

## Annex 2g: Evaluation Of Nataangué Farm Models

### INTRODUCTION

For developing countries, particularly those in sub-Saharan Africa, agriculture has always been of undeniable economic and social importance. However, this importance has increased since the United Nations (UN) Millennium Development Goals (MDGs) and Sustainable Development Goals (SDGs) placed agricultural growth at the forefront of government and donor agendas. These policy options are set against a backdrop of rapid population growth, and a paradigm shift characterized by a gradual shift away from extensive agriculture towards stimulating smallholder production. It is against this backdrop that this study seeks to take stock of the adoption of agricultural technologies, in terms of their impact on poverty, migration, food security and farm income.

To this end, the study analyzes the impact of the Nataangué Farm Model by Agence Nationale d'Insertion et de Développement Agricole (ANIDA), which the Senegalese government is currently testing as a model for providing an integrated package of agricultural technologies, including irrigation, marketing support and access to credit. It is an agricultural development program that promotes the use of drip irrigation systems and a complementary package of improved inputs, extension services and intensive marketing, through the establishment of farms in several regions.

The research challenge was to examine the extent to which this program led to a significant improvement in the welfare of beneficiary producers, compared with those who remained in traditional agriculture. It should be noted that the above-mentioned concept of poverty takes into account aspects linked to subjective poverty and monetary poverty. The concept of food security refers to quantitative availability, qualitative aspects linked to food types and diversity, and consumption patterns. Finally, the concept of migration is analyzed from both internal and external perspectives.

The research questions underpinning this study focus firstly on the effectiveness of integrated programs in relation to the integration of new technologies. They then look at their impact on productivity and production levels.

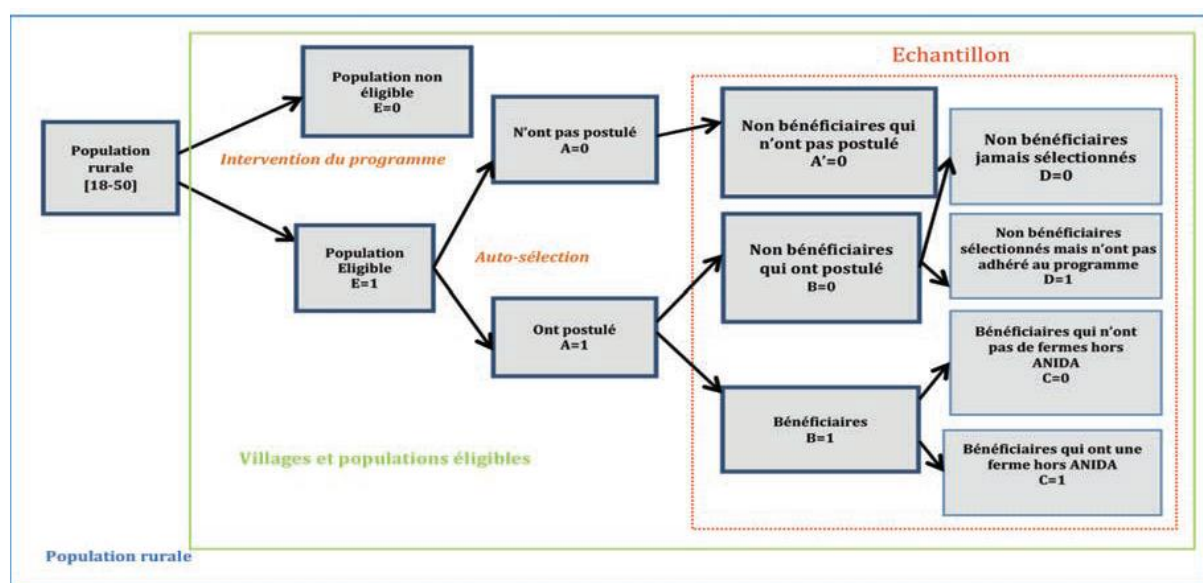
Finally, they look at the improvement in producers' living conditions, in terms of higher incomes and poverty reduction, but also the impact on rural women, who are more exposed to poverty.

### STATUS OF ESTABLISHING NAATANGUE FARMS

To date, ANIDA has developed 497 Naatangué farms (285 family farms and 212 village farms) in all the regions in Senegal. and have improved agricultural practices in target areas, with the support of other international donors (Spanish Agency for International Development Cooperation/Agencia Española de Cooperación Internacional para el Desarrollo). It resulted in sustainable subsistence and export agriculture, creating over 30,500 direct and seasonal jobs, and a strong demand for replication (ANIDA Performance Report, 2019).

Despite the strong political will and support for upscaling the model, as well as producer's demand for support to move to the diversified and integrated system, demand for expansion has risen to a level that can't be met by ANIDA or the government with available resources (estimated to be 68% shortfall). As of June 2019, the total number of farm applications received by the Agency since 2008 was 2,664 (an average of 266 requests per year). Even with the various programmes implemented with funding from different partners, the Agency was only able to reach 860 native farms by 2020, or only 32% of the total applications. Sometimes ANIDA can only provide advisory services from its team of agricultural advisers. This, combined with the high initial investment costs in equipment and training, and a private sector that is reluctant to finance agriculture because of perceived risks and slow return on investment, creates a financial gap that needs to be closed to support long-term climate resilience in the sector/regions. To meet the remaining demands and applications for Naatangué farms, various efforts are being made, including showcasing success of the Naatangué farm model and seeking for additional investment from both the government and donors.

