

On farm research and extension methods

Webinar Panel #5, 19 October 2020 – Key Points

This panel was the fifth in a series of webinars aimed at increasing the visibility of the 4R Solution Project, creating a network of African and Canadian scientists in its support, and increasing the engagement by African universities in 4R Nutrient Stewardship. The following report highlights the key points made by each speaker, and describes the discussions in response to questions. For more detail, see the recorded two-hour presentation and the presentation slide deck.

Introduction & Welcome

Clyde Graham, Fertilizer Canada, and moderator Ed Rege welcomed participants, outlined the theme and introduced the speakers.

1. On-farm Nutrient Omission Trials: A Platform for Crop Nutrition Research and Education. Kokou A. Amouzou | Program Coordinator - West Africa | African Plant Nutrition Institute

Using the participatory on-farm nutrient omission trial platform, farmers are present at each stage: identification of constraints, development of site-specific 4R-based nutrient recommendations, and dissemination and scaling. The role of decision support tools is also important and complementary. Deficiencies of secondary nutrients and micronutrients are also becoming common, and may need to be included in nutrient omission trials. The on-farm nutrient omission trial provides, in addition to soil fertility diagnosis, a platform for crop nutrition education as well. In the Farmer Field School, farmers are able to see the deficiency symptoms associated with each nutrient in each crop.

Question:

Why is urea deep placement technology not being widely promoted across crop production systems in Africa? Kokou answered, though this technology was not covered by my presentation, it is important particularly in rice-based systems. There is much promotion in Africa – particularly by IFDC in Togo and Burkina Faso, and it is continuing.

2. On-farm balanced nutrient evaluation trials: closing yield gaps and balanced nutrient management. Ruth Sitienei | Soil Scientist- Africa Region | The Nature Conservancy.

Current food production methods have depleted the health of our soils. Of agricultural soils worldwide, 52% are severely or moderately degraded. The Nature Conservancy (TNC) uses a landscape approach to smart expansion, addressing the ten critical transitions to transform food and land use, identified in the [Food and Land use Coalition](#) report. These transitions involve nutritious foods, nature-based solutions, wider choice and supply, and opportunity for all. There is an important role for women, but the covid situation has reduced the reach of extension. TNC is using new methods to link water, climate, and food, through soil health, making a business case for the smallholder farmer and providing specific fertilizer recommendations. Availability of the right blend of fertilizers imposes a limitation and is linked to diet-induced problems, including stunting in children. Starting with the soil, we can fix the whole ecosystem. Many soils need pH correction (lime) before fertilizer can be effective. The landscape approach, coupled with 4R Nutrient Stewardship and Site-Specific Nutrient Management, provides benefits to agriculture by minimizing leaching losses to get more efficient use of fertilizer, and closing yield

gaps. The goal of this holistic approach is healthy soils, healthy crops, healthy livestock, and healthy people. The landscape approach fixes the soil to enable feeding the world.

Questions:

1) Can you clarify the extension methods and approaches used in TNC programs? Answer: We work through partners: seed input companies, Toyota fertilizer company, and ICRAF for soil analysis. We advise on fertilizers, right inputs, right timing, spacing of plants, and hybrid seeds resistant to drought. They reach out to farmers in groups. During covid, we work through a digital platform, providing short messages to farmers, depending on the season, tapping into the right markets, and larger markets.

2) Do you use video extension tools. Answer: Not yet. Haven't used because we reach out directly, using brochures and charts.

3) While 4R technology is validated at the farm plot level, what processes do you use to scale up to the landscape level? Answer: We build the business case for 4R. Central point is the financial stability of the investment. One example includes the use of water bonds – using nutrients to attain better water use efficiency. Using the right fertilizer at the right time, placing it right to ensure availability to the crop. We are moving away from monoculture, for example by planting tomatoes in off-season. The landscape approach is demonstrating greater benefits of soil health.

3. Innovative Agriculture Extension Models for Empowering Smallholder Farmers in Africa: The case of Sasakawa Africa Association. Bidjokazo Fofana | Director - Crop Productivity Enhancement | Sasakawa Africa Association

Sasakawa is one of the few organizations that work with whole national extension networks. Across Africa, the farmer:extension ratio is 1 to 3,000. Sasakawa sees need to narrow that ratio, providing more extension workers relative to farmers. The main objective of its crop productivity enhancement theme is to increase agricultural productivity and income for smallholder farmers while strengthening the capacities and skills of national extension agents along the value chain. The extension model includes community-based value chain agents: traders and trainers, savings and investment, farmer learning platforms, seed multiplication, and agro-processing enterprises. Farmer Learning Platforms include 4 demonstration plot types: community demonstration plots (CDPs), technology adoption plots (TAPs), model adoption plots (MAPs), and community practices plots (CPs). In both Nigeria and Ethiopia, preliminary results indicate significantly higher yields (58% to >100% higher) of maize, teff, barley and wheat in CDPs as compared to CPs. Climate smart technologies evaluated in Mali, Nigeria and Uganda show substantially higher yields for maize, millet, sorghum, cowpea and sesame. For example, Uganda maize yields were increased from 600 to 2100 kilograms per hectare. Farmer Learning Platforms provide an avenue for all stakeholders to interact. Future technologies should mainstream climate smart agriculture in a value chain approach.

