

A Critical Analysis of Agriculture Extension Services in Papua New Guinea: Past, Present and Future

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A Critical Analysis of Agricultural Extension Service in Papua New Guinea: Past, Present and Future

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1. Introduction

Agricultural extension is a functional system of applying scientific research results and new knowledge to agricultural practices through farmer education (van den Ban & Hawkins, 1996). The process involves the conscious use of communication of information to help rural peoples form sound opinions and make good decisions on how to improve their production methods and techniques so as to increase farm efficiency and income, and to enhance their levels of livelihoods, and social and education standards.

Today, the field of agricultural extension is more complex and encompasses a wider range of communication and learning activities organized for rural communities by different disciplines, such as agricultural education, agri-business and marketing, agricultural engineering, mass communication, health and environmental sciences.

In Papua New Guinea (PNG), the complexity in the agricultural extension service has evolved with political, administrative, and institutional reforms over the last fifty years (Sitapai, 2011). Commencing as a single line central government function in the 1950s and 1960s, the agricultural extension service is presently a shared responsibility of the three-tiers of Government as well as statutory commodity boards, semi- or quasi-government organizations. However, despite the institutional complexity of service providers, the extension service is industry specific and supply-driven, with a primary focus on increasing production of cash crops. The extension service is also highly dependent on public funding. Hence, with the declining Government budgetary support over the years, the quality of the service has deteriorated, with limiting coverage nation-wide.

The state of decline in the quality of agricultural extension service in PNG has been extensively reviewed over the last twenty years. The Asian Development Bank (ADB) studies in the early 1990s recommended further institutional reforms for research and extension in PNG (ANZDEC, 1993). Subsequent reviews by the National Department of Agriculture and Livestock (NDAL) in the late 1990s (McKillop, 1994) and early 2000s (GOPNG, 2000) led to a National Extension Summit in 2004 (Dekuku *et.al*, 2005).

This paper presents an account of the evolution of agricultural extension prior to, and since Independence, including an analysis of the current status of extension service providers. It also outlines a process of reform as a way forward in mobilizing the potential of the rural advisory services, and as an effective tool for achieving agricultural and rural development. The paper concludes that this reform will be best aided by a new and robust extension policy, promoted by a national advocacy mechanism for extension stakeholders in PNG.

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2. History of Agricultural Extension Services

2.1 Pre-Independence Period

The agricultural extension service has a history dating back to the late 1930s with the advent of plantation agriculture (Dennis, 1981). After the 2nd World War, the early Administration commenced the rehabilitation of the agriculture sector, under a colonial policy of developing an export-oriented economy based on selected perennial tree crops. As part of this effort, the Administration, through its colonial Department of Agriculture Stock and Fisheries (DASF) commenced a network of agricultural experiment stations in the 1950s, located at strategic position in the country. The research facilities were established in the Central, East New Britain, Morobe, Eastern Highlands and Western Highlands Provinces. The oldest of these establishments was the Lowlands Agricultural Experiment Station at Kerevat, in East New Britain. It was established in 1938, and was rebuilt after the Japanese invasion in 1945.

The research centres were the sources of improved stock and plant genetic material, and information for farming communities. DASF also established extension centres in all districts, which became depositories of improved genetic material from research for distribution, and were also venues for farmer training and information dissemination.

The extension support to farmers was delivered using the Training and Visit (T&V) system. The objective was to identify highly suitable areas of land for plantation crops, and promote the establishment of estate and smallholder plantings using improved genetic material and technical advice. Many agricultural projects in the two decades prior to Independence were driven exclusively by this approach, including the development of land settlement schemes for rubber and cocoa in the mid-1960s, and the oil palm schemes in the early 1970s.

Early livestock extension was limited to cattle production. Commercial cattle grazing were promoted on ranches as well as under plantations crops. The latter was an ideal dual-production system in most coastal areas. Smallholder cattle farming was promoted under a World Bank (WB) subvention in the 1960s and this led to the expansion of pasture areas in Madang and Morobe, central Highlands and the Papuan coasts (McKillop, 1976).

Extension officers were trained at agricultural training colleges, established by DASF in the mid-1960s. The trainee awards were: a certificate in tropical agriculture after 2 of years training, or a diploma after 3 years of training. The trained officers are generalist in all aspects of agriculture, and are tasked to visit farmers with prescriptions for their production constraints. An agricultural extension officer position was a prestigious post in the colonial service, and for many years, this designation constituted a large percentage of civil servants employed by DASF.

The impact of agricultural extension services prior to Independence was mixed. While there was growth as measured by the planted areas of tree crops and levels of annual agricultural exports to early 1970s, the exclusive focus on the promotion of commercial crops and livestock, meant that the subsistence agriculture (village livestock and staple food crops), was totally neglected by the extension service. This situation has continued to the present time.

2.2 Post-Independence Period

The management and delivery of extension services in the post-independence period were largely influenced by two government policy interventions: the *decentralization* policy adopted immediately after Independence, and the *corporatization* policy of the 1990s. The following is an account of impact of these policies on agriculture extension to the present time.

2.2.1 The decentralization process

The decentralization process was aimed at empowering provinces to determine their own development priorities and manage their expenditure budgets. The policy outcome was the Organic Law on Provincial Governments (OLPG) passed in 1976. OLPG paved the way for the establishment of Provincial Governments, and the transfer of development functions and financial powers from the National Government. A key function decentralized was agriculture extension, but is performed as a concurrent function of provincial and national agencies, hitherto.

In 1995, OLPG was amended by the Organic Law on Provincial and Local Level Governments (OLPLLG), to give recognition to districts as the focus for local development planning and services delivery. The Organic Law further decentralized extension responsibility to local level governments (LLGs). However, at district level, extension staff report to district managers for their activities, and receive no command from agricultural advisers at provincial headquarters. This situation is made more complex by the administration of district support improvement program (DSIP) grants. Presently, DSIP allows for K1million annually for agriculture development per district, but it is difficult to ascertain whether this level of expenditure actually occurs, because many district lacked well defined plans and priorities.

Generally, the government extension programs at provincial and district level are poorly staffed and resourced. The situation has not improved despite increases in the provision of provincial grants and rural sector funding over the last decade. Since the late 1990s, several private sector organizations have become directly involved in the provision of extension and advisory services.

2.2.2 The corporatization of the agricultural sector

In 1990, the Government adopted a corporatization policy under which key commodity organizations for coffee, oil palm and cocoa and coconuts were created as separate legal entities. The objective was to give the industries autonomy, and be made accountable to their stakeholders. The move entailed further devolution of research and development, extension and marketing functions from NDAL.

The corporate entities developed joint extension activities with provinces, districts, as well as other actors at local level. The agencies are responsible for their own funding through industry imposed levies, but receive supplementary funding from the annual Government budget appropriations. Provincial and district program priorities are often determined independently of national agencies. Such disjointed program planning, reporting and responsibility of execution persist throughout the extension service.

The corporatization process also resulted in the transfer of the research function for tree crops (coffee, oil palm, cocoa and coconuts), and food crops and livestock from NDAL to respective agricultural statutory bodies. Importantly, the process did ensure that agriculture research remained a national function under the NARS, while agriculture extension function remained a concurrent function of several public, as well as private sector agencies.

