



STRENGTHENING CAPACITIES TO INNOVATE THROUGH NORTH-SOUTH COLLABORATIVE AGRICULTURAL RESEARCH IN PAPUA NEW GUINEA | 2

Researchers at the University of Queensland have worked on research projects in the PNG Highlands since 2005. These projects were, and are, applied research to manage soil fertility in sweetpotato-based cropping systems in the Highlands. They were funded by the Australian Centre for International Agricultural Research. Our key collaborator was PNG's National Agricultural Research Institute. Although the projects were in the field of Soil Science, specifically soil fertility management, our approach has always been multidisciplinary. The timeline of project management has always been a small scoping study type activity to assess research needs before full-length projects commenced. All activities were planned in close collaboration with NARI, NGOs, and the farming community. This allowed us to develop and implement projects in a truly collaborative manner. A key component was regular visits of UQ project staff to review project activities, provide on-the-job training, and plan new project activities.

In this Good Practice Note, Gunnar Kirchhof reflects on his experience of doing agricultural research in the PNG Highlands over the last 15 years. It is a personal account of having worked as an Australia-based researcher in the PNG Highlands; it is a narrative of impressions that aims to guide and make research in this region more effective.

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Cover photo: Completion of Farmer Field Schools on soil fertility training ©Gunnar Kirchhof

INTRODUCTION

Papua New Guinea (PNG) is the largest and most populous Pacific Island Nation. The least developed part of PNG is the Highlands Region. It was not until the 1930s that explorers discovered that the Highlands was home to almost one million people. This has grown to about three million at present with one of the highest population growth rates. Despite the large development potential of the Highlands Region, it is one of the least developed regions compared to other countries with emerging economies. This is evident by the fact that no proper road systems with efficient infrastructure exist today; the main road through the Highlands was not built until the 1950s, and at present it has severe maintenance problems. Quite often this region is also called the 'last frontier' with regard to development. Agricultural research has to deal with many challenges, such as poor infrastructure, security concerns, and dealing with a wide range of traditional communities including tribes. These are only some examples, yet, the Highlands Region has one of the greatest potentials for agricultural development compared to almost all Pacific Island Nations. But it is also one of the most difficult regions for agricultural research.

HISTORY

The staple food of PNG is sweetpotato. Most are produced in the Highlands Region by smallholder producers. Due

to the high population growth in the Highlands and very limited ability to expand agricultural production, intensification of sweetpotato-based systems is not only necessary but already happening. The question is about the sustainability of an intensification system that is primarily based on shortening the fallow period between sweetpotato crops, in the absence of any addition of nutrients to replenish what was reduced during harvest. The research that addresses these problems has been funded by the Australian Centre for International Agriculture Research (ACIAR) and was carried out by the author and co-workers from the University of Queensland in collaboration with the National Agriculture Research Institute (NARI) of PNG.

APPROACH

We collaborated with different NGOs during different phases of the projects. So far, there have been two major projects – the first was more about general soil fertility management in sweetpotato based-systems (2007 to 2011), and the current one (2016-2023) is more about the sustainable intensification of this system. Each of these two main projects was preceded by a smaller scoping type study as a lead-in to the larger projects. These scoping studies or short research activities gathered existing information and collected additional data as a lead-in to develop a larger project.



Farmer Aku Kulo from the Asaro Valley giving his approval for improved soil fertility management in his farm in Eastern Highlands of PNG © Gunnar Kirchof

Understanding farmers' perception through Farmer Surveys

All projects are basically bio-physical, technology-based research activities. However, unlike most technology-based projects, the starting point for this set of projects was a farmer survey to measure farmer perception about the significance of potential soil fertility decline in sweetpotato based-systems. During these surveys, we discussed sweetpotato production issues and concerns with farmers. Key questions were about the length of continuous production in different gardens, how productivity changed over time, and collecting information about what farmers thought. This was a Social Science-based activity. However, we confirmed what farmers told us by collecting soil and plant samples from

the gardens they referred to. This was the biophysical part of the survey. Given that we had to disturb a small part of the gardens, discussions were held about whether we should pay compensation to farmers. This tends to be a general cultural practice whereby if something is disturbed or destroyed, there is an expectation that whoever causes the damages, pays for it. We decided not to pay compensation or for loss of income by ensuring that farmers understood what our work was all about. Several β -test surveys were needed to ensure that this potentially dangerous argument about compensation remained calm. Wording surveys appropriately and surveying using conversation appeared key issues for the smooth running of this

combined social- and biophysical-based activity.

