

Assessment of National Capacity to Utilize GCP Technologies in Five Case Study Countries

SP5 Project G4008.24: From Attractiveness to Feasibility: A Strategic Assessment of the Capacity to Develop and Adopt GCP Technologies

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Introduction

Several mechanisms were put in place to select the project's case study countries: revisiting the existing evaluation of high priority geographic areas and cropping systems (Hyman *et al.*, 2008), a global inventory of GCP research according to country, crop and trait combinations; and the early analysis of some R&D indicators (especially agricultural research intensity ratios) drawn from the ASTI initiative. The group of countries selected was then confirmed when the GCP Challenge Initiatives were announced in order to focus case study efforts on countries and crops of direct relevance to the next phase of the GCP. The five case study countries and their commodity/trait focal of relevance to GCP are: Burkina Faso – cowpea and rice, Mali – sorghum and rice, Nigeria – rice and cassava, Tanzania – cassava, and Indonesia – rice. While drought resistance is the predominant trait of interest, in Indonesia GCP science is also targeting soil fertility constraints. Soon after, a representative or Case Study Leader (CSL) for each country was engaged in the team. They were invited to participate in a workshop held in Toronto, Canada in June 8-10, 2009. Each CSL was charged with the challenge of implementing a survey that would provide first-hand data which will be correlated with other sources of secondary data for the target countries and commodities including, among others, value of production, agricultural research investments and human resources statistics, and GIS data and maps. The ultimate goal of the study is to provide new methods, databases and tools to support future capacity assessments for other countries of relevance to the GCP.



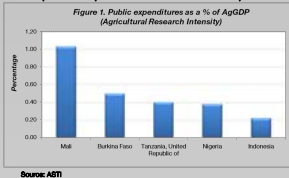
One of the sessions of the Toronto Planning & Technical Workshop, 8-10 June, 2009.

Workshop

Following the selection of the case study leaders (CSL), the project team gathered in Toronto (ON), Canada from 8th to 10th June, 2009 (Picture 1). Four of the five in-country leaders were brought in to participate in the survey planning and analytical design workshop whose central themes revolved around building awareness and understanding of the project goals, especially for the newly engaged members; validating the conceptual approach proposed in the project design; and establishing a standardized national survey instrument and protocol.

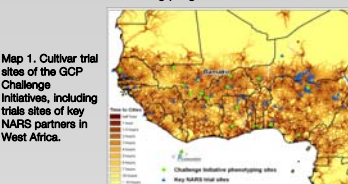
ASTI Data

The agricultural research intensity ratio (total public spending as a % of the agricultural gross domestic product) is an important indicator to determine the level of capacity of the research system to adopt and develop new agricultural technologies. Figure 1 shows that higher values, such as Mali (1.03%) suggest that there is a better chance that Mali's national breeding system might be better able to adapt GCP technologies than other countries (for example Indonesia with 0.22%).



GIS Data

One of the key questions about the capacity of breeding programs is the extent to which national programs are able to integrate well with GCP activities and technologies. The greater the levels of implementation interaction, and the greater the agroecological similarity that exists between GCP and national testing and trial sites, the greater is the probability that national programs will be better placed to accept and utilize GCP developed lines. As illustrated in Map 1, GIS data and tools can be very helpful in exploring the degree of harmonization between the location and the agroecological similarity of GCP and national breeding program efforts.

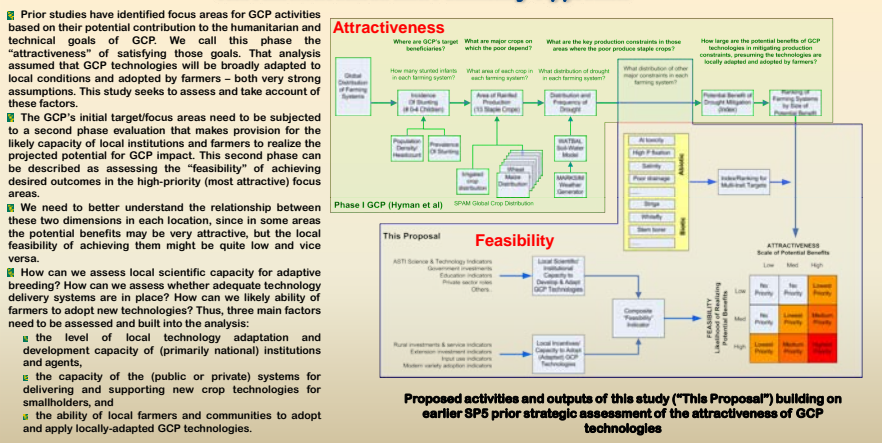


Literature cited

Hema, D. (2008). *Plant Breeding and Related Biotechnology Capacity, Burkina Faso*. Retrieved from <http://gipb.fao.org/Web-FAO-PBB/index.cfm?where=04>

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The Attractiveness and Feasibility Approach



