

SCALING-UP SYNERGIZED INDIGENOUS VEGETABLES AND FERTILIZER MICRO-DOSING INNOVATIONS



For food security and family economic empowerment in West Africa

Project Background

Major sources of nutritious food for the poor rural families in Nigeria and Benin Republic who lack the resources to purchase high value food items (eggs, meat and milk), are the indigenous vegetables, leaves and fruits which are gathered from the wild. Indigenous vegetables are highly nutritious, containing key vitamins and minerals - including high levels of carotenoids (Vitamin A), flavonoids, and phenols - that support human health. The vegetables also have great potential to improve food security, nutrition and income in farming communities. Four high premium indigenous vegetables: Fluted pumpkin-Ugu (*Telfairia occidentalis* f. Hooke, Nigeria only), African eggplant-Igbagba-Gboma (*Solanum macrocarpon* L.) and Local amaranth-Tete atetedaye (*Amaranthus viridis* L.) have been shown to have high market value, economic returns, cross-cultural acceptability and marketability in Nigeria and Benin Republic. These indigenous vegetables have been proven to compare favorably with the routinely cultivated vegetable species in terms of nutritional values hence the valuable dietary contribution of these vegetables to household nutritional security. The focus is the generation of knowledge and innovations, and the testing and deployment of different approaches for scaling up to ensure maximum uptake of indigenous vegetables production, utilization and consumption in Nigeria and Benin Republic.

Goals And Objectives

GOAL

To Increase food and nutritional security and economic empowerment of 255,000 resource-poor farming households with emphasis on women in the West Africa sub-region through the integrations of fertilizer micro-dosing and under-utilized vegetables innovations.

OBJECTIVES

- Develop technology capsule on fertilizer micro-dosing and water management technologies, value addition technology and seed production for indigenous vegetables.
- Test, demonstrate and deploy two different models (Innovations Platform and Satellite Dissemination Approach) for reaching and benefiting more farmers with sustainable vegetable production and marketing innovations.
- Scale up the technology capsule to advance indigenous vegetables production, increase yields, preserve soil and water ecosystems and enable fertilizer cost-saving.
- Promote policy advocacy to integrate the successful scaling up model into local, national and regional food security programmes in the West African sub-region.



Funding for this project has been provided by the Canadian International Food Security Research Fund (CIFSRF), a joint programme of Canada's International Development Research Centre (IDRC), and the Department of Foreign Affairs, Trade and Development Canada (DFATD). The multi-disciplinary research team is constituted by the Osun State University and Obafemi Awolowo University in Nigeria, Université de Parakou in Benin Republic and Canada's University of Saskatchewan and University of Manitoba.

This three year (2015-2018) project focuses on scaling up advancements and innovations in indigenous

vegetables value chain to boost vegetable business resulting in increased vegetable yields, improved nutrition and family income while also preserving soil and water ecosystems, and conserving fertilizer costs. Policy advocacy to integrate the successful indigenous vegetables into local, national and regional food security programmes in West Africa is a major focal point of this project. In Nigeria and Benin Republic, the project will scale up the innovations to 51 new locations, targeting a total of 51,000 farmers as direct beneficiaries, and 204,000 indirect beneficiaries. At the end of three years, it is expected the income of about one million families would have been doubled.

Importance of Indigenous Vegetables And Fertilizer Micro-dosing

According to the FAO, indigenous or traditional vegetables are all plants whose leaves, fruits or roots are used as vegetables by urban and rural people through custom and tradition. They have been for long harvested from the wild by women for use as soups consumed with the cereal-based dishes, or for their medicinal properties in West-Africa. Indigenous vegetables are highly nutritious, containing key vitamins and minerals - including high levels of fibres, proteins, carotenoids (Vitamin A), flavonoids, and phenols - that support human health. The vegetables also have great potential to improve food security, nutrition and income in farming communities.

Fertilizer micro-dosing is the localized placement of small amounts of mineral fertilizer in the planting hole at sowing, or at the base of newly emerged

plants, instead of spreading fertilizers evenly across the field. Micro-dosing is a low cost system for precision application of fertilizers and water. Its optimum application to the production of indigenous vegetable is one of the practical innovations for sustainable intensification of agriculture in sub-Saharan Africa. It increases cereal yields up to 200% while reducing fertilizer costs by 22% and increasing income by 30-90%. It enhances fertilizer access and affordability through re-packing fertilizer into small bags, which is beneficial for small-scale farmers who cannot afford large quantities of fertilizers. The technology leads to increase in the productivity and profitability of small-scale agriculture, while reducing costs and risks in the semi-arid zones characterized by low productivity of soils and water scarcity.