It is also important to assess why farmers are interested in working with us. There are basically three reasons: (i) for payment when collaborating with researchers; (ii) for status by talking or dealing with an important outsider, or; (iii) they have a problem to share with us where we can help. The latter is the group of farmers we should work with. An important point to highlight here is of farmers' complaints that research often conducts such surveys and then they are never heard from again. Some portion of our activities was the promotion of our work in newspaper articles and radio interviews. Part of the development of the second large project was another similar farmer survey where we visited those farms that had been interviewed before. Although happiness and satisfaction were not part of the surveys, it was obvious that our following up was much appreciated. It showed longer-term commitment and demonstrated that projects, in particular those that have longer-term goals for sustainability, run for more than just the usual 3 to 5 years.

Strengthening partnerships with the Research organisation and NGOs

NARI is PNG's primary agriculture research organisation with an entry point for research all over PNG, including two Highland-based research stations at Aiyura and Tambul, as well as several resource centers. Developing good working relations with the local staff, understanding the work culture and organisational administration is imperative for a successful project.



Project planning workshop, Goroka, July 2016 © Gunnar Kirchhof

The only efficient method to learn about the real environments is to spend time in-country and become part of the local team. This formed a crucial part of the author's involvement during the first main project when project visits were well over a month, several times a year. An even better approach would be to be based in-country, though in many cases this may not be possible.

The key issue is to avoid the short term, fly-in fly-out visits. It is impossible to gain a good understanding of local constraints and working cultures or environments by only spending a few days in-country once in a while. Expecting a short visit only makes it quite simple to prepare everything well and how well the short visit was organised is no indication of what normally happens. Longer visits not only assist with gaining a good understanding of what is really happening but also help foster the development of personal relationships. Providing local staff the ability to travel for conference attendance or training activities is also a large incentive for building and maintaining good collaborative partnerships.

Since the pandemic started in early 2020, no project site visits were possible. Since then we have had active communication via our WhatsApp group and regular Zoom meetings. These internet-based communication tools would not have been possible, say five years ago, and shows that mobile internet communication has come a very long way in the last few years. However, not being able to visit our collaborators has also set the project back by at least a year and it is our firm assessment that there is no efficient substitute for face-to-face meetings and discussions.

A very large number of NGOs are active in PNG. Most are local church-based organisations, some are international church-based organisations but also local, and then there are some large international aid organisations. No specific NGO will be listed in this section and it will be a very broad assessment of the benefits of working with NGOs.

The main benefit of collaborating with NGOs is their ability to reach communities, many of them very remote, that are outside what NARI can service. This makes them potentially excellent partners for outreach programs. However, most NGOs are not agriculture-based organisations and may have insufficient know-how to collaborate on agriculture-based projects. This then required training activities to ensure quality control of information disseminated to the communities.

How open NGOs are to training depends somehow on how strong their preconceived ideas are in regard to agricultural production. There is

considerable antipathy about using mineral fertilizer in many NGOs, and any activity that could promote the use of mineral fertiliser is blocked. In short, the promotion of organic farming is very effective and can undermine the sustainable intensification of the sweetpotato system. Almost all farmers we worked with are against the use of mineral fertiliser. This is rather ambiguous as they are using mineral fertilisers on vegetables.

The explanation may be that the new vegetables white people introduced to PNG came with instructions to use mineral fertiliser, but sweetpotato is the traditional crop and it did not come with a manual to use mineral fertiliser. Even market-oriented large producers do not use fertiliser even though some of our work with these farmers showed a 1:10 cost-benefit ratio from using mineral fertiliser. We do not understand very well how information circulates through the PNG farming community and NGOs are much better able to influence the perception of farmers than us, the researchers.

Capacity development

Adoption of research requires on-farm, farmer-led research activities, probably coupled with Farmers Field Schools or working with Family Farm Teams. On-farm activities are notoriously difficult for quality assurance. It is also very common that ad-hoc priorities shift and farmers are probably not as diligent as we would like them to be in looking after research activities. The same can also apply to on-station data collection due to security issues (produce gets stolen), staff turnover, or technical limitations.