Questions:

1) What are the key elements of successful extension related to soil conservation and management in agriculture? Answer: Soil conservation should address what is important to farmers. Conservation agriculture has a lower requirement for tillage, which is an advantage for women farmers, who have hardly any access to tillage equipment. Tillage imposes a high labour requirement on women farmers. Conservation agriculture also conserves water under deep

mulch reducing need for irrigation and reduces labour for weeding since mulch suppresses weeds

2) By what metrics, other than yield, does Sasakawa evaluate performance? For example, nutrient use efficiency, profitability, ease of adoption? Answer: We are evaluating adopted technologies, thus questions of adoptability, profitability, and best fit to the local needs are addressed before assessing yield impact. We have economics to make sure farmers can generate income. We identify which elements of the technology have not been adopted, to make sure it's all taken on board, addressing the human dimension.

3) What is the adoption process of the Farming Learning Platform model? Answer: FLP is an entry point technology intervention strategy. Working with farmers association is the critical entry point. Farmers cooperative are rural entities, rural institutions, and sustainability pillars. We have adoption increasing of business and extension models, using community-based extension agents. Where you improve motivation of farmers you assure sustainability.

4. Use of Duapa app - farmer led mobile platform for effective research education and extension services. Evans Larbi | CEO | Beit Farms

Agriculture in Africa is on the move. I am a farmer who started as a smallholder. I was able to use revenue from agriculture to cover the costs of my secondary education. My background is strong in Information Technology and business. I work with an organization with membership of 50,000 smallholder farmers in Ghana. The DUAPA app connects farmers and the value chain. It is an ICT farmer-led mobile platform to support access to food production information, research information, advisory services, information, markets, technologies through extension services. The innovation is to bridge the gap between those with and without access to extension services. We are targeting the stakeholders benefiting from the smallholder farmer, including the crop, private sector, fertilizer, farm machinery, feed suppliers, and fungicides. Many farmers are without smartphones or internet access. The strategy is to get them the right phone number to call for advice, from extension agents familiar with their language and their farming system. We have an agreement with Vodafone; working on other stakeholders as well. The business model has 9 blocks including all value chain actors (researchers, producers, extension workers, processors, transporters, consumers, and policy makers, telecom companies, weather insurers, banks, among others). Farmers can easily sell their produce on this platform.

Questions:

1) There are several other apps developed to help provide information. What do you see as the advantage of Duapa over the others? Answer: We have added value: the farmer needs to get the answers in a language they understand. Other apps don't. Without internet connectivity, the others don't work. Duapa works whether connected to internet or not - that's why we have contract with Vodafone - but we will work on more since not all farmers have Vodafone.

2) What is the source of extension advice on the Duapa app? Answer: Most of the extension service of Ghana. Bridging stakeholders to the government. Once farmer dials the code they get connected to local extension.

3) Clarification on the process that you use to motivate the integration and participation of all the players you mentioned? Answer: Vodafone has confirmed, have a large database, and they are on board. We are talking to value chain players who want to integrate their services. We have a whole team of IT guys on board.

5. General Discussion

Question: Who is the farmer we are reaching out for? Different farmers have different constraints. How to tailor the technologies to meet the different types of farmers?

Fofana answered, there are smallholder subsistence farmers across Africa. Along the way you subcategorize - subsistence to emerging, then emerging to commercial, and as this happens you start tailoring the needs. Start to modify the content of training and demo plots. Our primary target is not any one specific category of farmers. We change as we move forward with each category of farmers.

Ed Rege noted that the 'smallness' of farmers, their techniques and technologies, their use of own labor, their economic level, all need to be contextualized, right? Fofana agreed, and noted the importance of keeping aware of the dynamics as farmers change.

Shamie Zingore noted that interventions need to be successful in moving from subsistence towards market participation. There is the question around climate-smart plant nutrition: we all understand the challenges and the risk farmers face in increasing productivity, and we know that they are not able to maintain their investment because of the risk. How do we ensure farmers don't bear all the risk?

Kokou noted that climate change and weather variability plays a role in the crop responses to nutrient application that are observed in the nutrient omission trials. These sources of variability have implications for fertilizer requirement calculations. For this reason, long-term trials are needed that capture the variability due to weather and allow calculation of risk. The long-term trials are thus very important.

Ruth discussed an example of water use in a TNC project, in which a financial mechanism to fund land conservation upstream provided benefits. Farmers upstream were issued water bonds to stop pumping from the rivers. There is farming along the rivers, and risk of soil erosion into the water. The water flows to and is important for Nairobi City. This conservation project conserved the river and the sustainability of farming. Farmers continue to irrigate during the dry season. The farmers return on investment is built around soil health, agroforestry, and increasing biodiversity.

Ed Rege summarized the key points as follows:

Kokou – Locally embedded nutrient omission trial approaches provide relevant extension.

Ruth – Fix soil health to feed the world.

Fofana – Interactive farmer learning platforms show benefit of climate-smart technology.

Evans – Duapa app bridges the gap to reach those without access to extension.

Clyde Graham thanked Ed and Shamie and Labonya and Mac White for their support. He noted webinar materials are all available and will be posted on the website. He encouraged spreading the word on the 4R champion program: up to \$1,000 for micro projects in the area of science communication and extension related to 4R Nutrient Stewardship.

Next month's webinar will focus on Crop Sensing. It is scheduled for Monday 23 November 2020. Details of speakers and program are to be posted on the [4R Solution website](#).