Packaged seeds of Amaranthus and growing Ugu vegetable.



Women marketers with man farmer bunching Amaranthus for sale at Osogbo, Nigeria.



Vigorously growing Igbagba vegetable at Omi-Okun, Ile-Ife, Nigeria.



Microdosing on Igbagba in Mareborou village, N'Dali district, Benin.



Woman apply microdosing on a leafy vegetable in Mareborou village, N'Dali district, Benin.



Woman arranging Amaranthus and Igbagba for marketing in Malanville, Benin.

PREVIOUS SUCCESS STORIES



A man farmer carrying well developed Ugu fruit at Akanran in Nigeria.



Amaranthus grown for seed production at Ilode, Ile-Ife, Nigeria.



Farmers display fully developed Igbagba fruits for seed production at Idi-Ose, Ibadan, Nigeria.

Income benefits of fertilizer micro-dosing:

Our previous project on fertilizer micro-dosing and water harvesting showed that grain yield of cereals- maize, millet and sorghum could be doubled. Investment of 1.0 FCFA (or XOF) resulted in a net profit of 0.66 FCFA for microdose while generating only 0.50 FCFA for the conventionally recommended dose in Benin Republic. The micro-dose technology combined with the Food and Agricultural Organization's warrantage system resulted in increased income by up to 50% in more than 200,000 households in the sahelian Africa. Instead of the usual 4-6 bags (50 kg each) of fertilizer per hectare often recommended by conventional agricultural advisory and extension services, the micro-dose technology uses only one (01) bag of fertilizer per hectare.

Increased demand for indigenous vegetables:

Previous project worked with 1,400 farmers (51% women) who were been formed into 22 vegetable cooperative groups. Farmers' cooperative societies received training on agronomic practices, gender issues and savings education. Each cooperative was registered with relevant authorities in Nigeria so that farmers were able to access bank credit and federal government support. Farmer cooperatives have strong potential to further exploit market opportunities, and contribute to the government push to commercialize indigenous vegetables in domestic and export markets. Radio programs known as 'Ramo Elefo' (Ramo the Vegetable Seller) were aired on popular FM stations in south-western Nigeria to create awareness on production, utilization, and nutritional and health benefits of underutilized vegetables, reaching over 3 million listeners daily. These and new jingles have helped to stimulate demand for seeds or further information on indigenous vegetable production.

Empowering women's access to resources:

As a result of gender training, women that participated in the project had access to credit, land and irrigation facilities for the production of indigenous vegetables, and control over seed and fertilizer procurement. This opportunity

has enabled women farmers to take independent decisions on choice of land for vegetable production, size of land under cultivation, where and how to source credit, when to buy and apply fertilizer and the quantity to apply, when to irrigate, when to harvest the vegetables, and where and how much to sell the vegetables for. The formation of cooperative groups has also empowered women to participate actively in decision-making with respect to land acquisition for vegetable production, credit sourcing, profit-sharing, pricing decisions and overall management of group interests and concerns. Involvement in the cooperatives has stimulated a new savings culture, particularly amongst women (10% compared to 8.6% with men).

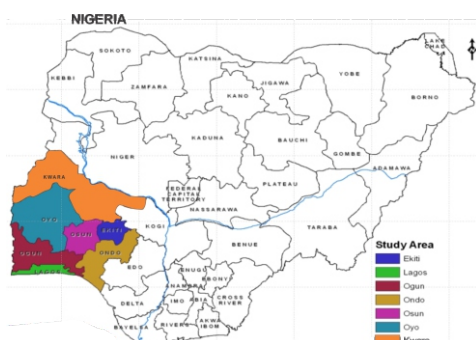
Improved production for increased income in vegetables enterprise:

Farmers that participated in the previous project adopted a range of technologies, including seed bed preparation, seed treatment to prevent soil-borne diseases and pests, seed planting rate, reduction of germination period, botanical pest control, and staking of *ugu* and *woorowo* for improved productivity and economic returns. Adoption of new technologies has led to leaf yields of 40 kg/m² for *igbagba*, 55 kg/m² for *ugu* and 5 kg/m² for *tete atetedaye* previously farmers realized about 50% of these yields or less. With increased yields, previously marginalized rural women farmers now realize an average income of about US\$3,376/year from the sale of indigenous vegetables compared to a pre-project income figure of US\$1,994/year.