## METHODOLOGY



The impact of ANIDA farms was analyzed using different control groups and different levels of analysis (household, individual and land). The first comparison is between groups of program beneficiaries (B=1) and non-beneficiaries, based on the batch of applications in the target villages (B=0). A sample of 13 of the 54 ANIDA farms was selected. For each farm, eligible villages were listed, and three were selected. For each village, a census was conducted to build a selection base for non-beneficiary farming households. In each household, plot leaders aged between 18 and 50 were identified. In addition to the head of household, one of them was randomly selected and interviewed. A census of beneficiaries was carried out on each farm, and certain information, including telephone number, age, gender and ANIDA status of the interviewee, was collected.

The census also made it possible to distinguish beneficiaries who work exclusively on an ANIDA farm ( $C=0$ ) from those who work on an ANIDA farm and have their own non-ANIDA farm ( $C=1$ ). A survey took into account producers who were initially selected for the program, but did not join or left in less than a month ( $D=1$ ). The total number of small-scale producers in the sample was 835, including 373 program beneficiaries ( $B=1$ ), 239 of whom work exclusively on an ANIDA farm ( $C=0$ ) and 134 who have a non-ANIDA farm in addition to their ANIDA farm ( $C=1$ ). For the non-beneficiaries, 90 were selected to participate in the program, but had not integrated the ANIDA farm ( $D=1$ , 82 had applied for the program, but were not selected).

( $D=0$ ), and 290 were eligible, but did not apply to join an ANIDA FARM ( $A'=0$ ). The econometric approach used the inverse propensity score method to construct a control group comparable to the group of beneficiaries.

## ANALYSIS AND SUCCESSFUL RESULTS

The study assessed production for three seasons between November 2014 and October 2015, calculating yields for horticulture and the following cereals: millet, sorghum and maize. Agriculture is the main activity for both beneficiaries and non-beneficiaries, whose main crops on both ANIDA and non-ANIDA farms are market garden produce and cereals. On ANIDA farms, market garden produce is grown by around 90% of MSEs, with cereal crops and market gardening accounting for 38% and arboriculture 41%. For non-ANIDA farms, horticulture accounts for 32% and cereal crops for 43.35%.

This difference in production structure is reflected in revenues: the value of a tonne of market garden produce is higher than that of a tonne of cereals. In terms of equipment, ANIDA farms are better off than conventional ones, as they have irrigation technology as well as infrastructure, assets and agricultural inputs. Given their water storage facilities and irrigation technologies, ANIDA farms not only appear more resilient to climatic events such as drought, but are also better provided with agricultural equipment.

In addition to differences in socio-demographic characteristics, ANIDA farms are more productive than those of non-program beneficiaries, with higher yields estimated at 6.059 kg/ha. As for labor productivity, it is estimated at 14.627 kg per worker for the beneficiary group, versus 5.927 kg for the control group. Compared with non-ANIDA farms, ANIDA horticultural producers' income was higher, with a gap of 683,900 FCFA per hectare. However, non-ANIDA farmers' cereal crop income per hectare is higher than that of ANIDA farm beneficiaries. Lastly, ANIDA growers' income per hectare for their crop portfolio is higher than that of non-ANIDA growers; higher productivity naturally translates into improved welfare for beneficiary households. Indeed, the latter have higher incomes than the non-beneficiaries, who have an estimated annual income of 800,831 FCFA, compared with an estimated 1,088 million FCFA for those involved in ANIDA farms; an average income gap of 287,000 FCFA. The impact of the program is estimated at 55,772 FCFA. In addition, average consumption is higher in beneficiary households (2,155 million FCFA) compared to producers in the control group (1,460 million FCFA).

The study shows that there are no differences between the two groups in terms of the incidence of poverty among beneficiaries. However, the depth and severity of poverty among beneficiaries were significantly lower than among non-households by 12% and 21% respectively. The program reduced the depth and severity of poverty by 20% and 34% respectively. Moreover, thanks to the program, food insecurity has fallen by between 3% and 4%. Some producers feel that their income enables them to live well, but this result is not significant. The program employs more people than non-ANIDA farms, with an average of 25 full-time workers.

In addition, the intention to migrate, such as looking for a new job, is less noted in the beneficiary group. Indeed, the proportion of individuals wishing to migrate was estimated at 5% in the beneficiary group, compared with 9% in the control group. As for jobseekers, their proportion was 35% among producers working on ANIDA farms, compared with 49% among non-beneficiary producers. In terms of spillover effects, only eight out of 332 non-beneficiary farmers consult ANIDA farm members; 10 out of 332 apply the farming practices learned through the ANIDA farm. Despite a high average cost per hectare, ANIDA farms are more profitable than traditional farms.

Their net profit per hectare is 20%, while that of non-beneficiaries is only 5%. This performance is due to the fact that ANIDA farms' yields per hectare are higher than those of conventional farms. Better-quality market garden produce enables them to sell their produce at better prices, and to export some of it. In addition, the economic activity of an ANIDA farm is greater than that of conventional farms.