The growth of the PNG NARS is worth highlighting here, because of its potential impact and influence on agriculture development. Accounts of four commodity groups of NARS and their technology packages that can impact farming communities through extension are given below:

- **COFFEE** - Coffee research and extension functions were taken over by Coffee Industry Corporation (CIC) in 1990. Since then, CIC has produced improved coffee varieties (both *Arabica* and *Robusta*), agronomic and processing techniques, and extension models for disseminating proven technology packages. In particular, CIC has developed improved processing techniques to up-skill farmers in producing high quality coffee beans. If adopted, the techniques can allow smallholders producers of Y Grade coffee (60% of annual production) to produce Premium Grade coffee and earning higher prices for their effort. The impact on coffee farmers' income and livelihoods would be enormous.
- **COCOA/COCONUTS** - Cocoa and coconut research and extension functions were corporatized in the late 1980s, but housed under separate entities until 2004, when they were amalgamated under PNG Cocoa Coconut Institute (CCI). CCI has released many cocoa and coconut technologies to farmers. The prime technology package is its hybrid cocoa clones which can yield over 1,500 kg of cocoa beans per ha. Presently, smallholder yields average only 250kg of beans per ha. With better adopted farm management practices (including cocoa pod borer control), farmers can achieve 50-75% increase in cocoa bean yield over 10 years.
- **OIL PALM** - Oil palm research was taken over by Oil Palm Research Association (OPRA) in 1984 and extension by Oil Palm Industry Corporation (OPIC) in 1991. OPRA is an industry body supported by all estate companies, while OPIC is a statutory body. There are many oil palm technologies released in PNG over the years.

The oil palm industry currently enjoys the benefit of high yielding seed developed from 40 years of oil palm breeding in PNG. At estate level, palms from this improved seed can produce 25 MT of fresh fruit bunches (FFB) per ha. Smallholders can only produce 8-10 MT of FFB per ha. With support of extension, smallholders can increase their yields by 50% or more if they diligently applied fertilizer to their palms.

FOOD CROPS & LIVESTOCK - Research in food crops and livestock became the responsibility of the National Agricultural Research Institute (NARI) in 1996. Since then, NARI has released several farmer impact crop/livestock technologies, including pathogen-free planting material (NARI, 2010). Future production of staples has been given a boost with the release by NARI of the pathogen-tested (PT) potato and sweet potato varieties. The use of PT material will immediately increase farm yields by over

80%. The tubers are of quality shape, and free from pest and diseases. Farmers using PT material will definitely enhance their income, and household food security status.

Extension support for food and horticultural crops is provided by the Fresh Produce Development Agency (FPDA), established in 2005. Livestock extension is currently supported by several agencies, both public and private. Livestock Development Corporation (LDC) is a public company that manages cattle and abattoirs previously operated by NDAL. LDC is presently undergoing a restructuring program that will grant the organization responsibility as lead agency for livestock sector.

Presently, meat consumption rate in PNG is increasing by 5% annually. LDC plans to work closely with livestock farmers and farming groups to raise their productivity and increase their output to match future demand for meat. There are huge areas of grasslands in PNG (>100,000 ha) for pastures, and providing immense opportunity for crop and livestock integrated farming. By improving pastures and increasing stocking rates, smallholders can quadruple local beef production from current 2500 MT to 8000 MT. With village poultry, chickens reared per hen through reduced predation and good husbandry practices can produce 8-10 village birds (from 3-5 presently).

Since 2007, an Australian Government assistance program, *Agricultural Research & Development Support Facility* (ARDSF) has assisted the NARS institutions to realign their research strategies to focus on development, rather than merely generating, transferring, and adopting technologies. Their adherence to the concept of Agricultural Research for Development (AR4D) is a paradigm shift from a linear model of research to accommodating integrated and collective actions of stakeholders to improve technologies, policies and institutions (NARI, 2011). The AR4D approach is considered a component of a wider system where a variety of outcomes from different sectors must be generated in order to enhance peoples' livelihoods.

Until recently, NDAL was responsible for the management of the national agriculture development plan (NADP). The Plan was approved by the Government in 2007, with a resource framework of one billion Kina over ten years (GOPNG, 2007). NADP has 10 thematic areas, one of which is "Research and Extension for Development" with a ten-year funding estimate of K 264 million. It is anticipated that the NADP will facilitate improvement and effectiveness of public institutions and agricultural programs, resulting in community wide impact and growth (5% annually) of the sector.

NDAL's role as a lead sector agency is still evolving, and the process is being managed under a functional and expenditure review (PSRMU, 2005). There is a widely held view that the Department must be immediately revitalized into a vibrant central entity with innovative capacity and modern skills to manage the diverse private and public stakeholder collaboration in all aspects of agricultural and rural development. The reform must strengthen NDAL's key role of policy and strategic planning for the sector, and the resourcing of agricultural development initiatives, including public support for extension. This is an undertaking which must be accorded the highest of priority.

3. Current Status of Agricultural Extension in PNG

3.1 Extension agencies and rural advisory service providers

The provision and support for agricultural extension is largely a government responsibility. The service is offered along commodity lines, using the T&V system or driven by general rural development programs. The activities are targeted at the district and village level, and the success of the programs is dependent on availability and quality of resources (human and financial).

However, since 2000, several non-governmental organizations (NGOs) and community-based organizations (CBOs) have also become actively involved in the delivery of agricultural services (Sitapai, 2011). Most of these agencies are linked to donor and financial institutions, churches, and farmer groups or associations (Lahis, 2008). The emergence of such organizations in recent years is in response to the break-down of government service delivery efforts of the past.

The NGOs and CBOs are mainly voluntary organizations that seek to initiate local area development. Several women groups have been formed to address development agenda that are specific to women. However, the capability and capacity of these private service providers vary considerably, and some are weak in their analyses of community needs and in the formulation of desired project interventions that deliver real benefits to the people on a sustainable basis. The current organizations involved in agriculture extension in PNG are listed in *Annex 1*.

3.2 Funding of extension

The Government funding for agriculture extension programs is variable over the last twenty years. An accurate estimation of the annual budgetary support is also not possible due to the proliferation of public and private sector entities involved. Only three external donor agencies (ADB, AusAID, NZAID) have supported agriculture extension over the last twenty years (Sitapai, 2011). Private sector participants vary in their resource levels, organizational capacities, and relationships with Government funded extension programs.

In 1992, ADB estimated that extension services in all provinces of PNG (excluding Bougainville) cost K 30 million² annually (ANZDEC, 1993). The study also showed that 90 percent of this funding went to salaries of officials and only K 3 million (or K0.17 million per province) was available for goods and services. This is barely sufficient to meet recurrent costs and initiate any long term extension activity. Although provincial funding has improved over the last ten years with increased Government support under the DSIP and other grants, the support for agriculture services overall has not improved significantly, relative to other sectors.

