Push–Pull System
Intensification with Vegetables
AT WAWAGA SHOPPING CENTRE IN MIGORI, THE VILLAGE HEAD IS ANNOUNCING A MEETING MEANT FOR THE WEEKEND.

We are having a chief’s baraza this weekend at the chief’s camp. We will discuss dangers posed by agro-chemicals and how to use improved farming methods.

LATER ON AT PERESIA’S HOME. PERESIA IS GIVING HER CHILDREN MEDICATION AS MOLLY OSITA COMES VISITING.

Hello Peresia. Why are your children not at school? We are just from hospital.

Oh sorry! What is the problem? They have rashes which the doctor said are caused by farmyard chemicals. The doctor has given them medicines.

There is a meeting at the chief’s camp this weekend. Farming and health will be topics of discussion.

I will join you for that meeting.
Greetings all. Lately, we have been having medical cases related to the use of agro-chemicals on our farms. Additionally, my office has received complaints of increased pest damage to our crops.

Greetings Chief! With us, we have the agricultural extension officer and the community health nurse to train us on what we need to do. Welcome nurse.

Greetings all! To improve on our overall health, we need to reduce or even eliminate the use of chemicals on our farms.

Greetings all! How do we eliminate chemical use with so many pests destroying our vegetable crops?

Our agricultural extension officer is better placed to answer your question. Officer, kindly respond to that question.

Greetings all! We can reduce, and even eliminate, the use of chemicals on our farms by using the proper farming practices.
To give you proper solutions, we need to identify the pests in your farm. I will display photos of common pests attacking crops in this area. The pests include …

- diamondback moth and larva, a serious pest of kales and cabbages
- Stemborer moths and larva, a pest destroying cereals
- Fall armyworm adult and larva, pests of cereal crops and several other crops
- common cabbage looper
- Tuta absoluta (tomato leaf miner), a serious tomato pest

We get to see all those pests you have shown us on our farms.

However, over the years we have managed to control stemborers and fall armyworm on our maize, sorghum and millet using Push–Pull and subsequently the Climate-Smart Push–Pull technologies.
You have just mentioned the magic word in pest management – Push-Pull.

I thought Push-Pull or Climate-Smart Push-Pull is just meant for maize, sorghum or millet!

I thought so too!

Scientists at icipe have improved on the Climate-Smart Push-Pull technology to include vegetables. This new technology is Push-Pull System Intensification with Vegetables.

I thought Push-Pull or Climate-Smart Push-Pull is just meant for maize, sorghum or millet!

How does Push-Pull System Intensification with Vegetables work?

The Push-Pull System Intensification with Vegetables involves planting alternate rows of maize, desmodium and vegetable crops together with a border trap crop of Brachiaria or Napier. The working of this technology is as shown below.

Maize

Brachiaria grass

Vegetable

Desmodium

Brachiaria grass

Maize

Maize

Maize
Is the vegetable intercrop limited to kales only?

No, the intercrop vegetable has been successfully used on a wide range of vegetables including:

- Cabbages
- Kales
- Cowpeas
- African nightshade
- Tomatoes
- And even onions.

Push–Pull System Intensification with Vegetables
where integration is with maize.

Push–Pull System Intensification with Vegetables
where integration is with sorghum.

‘Push’
Volatile chemicals from desmodium intercrop repel vegetable and cereal pests and attract natural enemies.

‘Pull’
Volatile chemicals from border grass attract cereal pests and trap them.

Desmodium roots fix atmospheric nitrogen in the soil, and improve organic matter, phosphorous availability and carbon sequestration.

Chemicals secreted by desmodium roots control Striga and deplete striga seed bank in the soil.
Zero chemical use ensures a healthy population of pollinators, such as bees and natural enemies of pests. Desmodium also acts as a cover crop reducing soil erosion and enriching soil by fixing nitrogen and improving carbon. Our community health nurse can take over from here.

Our able agricultural extension officer has taught us that we can farm organically without using harmful pesticides. This ensures that we eat fresh healthy food and so we spend less time in hospitals and more time being productive.

The Push-Pull System Intensification with Vegetables still maintains good control of the striga weed, stemborers and fall armyworm. Apart from pest management, additional benefits of the Push-Pull System Intensification with Vegetables include improvement of soil fertility, and improved income, because the farmer will be harvesting the vegetables for sale and domestic use, while still waiting for the maize crop to mature. During the off season, you can plant vegetables between the desmodium. This ensures maximum utilisation of the shamba. Additionally, it ensures moisture use efficiency and conservation. Desmodium and brachiaria will provide year-round fodder for your cows and goats.