The Survey

The main outcome of the workshop in Toronto was a set of 50 key indicators, grouped in five thematic areas: 1) crop breeding, 2) seed systems, 3) enabling environment, 4) household characteristics, and 5) adoption. Each indicator was subjected to thorough analysis by the group which determined, later on, the metric (units of measurement – e.g. Dollars, number of people, hectares, etc.) and sources of data (e.g. NARS, national agricultural census, ministries of agriculture, etc.). The indicators were then incorporated into a survey form. The initial five thematic areas were regrouped into three questionnaires (Figure 2): Crop Improvement; Seed Systems and Extension; and Household Characteristics, Enabling Environment and Adoption. The survey is being administered to several target groups such as National Agricultural Research Systems, seed companies, ministries of agriculture, universities, farmer associations, NGOs, and other specialized agencies by means of documentary research and focus groups. Each focus group is composed by approximately 8 people (experts/key informants) from the said agencies. The CSL is responsible for putting the group together and facilitating a focus group discussion (FGD). The purpose of each FGD is to reach a consensus on each aspect of the survey. That way, the group will have a more consistent interpretation of the question being asked in the questionnaire and, therefore, the possibility of obtaining more consistent responses is better.



Figure 2. Three Questionnaires used in the survey: Crop Improvement, Seed Systems and Extension, and Household Characteristics, Enabling Environment and Adoption.

Focus Group Discussion Methodology: The Case of Nigeria

Two FGDs were carried out in Northern (rice) and Eastern Nigeria (cassava). Different actors were involved in joint discussions that revolved around the survey instruments developed for the national studies and they included representatives from crop breeding programs, farmer associations, seed companies, NGOs, CG Centers, among others (Image 1). Two more FGDs are still to take place in Western Nigeria for cassava and rice.

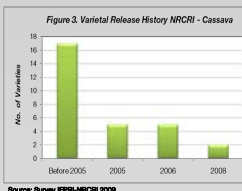


Image 1. Top left: Members of the rice FGD in Northern Nigeria. Middle right: Cassava FGD in Eastern Nigeria. Bottom left: Field trip in Eastern Nigeria.

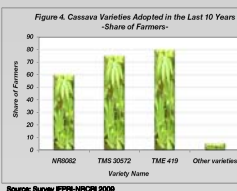
Initial Survey/FGD Data

The agronomic and quality attributes of released improved cassava varieties in Nigeria (Figure 2) include: yields higher than 25 t ha⁻¹, dry matter content above 30%, mosaic disease resistance, and they can satisfy the food, industrial and livestock demands.

The average crop area of improved varieties of cassava among adopters is 0.5 ha. The share of farmers in terms of adoption rate (Figure 3) shows that NR8082 has spread up to 60%, TMS 30572 has spread to 75% among farmers, while the adoption rate for TME 419 among farmers is around 75-80%. Other varieties are less than 5%.



Source: Survey IFPRI-NRCRI 2009



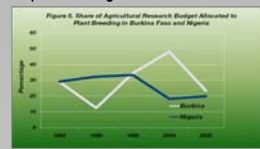
Source: Survey IFPRI-NRCRI 2009

GIPB Data

The Global Partnership Initiative for Plant Breeding Capacity Building (GIPB) of FAO, is one of the latest resources for the project. GIPB databases offer vast information on plant breeding capacities which has been incorporated as a very trusted secondary data source.

Budget Allocation

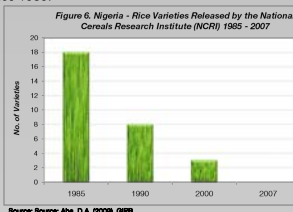
Part of the data found on the website include budget allocation to plant breeding. As observed in Figure 1, in 1995 the total budget for agricultural research in Nigeria was US\$668 thousand and the plant breeding budget US\$223 thousand (33% of the total budget). Conversely, in the same year, the total agricultural research budget in Burkina Faso was US\$61.8 million, which elevated the plant breeding portion to US\$21 million (34.51%). By 2005, the budget allocation for agricultural research in Burkina Faso decreased drastically to US\$7 million and for plant breeding to US\$1.7 million (23.36%). In Nigeria, on the other hand, the allocation for both total agricultural research and plant breeding rose up to US\$1.8 million and US\$361 thousand respectively, although the proportion of budget for plant breeding decreased to 19%.



Source: GIPB Database. Calculations of percentages done by the authors.

Varietal release data

The National Cereals Research Institute (NCRI) has released a total of 29 improved rice varieties in the last 22 years (Figure 6). However, the institute did not release new varieties in 2007, which confirms a negative trend since 1985.



Source: Abe, D.A. (2008), GIPB.

Conclusions

- Five country case studies are on-going following an agreed data collection and synthesis approach.
- Both questionnaire-based surveys and Focus Group Discussions are being used to gather information on the capacity of national institutions to readily utilize and further develop GCP technologies.
- Three national sub-sectors are targeted for data gathering; breeding programs (the point-of-entry for GCP technologies), seed systems (needed to scale up and disseminate the technologies), and extension and farmer (where technology information, production practice knowledge, and farmer preferences come together to shape adoption possibilities).
- Initial results are now being processed for two countries, Nigeria and Indonesia and nationally compiled information being merged with data collected from other sources (ASTI, GIPB, related GCP projects, and HarvestChoice)
- Country visits will be needed to accelerate and harmonize data gathering and interpretation efforts.
- Early results suggest required capacities are fragile, where they exist, especially as a consequence of variable investment. Further analysis seeks to identify the weakest links, and propose rapid assessment techniques for defining capacity bottlenecks and development opportunities.

Acknowledgements

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