In 2010, it was estimated that the total support for extension and advisory services by the Government was about K 100 million (Sitapai, 2011). This estimate excluded the NADP support in that year. As shown in *Annex 2*, the extension support in 2010 is equivalent to 4.6 percent of the total value of agricultural exports of that year.³ The national agencies contributed about 28 percent of the total funding for extension related activities in that year. Of these, CIC support for

² The value of Kina then was = US\$

³ The total value of agricultural exports in 2010 was K2160 million.

smallholder oil palm extension was significantly higher than any other agency. The National Development Bank (NDB) also supports oil palm extension, and its input is long-term, and this has continued since the commencement of smallholder oil palm schemes in the 1970s.

3.3 Extension personnel

Lack of human resource capacity in the national extension service is a major factor affecting the level and quality of services delivery in PNG. This is most apparent in the provincial extension service, where budget constraints have drastically reduced staff numbers over two decades.

The numbers of extension personnel employed in the public sector organization (national and provincial authorities, and parastatals) are given in *Annex 3*. At the provincial level, Morobe maintains the largest number of extension staff than any other province. This is expected as Morobe is the largest province in PNG, and has received generous donor support for its agriculture programs in recent years than most provinces (Sitapai, 2011).

Of all the national agencies, OPIC maintains the highest number of extension personnel. Staff numbers in most national agencies have declined over the last decade due to resource constraints. For instance, the new CIC strategic plan for the next medium term categorically states that due to capacity constraints it shall only provide an extension service on demand (CIC, 2012). CIC has in fact reduced staffing numbers from over 300 in mid-1990s to just over 30 personnel in 2011 (Sitapai, 2011). The staff decline over this period has increased the number coffee farmers per extension officer from 1700 to over 14,000 farmers. The organization has therefore recognized the importance of undertaking much of its future business in partnership with other value chain actors, to maximize synergy and impact on producers. CIC does provide group extension to coffee cooperative societies. Other donors (e.g. WB) and industries (e.g. cocoa) also encourage the formation of farmer cooperatives as targets of extension programs.

3.4 Extension approaches

Past reviews of agricultural extension approaches in PNG (ANZDEC, 1993; McKillop, 1994; GOPNG, 2000; Dekuku *et. al*, 2005) have shown varying degrees of choice of methods, the operating environments, and the results of interventions. To date, no assessment and evaluation of the various extension methods have been undertaken, in terms of their impact; sustainability (financial, human and environmental); effectiveness and efficiency. However, a general conclusion drawn from these reviews is that no one extension model will suit all purposes, and models more suited or appropriate to specific areas, needs, or circumstances need to be identified and promoted (Dekuku,*et.al*.2005; Lahis, 2008).

The extension approaches used in PNG over the last 50 years can be grouped into four models: *technology transfer*; *human resource development*; *private sector assisted delivery*; and *participatory or farmer-demand driven extension* (Sitapai, 2011). The adoption of the approaches represents a changing paradigm in extension in PNG over five decades.

3.4.1 Technology transfer

This approach is perpetuated by the T&V system of delivery, and has been in practice from pre-Independence period to the present. Technology transfer involves a top-down approach and

delivers specific recommendations to farmers about the practices they should adopt. In PNG, technology transfer mode has followed two general trends: (a) Provincial and district general extension; and (b) Industry-driven service delivery.

In the former, improved crop and livestock technologies from research were disseminated with information to provincial/district extension centres for distribution. The extension centres provided farmer training in livestock/crop husbandry practices on-site as well as in village locations. The information provided was of general advice on agricultural practices. Generally, the provincial extension personnel were less qualified than those in national agencies. The gap between provincial and national institutions also deprived provincial extension staff of opportunities to undertake further skills training. Further, the demise of the district extension centres in all provinces since the 1980s has reduced the quality and effectiveness of extension efforts nation-wide.

In the latter trend, the participation of agricultural industries (crops and livestock) in the delivery of extension services to farmers gained prominence from the mid 1980s (McKillop, 1994). The industry extension model, developed initially in coffee by CIC, was later adopted in oil palm by OPIC, and in cocoa and coconuts by the CCI. In the sugarcane industry, Ramu Sugar agents provide advice and cane varieties to out-growers, and purchase the matured canes from them for central processing. Similarly, Niugini Table Birds, with its central poultry processing facility, delivers the total package of inputs and technical advice to out-growers, and deducts the cost per bird when delivered for processing. These industries can be financially efficient and sustainable in their businesses, as long as they can retain comparative advantage. However, the industries are vulnerable to price fluctuations and the volatility of out-growers in response to central control.

The effect of the T&V system of extension is most significant with cash crops over the last 35 years. A common feature is a change in production over time. Coffee and cocoa have experienced periods of rapid expansion (early 1960s to early 1980s) and may have now reached their peak (Allen *et. al.*, 2009). Oil palm on the other hand, is still in the rapid growth phase, which may continue for some years yet, as large parcels of land are mobilized for agricultural use. Overall, the industry-driven or commodity extension approach offers the opportunity to develop a performance-oriented institutional culture, and is much more focused and cost-efficient than the generalist mode in provinces.

In general, all modes of technology transfer will succeed if there is a genuine ‘pull’ by potential beneficiaries in response to the industry ‘push’ by service providers. The smallholder cash crop sector in PNG has proven the opposite. In many instances, rural villagers have readily adopted cash crops with relatively little advice or assistance from Government extension (Bourke, *et. al.*, 1998). Smallholders presently produce over 80% of annual cocoa, copra and coffee production, and over 50% annual volume of FFB delivered to palm oil processing mills.

Another aspect of agricultural output that has significantly increased over the last 30 years without any formal extension support is subsistence food production. Subsistence crops and village livestock constitute an important part of PNG agriculture, as they provide most of the food consumed locally – an estimated 83% of food energy and 76% of protein (Bourke, *et.al.* 2009). The rest is imported. Annual staple crop production (sweet potato, cassava, bananas, sago,

yam, taro, Chinese taro) in PNG has increased in recent years, and is estimated as 4.5 million tonnes (Bourke and Vlasaak, 2004). This has enhanced local marketing of fresh produce, which is likely to continue in the future. This growth is driven in part by the devaluation of the Kina which has seen a significant increase in the prices of imported food. Domestic consumers have responded by purchasing less imported food and more local produce.

3.4.2 Human resource development approach

Human resource development (HRD) approach is a model akin to early extension in developed countries, when agricultural universities gave training to rural people who were too poor to attend full-time courses. Top-down teachings are employed, but participants make their own decisions about how to use the knowledge they acquire. This mode of extension has been recently adopted by the PNG University of Natural Resources & Environment at Vudal, and the PNG University of Technology in Lae.

(a) PNG University of Natural Resources & Environment - Integrated Agricultural Training Program (IATP)

IATP is the University community outreach extension program. It commenced in 2002 as an Australian government funded project, and aims to improve livelihoods of people using training to deliver information and agriculture extension services. It takes a holistic approach and uses field-based problem solving to define livelihoods training subjects as the medium for delivery. These are packaged into a number of training manuals. Currently, IATP operates in five provinces, and plans to be totally self-financing by 2013, and to be established country-wide by 2016.