Family Farms Teams training at Voice for Change in Jiwaka Province © Gunnar Kirchof

This tends to make capacity building and on-the-job training just as important, if not more important, for impact compared to research publications. Effective training also requires longer site visits and not short-duration fly-in fly-out visits. Organisational capacity building is probably the main impact of many research projects. It can be measured by how many staff, mainly junior staff, was able to go abroad for a Masters or PhD program. However, a larger goal is the adoption of new technology, in our case, soil fertility management practices that result in sustainable intensification. Part of our first large project was Farmer Field Schools and we estimated that we trained around 7000 farmers. But having trained farmers doesn't equate to adoption and associated reduced soil fertility rundown and improved productivity.

IMPACT

We know from our survey work that within 10 years, the length of fallow has shortened by almost half, and continuous production is now more common. But no data shows large-scale adoption, perhaps some informal observation, in particular from the Eastern Highlands, that farmers burn less and retain fallow biomass more than they did before we started our work. Farmers, however, still remember our Farmer Field Schools favourably. Even though they may not use mulch or compost to maintain soil fertility, many are still familiar with what our trainers called the NPK-mix: a mix of piper for K, Tithonia for P, and the fish-kill-plant Tephrosia for N as an alternative to mineral NPK. But it seems the adoption of this organic NPK-mix has not happened.



Highland Markets, Mount Hagen © Gunnar Kirchof

Overall, even after over 15 years of our work on soil fertility on sweetpotato based-systems, the measurable adoption of known methods that will overcome soil fertility decline is very low. Although we know that farmers are aware and concerned over declining yields, not much has changed in the way they manage, or do not manage their soil resources. We still do not understand very well what holds them back.

This is particularly peculiar for larger-scale farmers who run sweetpotato production as a business. They are aware of a 1:10 cost benefit ratio for using mineral fertiliser, yet they don't use it. Our work has shown that mineral fertiliser does not impact taste, yet farmers are convinced it reduces taste. And as in regards to selling

sweetpotato, no customers have ever asked if mineral fertiliser has been used.

CONCLUSION

The key points for undertaking North-South collaborative research trying to promote new crop management practices in countries such as PNG can be summarised as follows.

Relationship Building with farmers:

Foster good relationships with the farmers by understanding their perceptions through a survey and providing tangible follow-up. The way we assess farmers' perception is still inadequate and we need to gain a better understanding of adoption constraints and what adoption pathways to use.

Long-term engagement with national research teams: Avoid short-term fly-in fly-out project visits and aim for longer, even semi-permanent placement of project staff in-country. For efficient project communications, site visits are needed and internet-based communication should only be an alternative whilst pandemic-based travel restrictions are in place.

Focus on capacity development: Research should focus more on the capacity development of NGOs with less emphasis on research publications. Also build on the capacity of NGOs, especially their community access to reach remote communities, but ensure sufficient agricultural knowhow for non-agriculture focussed organisations.

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Large Engan Sweetpotato mounds in the Western Highland Province
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Good Practice Notes Series

The Asia-Pacific Islands and Rural Advisory Services Network (APIRAS), the Asia-Pacific Association of Agricultural Research Institutions (APAARI), in close collaboration with the Research and Extension Unit of the Food and Agriculture Organization (FAO) of the United Nations are committed to strengthen agriculture innovation systems in Asia-Pacific for transforming agri-food systems.

In 2020, APIRAS and APAARI carried out a Joint Rapid Appraisal (JRA) to scope the innovation environment to identify and document initiatives aimed at strengthening Agricultural Innovation Systems (AIS), in a context of the TAP-AIS project.

The JRA study revealed three main barriers that constrain development of an effective AIS in the Asia-Pacific. These include: a) lack of sufficient partnerships among actors in the AIS, b) inadequate investments and lack of policies that could steer the research and extension agencies to engage with other AIS actors, and c) lack of sufficient capacity development initiatives aimed at enhancing functional capacities of AIS actors. Publication of this series of Good Practice Notes is an attempt by APIRAS and APAARI to document cases that have tried to address development of an effective AIS through addressing the above constraints.

The TAP-AIS project

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