Dietary diversity:

The project made available six indigenous vegetables which have now been adopted in family diets. Women have been given training on food preparation and improved processing technologies. The daily radio jingles have also helped to sensitize the public on the nutritional and health benefits of indigenous vegetables and stimulate dietary diversity. Farmers now report that sales of indigenous vegetables have increased due to increased consumption and that it is becoming difficult to meet demand. Farmers have also increased household consumption, as they taste better and provide greater nutritional benefits compared to non- indigenous vegetables.

Research Sites



Scaling up Innovations:

In Nigeria, the synergized micro-dosing/indigenous vegetables innovations will be scaled up in the following context:

- The target is to extend the farmer-friendly and economically viable innovations to 255,000 farmers. The project targets incorporating at least 51 women vegetable marketers' cooperative societies with a total of 10,200 members.
- The project will establish 20 seed producer/marketer cooperative societies in Nigeria and Benin. In terms of cultivated area expansion, at the end of 36 months we target that the area under indigenous vegetables cultivation will reach 101,000 ha in Benin and Nigeria.
- We are targeting at least 10 (ten) schools per district with at least 500 students as YVSC members/district resulting in 25,550 young vegetable scientists club (YVSC) members in Benin and Nigeria.

- In scaling up the value addition technology, we will utilize cooking trials approach, recipe sensory panel evaluation and community gathering sensitization approach which will involve the rural women.
- We will conduct massive training on indigenous vegetables seed production practices i.e. seeding method, isolation distance, exclusion of off-types, harvesting indices, seed harvesting, seed cleaning, seed sorting, seed drying, seed treatment, seed packaging, seed storage and seed testing.
- We will intensively utilize and compare two dissemination approaches: the innovation platforms and the satellite dissemination approach (SDA) based on cooperation capacity building, learning, problem solving and on various tools, including radio jingles, TV shows, training in churches, mosques, local governments, etc to achieve the objective of the technology capsule scale up.

Expected Results:

- Large-scale adoption of technologies for optimum combination of fertilizer micro-dose for production of indigenous vegetables, directly reaching over 255,000 male and female vegetable farmers in new locations within Nigeria and Benin.
- At least 20 private sector partners, farmers cooperatives, women's associations and government agencies involved directly in building rural small and medium businesses of vegetables and inputs.
- Doubling of the income of at least one million farmers in West Africa along the indigenous vegetable value chains.
- Economic empowerment of at least 50 women vegetable cooperative groups and 20 youth seed producer groups to develop profitable vegetable businesses in small and medium towns and large urban centers,
- Increased utilization and consumption of indigenous vegetables in the diets of poor rural farmers and urban dwellers in West Africa.
- Training of 20 young vegetable scientist clubs in critical areas of vegetable seed systems and agronomy, value addition, efficient water management, scaling up and agri-business development.
- Emergence of research leaders and champions supported to inform and shape food and nutrition security debates, programmes and policies in West Africa and beyond.

Ultimate Goal

At the end of the project, the income of at least one million farmers in this region gets doubled while ensuring nutritional security through sustainable development of indigenous vegetable production enterprises.

PARTNERS IN SUCCESS



FOR MORE INFORMATION

Prof. Derek PEAK

Department of Soil Science,
51 Campus Drive, Saskatoon,
University of Saskatchewan,
Saskatoon S7N 5A8, Canada.
jdp648@mail.usask.ca

Prof O.C. Adebooye

Department of Agronomy,
Osun State University,
PMB 4494, Osogbo, Nigeria.
ocadebooye@daad-alumni.de

Dr. P.B. Irénikatché Akponikpe

Université de Parakou,
Bénin 03 BP 351 Université,
Parakou, Bénin.
Akponikpe@yahoo.com

Prof D.J. Oyedele

Department of Soil Science &
Land Resources Management
Obafemi Awolowo University
Ile-Ife, Nigeria.
d_oyedele@yahoo.com

Prof Rotimi Aluko

Department of Human
Nutritional Sciences
University of Manitoba
Winnipeg, Manitoba
R3T 2N2, Canada.
rotimi.aluko@umanitoba.ca

Visit: www.microveg.org

Email: enquiries@microveg.org