(b) PNG University of Technology – South Pacific Institute for Sustainable Agriculture and Rural Development (SPISARD)

SPISARD is the University centre for the promotion of rural development (UNITECH, 2009). The institute is tasked to develop location and farming system specific extension methods and approaches, and provide training and transfer of sustainable agricultural technologies related to food and cash crops, and livestock. The aim is to improve and attain sustainable integrated farming system practices suitable for subsistence and semi-subsistence farming communities. It promotes a 'model village' concept, where chosen rural locations become focal points for on-farm research, training and extension with active farmer participation.

This approach is unique in PNG, because the development process takes place in the farmers' environment with immediate 'real time' feedback based on the farmers' perspective and satisfaction. Presently, SPISARD is working in model villages in four provinces, and will expand its program country-wide as resources permit.

The important aspect of HRD resource development mode of extension is that it is institutionally driven, and promotes participatory approaches, with active farmer participation in all aspects of extension delivery. While the specific *modus operandi* may vary between IATP and SPISARD, both organizations have established a sound institutional base to continue playing the role of empowering farmers to become more efficient, productive and self-reliant in their own environments. Conceptually, the approach aims to develop a people-centred knowledge

management process that is built on an understanding of farmer's needs, and shapes the existing technical information to respond to farmers' requirements, and delivers knowledge in a form they can understand. Both institutions require external funding to expand their work. They have already commenced forging partnerships with provincial authorities, and other development partners, such as mining companies, to plan and executive new community programs.

3.4.3 Private sector assisted delivery

This mode of extension has been piloted in PNG using participatory approaches to promote pre-determined packages of technology and agricultural innovations. It is being driven by donors, and the approach entails mobilization of private strategic partners or service providers to address farmers' enquiries with technical prescriptions. Two donor-funded projects have promoted this model since 2000, and the approaches are briefly described below.

(a) Contracted extension services – Smallholder Support Services Pilot Project

This ADB project (SSSPP) commenced in 1999 and ended in 2007. Its aim was to strengthen provincial extension in Morobe and Eastern Highlands provinces, using a mixed model of public funded-private delivery and contracting-out of extension services to smallholders (Lahis, 2008). The key aspects of SSSPP are as follows:

- Interested communities are assisted to identify their priority needs and formulate action plans through participatory rural appraisal and planning (PRAP);
- A dedicated trust fund and management unit is established per province;
- A pool of interested service providers are contracted to deliver services in response to community action plans;
- Farmers participate in the monitoring and evaluation of implementation, supported by external evaluation of contract outputs and outcomes;
- Promote public private partnerships and joint ventures in service delivery; and
- Ensures adequate backstopping and capacity building of service providers.

The quality role of service providers is a necessary prerequisite for success in this mode of extension. Two trends are worth noting: firstly, service providers' skills become more specialized as farmers' demands become more specific; and secondly, community groups may contract their own Village Extension Workers (VEWs) as they develop user-pay capacity.

Reviews of SSSPP have indicated that there is wide scope for adoption of the contracted mode of extension in all provinces. However, as cautioned by Lahis (2008), this would require a holistic government response to community development needs, beyond agriculture. It must also take account of the overall rural development needs on a cross-sectoral level.

(b) Market-oriented extension – the Bris Kanda Inc Experience

Bris Kanda is a rural enterprise development organization, established in 2006 under a 10 year program assistance of the New Zealand Government in the Huon District of Morobe Province. The organization's overall goal is to reduce poverty and vulnerability amongst target rural communities through improved and sustained income generation. It uses a private sector driven

approach to identify weaknesses in smallholder's production and supply chains, find appropriate solutions, and connect them to relevant services. It is the first project intervention in PNG that promotes market-oriented agricultural extension and advisory services.

A mid-term review of the program in 2010 rated the approach as the most innovative and timely, given the deficiencies in the Government efforts to promote rural development in recent years (Mohamed and Sitapai, 2010). The review concluded that strategic partners (who may be private service providers or quasi-governmental) are the pillars underpinning the approach to service delivery. The concept of engaging strategic partners who have a mandate to serve rural communities, will strengthen this approach, and fulfills the expectation of the Government's public private community partnership policy.

3.4.4 Participatory or farmer-demand driven extension

Since 2000, there has been a continuous reassessment and re-focusing by change agents and their organizations in how they can work with farmers more effectively. Using methods such as experiential learning and farmer-farmer exchanges, researchers and their agents are discovering that knowledge is better gained through interactive processes, and wider stakeholder participation. Farmers involved are more committed participants because they are allowed to take decisions themselves, of the innovation options before them, and the perceived outcomes.

Participatory modes of extension currently being used in PNG are: farmers' field school (FFS) concept, participatory action research (PAR) or participatory technology development (PTD). FFS is being trialed by CCI to lift level of cocoa farm management practices in curtailing losses to cocoa pod borer. It is a group-based learning process used in several countries to promote integrated pest management (IPM) strategies. FFS brings together concepts and methods from agro-ecology, experiential education and community development.

NARI is the lead advocate of PTD; an approach to learning and innovation that promotes sustainable agriculture. The approach involves collaboration between researchers and farmers in the analysis of agricultural problems and testing of alternative farming practices. One of NARI's technology innovations - the integrated pest management strategy (IPMS) for taro beetle in PNG, has shown great success at the farm level when it was introduced using the PTD approach. The rural women farmers did set themselves up as members of a cooperative society, to commercially produce taro for export to urban markets using NARI's IPMS technology. FPDA has promoted the engagements of VEWs in vegetable and horticultural production at village level. This approach promotes indigenous technical knowledge, and recognizes the value of local expertise and traditional wisdom.

The participatory approaches for farmer empowerment are not widely used, as they are recent interventions in PNG. In other developing countries, these approaches have proven to be farmer-friendly, cost-effective, and provide a sound basis for achieving sustainable smallholder agriculture. The aforementioned approaches are being promoted by NARS institutions or are project driven. While this is acceptable, it is now widely recognized that such methods are merely tools which, to be effective, need to be part of wider institutional structures, organizational procedures and financial mechanisms. These mechanisms help create a voice for the users of extension, and makes extension service providers accountable to their clients.

4. The Need for Reform in Agriculture Extension and Rural Advisory Services in PNG

Since Independence, agriculture extension has played a pivotal role in agricultural development. Extension service is still a much needed investment in enhancing human and social capital of the rural population. However, as this paper has established, extension services in PNG are in disarray, poorly resourced, and lack leadership and direction. The challenges are huge, and there is a growing realization that an urgent sector reform must occur, to mobilize strong advisory institutions that would empower and provide the foundation of support to rural populations to research markets, access technologies, and influence the policies that affect their lives.

