



The Commercial Products (COMPRO) project was initiated in November 2008 with an aim of assisting farmers in obtaining crop productivity enhancing products and stable yields that enable them generate more income through marketing their produce. The project's objectives are to screen, evaluate, and scale up innovative chemical and biological commercial products. It is expected that this effort will increase crop yield by 30% and directly empower about 175,500 households (approximately 1.3 million persons) in selected areas in Kenya, Ethiopia, Niger, and Nigeria.

Over the last 2 years, the project has been able to screen over 100 products from different private companies within and outside Africa. These products have been grouped into three categories:

- Category I – Biological nitrogen-fixing products (rhizobial products)
- Category II – Other (non-rhizobial) microbiological products including *Trichoderma*, *Bacillus*, free-living nitrogen-fixing bacteria, and mycorrhizal products
- Category III – Chemical products

The screening has been done through testing of products under greenhouse conditions and through field trials in different agroecological zones (five mandate areas in each country). Trials in the field are undertaken under research-managed fields and farmer-managed fields.

CIAT partners with Moi University, the International Institute of Tropical Agriculture (IITA), and the Ethiopian Institute of Agricultural Research (EIAR) for implementing project activities in the target areas. The partners are actively involved in undertaking field trials. Recently, Moi University participated in the Eldoret Agricultural Show, and the COMPRO stand elicited a lot of interest including that of Kenya's Vice President, Hon. Kalonzo Musyoka.

Through the COMPRO project, 5 Ph.D. and 7 M.Sc. projects are currently being trained. The project has observed that there is high demand in soil microbiology training in Africa and the CIAT team has been able to conduct training involving various partners from Moi University and the EIAR.

There are ongoing discussions with international and local private sector companies (e.g., Becker Underwood-International; and Real IPM-local) as well as a local NGO (FIPS-Africa) for the promotion and dissemination of effective products. This is instrumental in moving the project to the next level with regard to achieving its overall objective as already stated.

A key lesson learned has been the need to intensify field-testing in order to achieve the goal of reaching 175,500 households. Involvement of local NGOs is key in achievement of this. The team has also embarked on plans to undertake farmer training and farmer field days as

a means of disseminating information on the efficiency of the products providing information on the most effective for specific crops.

Further, and to illustrate the importance of the productivity enhancing properties of the products, the case of the adoption of tissue culture (TC) technology to address banana and plantain production constraints has led to increased demand for planting material and commercialization of banana TC, leading to an increase in production to 1,058,018 metric tons valued at 9 billion shillings (US\$0.15 billion) in Kenya alone. Although TC revitalized banana industry in Kenya, a survey showed TC orchards to succumb to pests and diseases, nutrient stress, and physiological degeneration. TC plantlets have poorly developed cuticle, non-functional stomata, uncertain behavior, and weak root system. This normally infests at the transfer and nursery stages with mortality being the major risk caused by poorly developed rooting systems and low nutrient reserves and without rhizosphere microorganisms.

Further, crop production in many smallholder farms of Kenya is declining due to various constraints including soil fertility decline (especially N and P) and high fertilizer prices, thereby needing the use of minimal fertilizers in nutrient poor soils. After application, P fertilizers are rendered inaccessible due to chemical reactions in soil that fix P into the soil colloids, making only a small portion available for plant uptake. There are numerous rhizospheric microorganisms that solubilize the fixed P, thereby providing this P for plant uptake. A number of companies have produced commercial

products, which they claim to have P solubilizing potential in a variety of soils. COMPRO has worked towards screening 10 commercial products having P solubilizing capacities in two soils with contrasting properties. Only effective products were tested in farmers' fields in three mandate regions (Bondo, Meru South, and Bungoma). Among these, four products were found to be effective in promoting maize growth under greenhouse conditions. However, the product effectiveness was enhanced by addition of either soluble P fertilizer or Minjingu rock phosphate. When tested in the field, in different agroecological zones, none of these products gave significantly higher yields probably due to out-competition by indigenous strains.

In soybeans, among the 10 products tested under greenhouse conditions, only three products had significant yield increases above the uninoculated controls. The product effectiveness was higher when co-inoculated with effective rhizobial inoculants (from CAT 1 products) than when inoculated alone or in combination with arbuscular mycorrhizal fungi products. In the field, only one product with phosphate solubilizing bacteria was found to be promising in all the mandate regions. This product, in combination with rhizobial bioinoculant, has currently been extended to various households to test reproducibility of the results.

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