You can also plant the vegetables without maize or sorghum as shown here between two cereal cropping seasons when the land is not doing anything.

Are there any other benefits to the Push–Pull System Intensification with Vegetables?
Apart from nutritious and healthy food, Push-Pull System Intensification with Vegetables ensures that our water sources are not contaminated with agro-chemicals.

Thank you all for having attended our meeting. I hope that you will put into practice what you have learned today for better health and wealth.

MONTHS LATER.

It is early evening Peresia and John Otiep are seated outside their improved house after watching an episode of Shamba Shape Up on Citizen TV on vegetable integration on Push–Pull farms when Molly Osita comes visiting.

(Hello Molly Osita. Welcome. Welcome Molly Osita. Thank you.)

Hello, I have just watched Shamba Shape Up on Citizen TV. How is your Push–Pull System Intensification with Vegetables getting along? Mine is superb.

JUST THEN THE CHILDREN ARRIVE HOME FROM SCHOOL

Hello children.


Father, Mother, we have all topped our respective classes.
Wow! Congratulations!

Congratulations my children. Get into the house and have your milk.

Thanks Mother.

It's all thanks to you Molly Osita. You informed us of the village meeting convened by the chief. The Push-Pull vegetable integration technology has changed our lives.

Hello everyone. Mama Tim, I have come for my regular order of vegetables.

And I have come for milk.

Thanks Molly Osita. With the Push-Pull System Intensification with Vegetables, I have a ready supply of desmodium and Brachiaria as feed for my two cows. They produce enough milk for our home consumption and we sell the surplus milk.

The children no longer suffer from conditions triggered by agro-chemicals and their performance in school is improved since they no longer miss classes due to hospital visits.

Since we integrated vegetables in our Push-Pull vegetable integrated farm, we have stopped buying vegetables altogether. We also have vegetables for food and sale in between the cropping seasons.

AS THE NEIGHBOURS LEAVE WITH THEIR MILK AND VEGETABLE ORDERS, JOHN OTIEP TURNS TO MOLLY.
Most of the pests we had on the farm have reduced and we didn’t even use pesticides to control them.

Before adopting Push–Pull System, a soil analysis indicated that our farm had poor quality soils. After adopting the Push–Pull System the soil has improved and a recent soil analysis shows increased presence of carbon, phosphorous and nitrogen, yet we did not use artificial fertiliser at all. Therefore, integrating vegetables on such rich soil was easy.

A number of our neighbours have been asking us to teach them about Push–Pull vegetable integration.

That is great. The Ministry of Agriculture has been looking for model farms to use as a training base for villagers and I had hoped you will be willing to cooperate with them to teach Push–Pull vegetable integration.

Push–Pull vegetable integration has changed our lives and we would love to positively impact our society.

We are more than willing. Our Wawaga Village can be renowned for producing vegetables.
icipe's mission is to help alleviate poverty, ensure food security and improve the overall health status of peoples of the tropics by developing and extending management tools and strategies for harmful and useful arthropods, while preserving the natural resource base through research and capacity building.

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The International Centre of Insect Physiology and Ecology (icipe) was established in 1970 in direct response to the need for alternative and environmentally-friendly pest and vector management strategies. Headquartered in Nairobi, Kenya, icipe is mandated to conduct research and develop methods that are effective, selective, non-polluting, non-resistance inducing, and which are affordable, to resource-limited rural and urban communities. Icipe’s mandate further extends to the conservation and utilisation of the rich insect biodiversity found in Africa. Icipe’s Capacity Building and Institutional Programme aims to promote the development and utilisation of sustainable arthropod management technologies by enhancing the research and training capabilities of countries in Africa. The Centre’s major areas of capacity building activity are: (i) Capacity building and professional development of university lecturers, researchers, and professionals in insect and related sciences; (ii) institutional development by nurturing and strengthening higher education, research and extension institutions; (iii) promoting innovations in insect science, in collaboration with regional and national agricultural research and advisory services, and the private sector. These objectives are realised through postgraduate training at PhD and MSc levels, professional development schemes for scientists, and non-degree training for technicians, scientists, community members and extension workers.

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