4.1 The Challenges to Extension Reform in PNG

The Food and Agriculture Organization of the United Nations (FAO), and the international advocate of pluralism in agricultural extension, the Global Forum for Rural Advisory Services (GFRAS) have identified the overall challenges in reforming global extension service, and where it may progress in the future (Christoplos, 2010; Pound, *et. Al.*, 2011). Most importantly, any effort in mobilizing the potential of agricultural extension requires an open mind about what needs to be done and who is to do it. The process should be assisted by experiences regarding the different roles of public, private and civil society actors in a variety of extension tasks. Extension reform must therefore involve a broad range of stakeholders. There are five key challenges that need addressing if the full potential of agricultural extension services is to be realized in PNG:

1. Focusing on best-fit approaches

Extension services are an essential vehicle to ensure research, development of farmer organizations, improved inputs, and other elements of rural development support actually meet farmers' and other rural actor's needs and demands. While the search in the past has been on 'quick-fix' approaches that can be easily implemented and scaled-up, experiences so far in PNG indicate that no 'one-size-fits-all' approach is unacceptable. Programs must take into account the diversity found in rural areas, where governance, levels of capacity, farming systems, and many other factors differ. These variables must be considered when designing policies, approaches, programs, and institutions. Further, the rapid and unpredictable changes in markets and climates, and the diverse ways that these changes impact different groups, mean that extension services cannot provide blanket advice.

The focus on best-fit approaches is an opportunity to shape services that are relevant, pluralistic and demand-driven. It is an opportunity to make extension flexible enough to deal with current and future rural development issues and crises. Policy makers and planners must invest time and effort in devising approaches that fit unique situations.

2. Embracing pluralism in advisory service provision

Presently, there are a growing number of different types of extension services providers and approaches in PNG. This is appropriate, as the diversity of rural life and needs should be matched by diversity in services, approaches, and providers. Service providers also

differ in their types of clientele. Three categories of providers exist: the *public*, *civil society organizations* (NGOs), and *private sectors*. While public extension provision has played a major role in PNG agriculture, private and NGOs and farmer organizations are also key players today.

Public extension services must continue to play a coordinating, technical backstopping, and quality assurance role within pluralistic systems. They should ensure that national development objectives such as poverty reduction are met and provide services of a ‘public good’ nature. They have the advantage in offering impartial advice and dealing with issues related to sustainable natural resource management.

Civil society organizations have a key role to play as well, Farmer organizations are the most sustainable type of service provider. Farmer organizations organized by commodity groups provide advisory services related to the commodity along the entire value chain. Like public service providers, civil society organizations are critical to reaching disadvantaged groups. They must be steadfast in serving these clients to overcome potential elite biases.

Private sector providers assist a limited clientele, primarily related to high-value products and relatively well-off producers. Input suppliers provide information regarding new varieties and planting methods to all kinds of producers. While private providers are not likely to reach hundreds of thousands of poor farmers, particularly women, they play an important role in linking producers to market and increasing incomes.

Institutional pluralism through different service producers must be matched by pluralism in financial flows if extension services are to be broadly accessible. Private investment will not address the needs of all rural producers. Hence, **targeted public investment in the national extension service will remain crucial, even when services are carried out by non-state providers**. Private advisory services may actually be better at reaching the poor farmers than the public sector if incentives such as subsidies are provided.

Pluralism in advisory services provides the opportunity to capitalize on the comparative advantages of different types of organizations. The critical element is the coordination of the different service providers, in ensuring that vulnerable sectors of the farming population are not forgotten, and avoiding excess duplication of efforts. Public financing, technical backstopping, and coordination are needed in pluralistic systems of extension delivery. This will guarantee the quality assurance of advisory services, and ensure that the needs of the disadvantaged are met.

3. **Increased accountability to rural clients**

There are increasing calls for ‘demand-driven’ and ‘farmer-led’ rural advisory services in PNG. The need for planning, monitoring, and evaluation of such services would be best met by farmer organizations. A challenge here is the limited capacity of current farmer organizations and their higher level federations to plan and monitor extension programs.

Additionally, when focusing on demand driven and farmer-led approaches, there is a need to be aware of gender, age, and cultural differences. This is critical, because policy makers and planners must ask the hard question about whose demands are being served. Women have an important role in PNG agriculture, particularly in subsistence food production. Different ethnic groups have unique links and obstacles to reach different markets. Agriculture today is perceived negatively by the younger generation and seen as unrewarding. Climate change is having severe impacts on people living in vulnerable environments. However, extension alone cannot be the solution for addressing any of these trends. But extension must be part of more comprehensive solution to equity challenges by involving wider sets of stakeholders in innovation systems and among the government, private sector and civil society.

Utilizing farmers' organizations is not the only way to make extension services more accountable. The essence of decentralization, if well planned and implemented, can increase accountability to rural people through subsidiarity – placing responsibility for activities at the lowest possible level of aggregation. The ways that extension services are financed can be a means of holding them accountable for the quantity and quality of services they provide. However, LLGs and other stakeholders need capacity to plan, manage, and monitor such programs. Increasing accountability to rural people must go hand-in-hand with investment in the capacity of service providers and local authorities and assurance of quality to make these systems work.

Accountability in extension also means knowing whether a program, method, or organizational innovation actually worked or not. Much is still unknown about the effectiveness of extension programs and approaches in PNG. Methods for clear, rigorous, and participatory evaluation of extension programs must be found. Further research is also needed to provide a better understanding of the complex relations and multiple accountabilities that exists between service providers, their clients, and other stakeholder institutions, such as LLGs, private investors, researchers, and farmer organizations. This offers the opportunity to make extension services more relevant and effective for rural people and their livelihood goals.

4. Human resource development for extension

Lack of human resources is a fundamental bottleneck to effective extension given the new challenges facing rural development in PNG. Since the conversion of NDAL agriculture colleges to university programs in late 1990s, support for agricultural education towards extension has reached a point of near-collapse. There are different levels of HRD needs for extension: farmer level; extension agent level; and higher education/training institution level.

Agricultural education and empowerment of farmers is an important component in the efforts to enhance their capacity to demand and utilize advice. Farmers and other rural actors need technical and management skills, as well as the ability to operate in groups, use information and communication technologies effectively, and seek markets.

Extension agents (public or private) need capacity development as well. Effective advice is no longer a matter of simply providing messages about set technological packages to rural people. There is a shift from technical approaches to those that are organizational, cultural, and social. Advisors must also have skills in building social capital, facilitating discussions, and coaching stakeholders in natural resource management and market supply chains. They must shift from lecturing to empowering clientele, so as to deal with uncertainties and variability like climate change and market trends. Such tasks require professional soft skills in critical thinking, problem solving, organizational development, and negotiation.

Agricultural **universities** have an important role in training people within the agriculture sector. The efforts being made to invest in tertiary agricultural education, particularly in curriculum adjustments at UNITECH and UNRE is encouraging. The expansion of farmer training efforts of IATP and SPISARD should be supported, as this would lead to enhanced HRD throughout the agricultural innovation system.

Public funding for HRD in extension is also important. Plans for mobilizing the potential of agriculture extension must reflect the prevailing human resource crisis, and include concerted and sustainable strategies to address it. If plans are followed through, it is an opportunity to equip advisors and other rural development actors with the necessary skills to deal with the constantly changing and complex arena in which they operate.

