal.
The Family Drip Irrigation System

A reservoir and an irrigation kit combine to make up the basic irrigation system. The reservoir capacity is determined by the size of the field to be irrigated, and the long-term evapotranspiration averages in the region.

The Irrigation Kit

The irrigation kit uses the pressure of gravity from a height of one meter and above to distribute water evenly throughout a field allowing:

- Maintenance of low soil moisture tension and ample soil aeration
- Reduced leaching of fertilizers as compared with pressurized systems
- Water application based on crop evapotranspiration
- Application of nutrients based on crop demand

The basic low-pressure drip irrigation kit is composed of taps, a filter, the main distribution line, and 500 – 1000 meters of laterals (in which the drippers are embedded).

The Operating System

Irrigation and plant nutrition management, as follows: Irrigation water is applied every day. It takes 3-4 hours to complete an irrigation cycle. The continuous maintenance of low soil moisture tension (due to the lengthy irrigation period) results, particularly in sandy soils, in higher growth rates and hence in higher yields. Under low-pressure discharge, water moves mainly horizontally resulting in very little vertical leaching of nutrients. This special characteristic eliminates the need to apply soluble fertilizers (that are not always available) in the water with every irrigation event (as practiced in conventional drip systems).

Maintenance

The system operation is confined to daily cleaning of the filter prior to irrigation, and periodical flushing of the reservoir and laterals. The rigid drip systems manufactured by Israeli companies can last for more than 10 years with little or no maintenance.