5. *Sustainability: beyond projects to institutions.*

The sustainability of pluralistic extension services will depend very much on government commitment and financing. Past extension projects have shown that project resources can mobilize service provision for a short period of time, but sustainability of these projects has generally been poor. All too often, the high profile ‘quick impact’ investments (such as addressing food insecurity or climate change) have distracted attention from the need to strengthen institutions that will carry out future programs. If this is to be avoided, future project support must be balanced with systematic, institutional approaches to reform and strengthening pluralism in advisory service systems.

The changing technological landscape, including the spread of internet and use of mobile phones, has demonstrated the potential of ICTS in enhancing access to information about markets, weather, and technological options, and improve communication and linkages among stakeholders. The success of reducing the digital divide is often heralded as yet another ‘silver bullet’ for sustainability. It is expected that the use of ICTs would reduce the problems of bloated bureaucracies and high recurrent costs.

The opportunity here is to ensure that the newer methods are integrated within the work of existing institutions and organizations. Methods must be adapted to existing capacities and the context where they will be used. In spite of limited knowledge on the varying effectiveness of various approaches in addressing different needs, demands, and capacity constraints, it is clear that the extension service in PNG forms an essential institution within the rural development sphere.

4.2 A New Agricultural Extension Policy

The White Paper on Agriculture – Sector Policies 1996-2000, was the first Government policy document in the post-Independence period (GOPNG, 1996). Its overall policy thrusts were to increase production, and improve sector productivity and sustainability through appropriate and cost-effective technologies, and improved extension and development approaches. Since then, several high level forums (GOPNG, 2000; Dekuku, *et. al.*, 2005) have highlighted the need to formulate a comprehensive national extension policy that is inclusive, and advocates pluralism in service provision and financing.

A recent review of extension in PNG by the Centre of Tropical Agriculture and NARI (Sitapai, 2011) has further concluded that a new order to agriculture extension in PNG is overdue, and this reform should be anchored on a new agricultural extension policy. Based on the key challenges to extension reform outlined above, the following principles are proposed as guides to the formulation of a national agricultural extension policy.

(a) Extension is an integral component of a national agriculture policy.

In the absence of a national agriculture policy framework, the role of extension can be redefined in a set of new institutional structures that recognize that extension alone is not the solution. The complex nature of extension systems, tasks and roles within agriculture and natural resources management systems means that a more integrated perspective is required on the facilitative role of extension for achieving synergies with new investments in research, other rural services and new types of participatory programming.

In essence, an agricultural extension program is more likely to succeed if the conditions for growth (in agriculture and related industries), are well articulated in the national agricultural policy and plans. But it must be stressed that the emphasis should be on developing an extension policy rather than a national extension structure. The policy should be flexible with indicative framework for incentives intended to create synergies between different actors.

(b) Extension is advisory, not prescriptive.

Extension is too often merely seen as a vehicle for spreading scientific and technical progress and technology transfer. But this is a narrow and highly unsatisfactory definition. Producers need more than just technical information. There is rarely a ‘one size fits all’ solution to address the mix of technical, economic, commercial, social and environmental aspects of farming constraints. Farmers need information on markets, credit facilities, and consumer demands. However, simply making information more readily available is not enough to ensure that it is used effectively. On the various levels of their activities (farm, local community, industry subsector), producers must themselves be able to analyze the constraints, seek out and test solutions, and make choices from an array of existing service producers.

By building producers' capacity to take individual and collective initiatives, facilitation makes available technical solutions that are more relevant to farmers' constraints in the short term, and in the long term provides a framework for ongoing innovation. Therefore, agricultural extension activities should facilitate:

- direct exchange between producers as a way of diagnosing problems, capitalizing on existing knowledge, exchange experiences, disseminating proven improvements, and even defining common undertakings; and
- relations between producers and service providers (public and private).

Future extension personnel must be adept in participatory techniques, and resourceful in drawing on a mix of communication methods and technologies. They must think in terms of market opportunities, increasing producer incomes and total farm management.

(c) Extension services must be made accountable to producers.

Producers should be treated as clients, sponsors and stakeholders, rather than beneficiaries of agriculture extension. Extension activities are more effective when farmers are directly involved in defining, managing and implementing them. This happens when:

- farmer organizations manage their own technical services;
- producer groups and private (management, literacy training) or public (research, training, extension) service centres work together on a contract basis; and
- producers can target funding on problem solving for their specific needs.

(d) Market demands require farmers to forge new relationships with value chain actors.

Markets are the driving force in agricultural development. A major objective of the Government is to expedite a gradual transition from low-productivity subsistence farming to specialized production based on comparative advantage and the trading of surpluses on the market. Small farmers must be able to produce a sufficient range of competitively-priced outputs in the right quantity and quality at the right time. The move from subsistence to commercial farming is consumer- rather than producer-driven.

Extension must be concerned with local economic development and empowerment, and not just farming itself. In effect, market-oriented extension is about making sure a range of actors are able to collaborate with one another. For instance, if traders and input vendors want to invest in a particular product, they may need to provide advice to farmers about varieties and planting methods. The other value chain actors who are advising farmers about what they want to sell (inputs) or buy (farm produce) therefore also need to understand the technology themselves in order to provide such advice. These actors require access to extension as well.

(e) New perspectives are needed on extension financing and extension delivery.

In the past, extension was seen to be a public good, delivered by public sector agencies and financed by public resources. This is no longer the case:

- Extension systems are now recognized as encompassing an assortment of public and private goods.
- Public agencies are but one channel by which farmers and other value chain actors access information.
- Readiness to finance extension from public resources has decreased.
- It is recognized that the willingness of the clients of extension to pay for services was underestimated in the past.

Extension financing and extension delivery should be seen as separate responsibilities. Regardless of whether extension services are financed by farmers, the government or commercial actors, it is essential to remain impartial about which service provider should be contracted to deliver the service. Extension activities can be exclusively financed by the government and entirely delivered by private extension agents. There are also examples of public extension agencies being ‘contracted in’ by non-state actors when, for example, NGOs have received contracts to provide services but have been unable to scale up to meet their responsibilities.

There is also a need to understand how the flow of resources can be used to enhance empowerment and accountability. The ways that extension agencies receive payments for their services have profound impact on their accountability to their clients for providing quality services. If resources are provided to individual farmers or their organizations in the form of vouchers or other appropriate mechanism, they can contract the service providers of their choice, thereby increasing their power over the rural innovative system.

The choice of financing structure is as much about demand-drive as it is about covering the costs of services. Indeed, any scheme that provides token payments for services by the rural poor is unlikely to generate significant financial flows from the farmers themselves. The objective is rather to ensure ownership of the services through redirecting financial accountability. The extension agent needs to feel that the client is the farmer and not the donor or the Ministry.

(f) Pluralism and decentralization require coordination and dialogue between actors.

A centralized national extension system did work prior to Independence, but has produced mixed results since then. Also, no single extension approach or organization fits all situations. The wide range of social environments, economic contexts, agro-ecological conditions and many different types of crops/livestock have produced a variety of farming systems challenges in PNG. The need for integrated approach to extension is particularly important at local levels. With decentralization and more pluralistic arrangements, progress should be made in promoting the subsidiarity of extension services and in making them accountable to farmers. Hence, more exchange for learning and coordination among local government, the private sector and civil society is required. The shift of responsibilities to local levels should also be accompanied by a shift of resources or readiness to pay the relatively high recurrent costs of these services.

Presently, human resources capability for effective extension at LLG level is very low. There is also poor strengthened coordination and linkages between central ministry-led bureaucracies and LLGs, and this trend must be reversed. As decentralization is here to stay, there must be strong and objective leadership to make sure that the effectiveness and sustainability of extension is also recognized as a local responsibility, albeit with financial support from the National Government. Decentralized extension must not become a responsibility of everyone and nobody, but should be managed by professional service providers specialized in agricultural and rural development.

New forms of collaboration, coordination, communication and cost-effective access to new innovations (e.g. by using modern ICTs) are crucial for decentralized extension providers to enable them to respond to these new challenges and to keep up-to-date with their knowledge and skills.

As stated above, a sound national extension policy must be flexible and promotes pluralism in extension service and extension financing. The policy must forge and seek commitment by public and private sector agencies to contribute to adequate and sustainable funding of extension programs. The Government, through its regulatory powers and financial resources, can guide the activities of private and professions actors by setting:

- sectoral, geographical or issue-specific priorities,
- skill requirements for agricultural advisors,
- the eligibility criteria of private training, outreach and advisory services, and
- frameworks for necessary consultative mechanism.

However, the national extension policy-making cannot be left to the Government alone. All stakeholders must be involved, especially the farmers. This means facilitating:

- Farmer representation in policy discussions, including management and policy bodies of extension and semi-public extension, as well as training and research organizations;
- Producer representatives' input into groundwork for activities; and
- Capacity building for producer organizations to handle such functions by training their elected leaders and staff.

4.3 A National Coalition of Extension and Rural Advisory Service Stakeholders

The overwhelming conclusion of this paper is that, small-holder farmers, especially the resource poor in remote rural communities of PNG are not receiving adequate level of extension and advisory services. Their inability to articulate demand and the failure of other actors to understand their demands act as deterrents to fully benefitting from the services. The diminishing role of extension and advisory services as public goods is also a hindrance to future growth and rural development.

It is apparent that the responsible Government agencies have turned a 'blind eye' to the current state of agriculture extension in PNG. This is an untenable situation. To sensitize wider extension stakeholder awareness of the plight of the extension service and the prevailing issues, an effective advocacy mechanism must be established to provide leadership and coherent voice for rural advisory services. This effort must aim at ensuring that the prevailing issues remain an integral part of the development discourse, and future public sector reform.

Presently, the Agriculture Sector Committee of the Consultative Implementation and Monitoring Council (CIMC) acts as a forum for reviews and sanctioning of sector policy issues and strategic directions for agricultural development. This paper proposes that this mechanism of dialogue be expanded to allow the establishment of a **National Coalition of Extension and Rural Advisory Service Stakeholders (NCE&RASS)** within the CIMC. NCE&RASS will provide an essential forum for extension stakeholders to meet and reflect on their experiences and to formulate relevant inputs into wider policy discussions and institutional reforms.

As a voice for the extension community, NCE&RASS shall ensure that extension platforms at global, national and local level are fully embraced to shape future the rural development discourse. The policy dialogue on extension and agricultural development at all three levels will become more relevant and evidenced-based if people knowledgeable about extension are involved. The stakeholder groups that would constitute NCE&RASS are depicted in Figure 1. The groups are:

- **Clients of extension and advisory services** – PNG men and women farmers;
- **Service providers** – public sector (national, provincial, local advisory, financiers), private sector (advisory, processors, traders, exporters, financiers), civil society (producer organizations), research, and agriculture education systems; and
- **Enabling organizations** – National, regional and global policy makers, donors, financial institutions, ICTs and media groups, and regional and global extension networks.

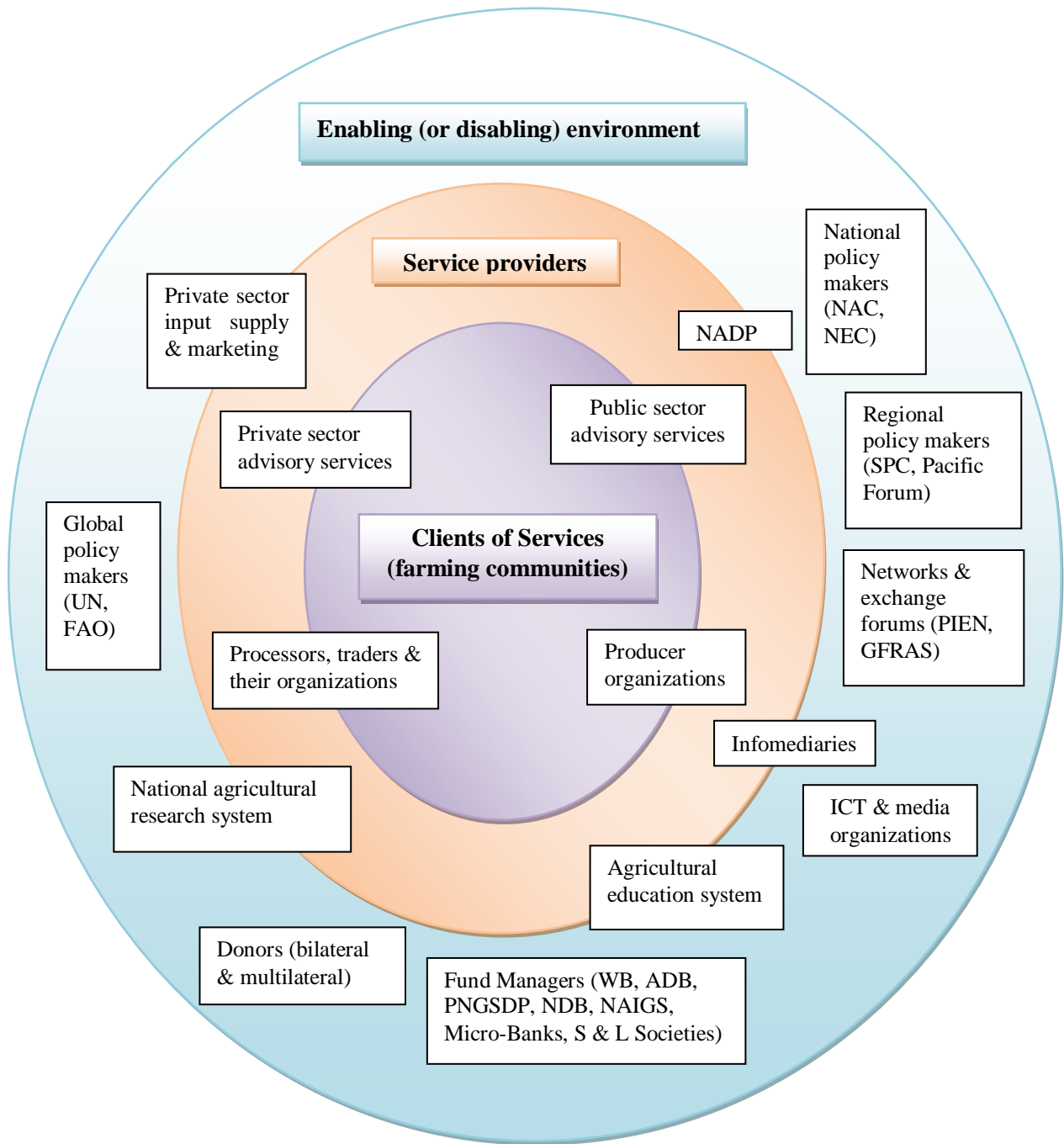
At the global level, the effort in raising the voice of extension stakeholders has been heightened with the establishment of the Global Forum for Rural Advisory Services in 2010 (GFRAS, 2011). GFRAS is a forum of various stakeholders worldwide who have an interest in extension and rural advisory services. Its mission is to provide a space for advocacy and leadership on pluralistic, demand-drive rural advisory services within the global development agenda. This will result in rural advisory services and extension systems that more appropriately, effectively, and sustainability contribute to the reduction of hunger and poverty worldwide.

GRFA has three key functions (GFRAS, 2012):

- (a) **Providing voice** for advisory services within global policy dialogues and promoting improved investment in extension;
- (b) Supporting the development and synthesis of **evidence-bases approaches and policies** for improving the effectiveness of extension; and
- (c) **Strengthening actors and fora** in extension through facilitating interaction and networking.

The country link to GFRSA is through the Pacific Islands Extension Network (PIEN) established at the Secretariat of the Pacific Community. When formally established, NCE&RASS shall become the national focal point for PIEN and GFRAS in PNG. As a sub-sector mechanism of CIMC, it shall become the national forum for dialogue and coordination between farmers and other extension stakeholders (public and private organizations). This dialogue must be equitable, and more importantly, coordination must not become central control by a different name.

Figure 1: Extension and Rural Advisory Service Stakeholders in PNG



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Annex 1: Public and Private Extension Agencies in Papua New Guinea

Institution	Status	Key Function	Key Services
Department of Agriculture & Livestock	Government Department	Agriculture policy, coordination, strategic planning	Supporting cooperative extension and contracting out services
National Agricultural Research Institute	Parastatal	Applied food crop and livestock research and development	Packaging technology, information dissemination & natural resource management
Coffee Industry Corporation	Parastatal	Coffee research and development, marketing and regulation	Packaging coffee technology and information dissemination
Oil Palm Industry Corporation	Parastatal	Smallholder oil palm extension	Packaging oil palm technology and information dissemination
Cocoa Coconut Institute	Parastatal	Smallholder cocoa and coconuts research and extension	Packaging cocoa and coconut technologies and information dissemination
Fresh Produce Development Authority	Parastatal	Extension information and support to vegetable and fruit farmers	Packaging vegetable and horticultural technologies and information dissemination.
National Agricultural Quarantine & Inspection Authority	Parastatal	Agriculture quarantine and animal and plant health services	Plant and animal quarantine and advisory services
PNG University of Technology	Government Higher Education Agency	Agriculture training and farmer education	Packaging information and farmer training
PNG University of Natural Resources & Environment	Government Higher Education Agency	Agriculture training and farmer education	Supporting rural network of resource centres & agriculture external studies
Niugini Table Birds	Private agency	Poultry extension	Provide advice, farm inputs & processing
Agmark Pacific	Private agency	Cocoa extension	Cocoa pod borer IPDM advice
PNG Balsa	Private agency	Balsa extension	Provide advice on balsa intercropping
Lutheran Development Services	Church agency	General agriculture extension	Packaging translated information , dissemination, and farmer training
Ramu Sugar	Private agency	Sugarcane out-grower extension	Supply of planting material, other inputs, and processing
Trukai	Private agency	Cattle extension	Supply of stock and live exports
Farmset	Private agency	General extension	Supply of seeds and other inputs
New Guinea Fruit Co	Private agency	Extension support to fruit and honey producers	Fruit juice and honey processing and export
Kongo Coffee	Private agency	Cooperative extension	Coffee processing and exports
Foundation for Rural Development Inc	Non-government organization	Promoting community development	Training of farmers and rural entrepreneurs
Pacific Spice	Private agency	Spices extension	Farmer training & market support
PNG Women in Agriculture Development Foundation	Non-government organization	National focal point for women engaged in the promotion of agriculture	Farmer training, primary health care, and general rural livelihoods
Foundation for Women in Agriculture Development	Community-based organization	Women farmer extension	Provision of farmer training and market product development
North Fly Rubber	Private agency	Rubber extension	Rubber advice, farm inputs, and processing support, and export

Source: Sitapai, 2011.

Annex 2: Estimated Budget Support for Agriculture Extension, 2010

Agency	Development Budget (K million) ¹	Appropriation for Extension (%) ²	Extension Budget (K million) ³
Department of Agriculture & Livestock	28.17	30	8.45
Oil Palm Industry Corporation	11.85	80	9.45
National Agricultural Research Institute	29.20	10	2.92
Fresh Produce Development Agency	5.82	80	4.66
Coffee Industry Corporation	3.25	50	1.64
Cocoa Coconut Institute	2.54	50	1.27
National Development Bank	25.50	5	1.27
Provinces	94.50	80	75.60
TOTAL	200.83		105.26

Source: Sitapai, 2011.

¹The Development Budget is an average of total expenditures in 2009 and 2010. The total appropriation for the nineteen Provinces is estimated from provincial and district grants.

²The percentage of appropriation for extension is based the institutional focus given to extension and development by each agency. At provincial level, extension activities may extend beyond agriculture, to related sectors such as forestry, fisheries, and health and nutrition.

³The Extension budget covers costs of field staff and delivery of services. The budget for OPIC, CIC, and CCI excludes extension levies collected against tonnage of oil palm fresh fruit bunches produced; and tonnage of cocoa beans, coffee beans, copra, and coconut oil exported.

Annex 3: Number of Agricultural Extension Personnel in the Public Sector, 2011

NATIONAL AGENCIES OR PROVINCES	EXECUTIVE MANAGERS	FIELD OFFICERS	TOTAL
NATIONAL AGENCIES			
National Department of Agriculture & Livestock	12	43	55
Cocoa Coconut Institute	4	32	36
Coffee Industry Corporation	5	29	34
Fresh Produce Development Agency	6	16	22
Oil Palm Industry Corporation	5	86	91
Livestock Development Corporation	2	30	32
PROVINCES			
New Ireland	2	10	12
Bougainville	3	9	12
West New Britain	3	9	12
East New Britain	6	18	24
Manus	3	14	17
Morobe	6	60	65
Madang	5	49	54
East Sepik	3	40	43
Sandaun	5	42	47
Western Highlands	3	34	37
Eastern Highlands	5	28	33
Simbu	3	20	23
Enga	3	18	21
Southern Highlands	3	22	25
Oro	3	22	25
Central	3	39	42
Milne Bay	3	29	32
Gulf	3	23	26
Western	3	27	30
GRAND TOTAL	100	750	850

Source: Sitapai, 2011.