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Foresight and Innovation for Boosting Agriculture¹

[The] Pacific region... [will be] a region of peace, harmony, security and economic prosperity, so that all its people can lead free and worthwhile lives. We treasure the diversity of the Pacific and seek a future in which its cultures, traditions and religious beliefs are valued, honoured and developed. We seek a Pacific region that is respected for the quality of its governance, the sustainable management of its resources, the full observance of democratic values, and for its defence and promotion of human rights. We seek partnerships with our neighbours and beyond to develop our knowledge, to improve our communications and to ensure a sustainable economic existence for all.

Pacific Islands Forum Communiqué 2004 – Auckland Declaration

There can be no peace without equitable development and there can be no development without sustainable management of the environment in a democratic and peaceful space.

2004 Nobel Peace Prize winner, Professor Maathai of Kenya

Introduction

Agriculture, an integral part of Pacific societies, has the potential to play a larger role in meeting the needs and aspirations of the local people in a rapidly changing global and domestic environment. Subsistence agriculture has been the primary source of food security, human health and resilience to disasters. It has also been an important element of national economic growth through exports of key common commodities, such as copra. The agricultural sector today has gradually shifted away from subsistence to semi-commercialised and commercialised agriculture. In some countries, a more diversified agriculture, based on export commodities such as sugar, root crops, kava, noni and other horticultural crops, support national economies. The sector continues to grow, and has a potential in many countries to provide for increased food security and employment, particularly in rural areas. In the larger Pacific island countries (PICs), agriculture can provide for a growing demand for food in urban areas and in export markets.

To realise their agricultural potential, each member country's planning and development of the agricultural sector needs to be integral to the national development efforts, as well as reflect a systematic and holistic ecosystem-based management (EBM) approach. Ideally, countries would **know** where they are today, have **foresight** and will be able to provide the **innovation** to systematically address their needs and aspirations to achieve the desired outcomes – i.e. countries must adopt a strategic approach to their agricultural sector development.

Knowing in this context is not only about being aware of the state of agricultural products and production, marketing and trade, but also means an understanding of what has worked and what has not, and the reasons why, including:

- who the stakeholders are, what they do and how they interact with each other – the farmers, processors, marketers, buyers and consumers as well as the policy-makers,
- the current status of our governance structures and how well they support, or do not support, agriculture and other economic activities, and
- the external and internal factors that influence different facets of economy, society and environment.

Foresight is about identifying the kind of agricultural system expected or wanted for the future, as well as the potential role agriculture can play, given the limited resource endowments and the realities of market forces in today's globalised world. Foresight is also about the right kind of society, of governance system; the kind of economy and economic growth that would provide for material needs and comforts; and the nature of environment and resources that would provide for and sustain the population.

Innovation is about generating knowledge, creating technologies, defining and implementing strategies and designing enabling environments that allow people to determine their own destiny. It is about knowing how to harness the interests and energies of people in the Pacific, use old and new ideas and scientific and traditional knowledge to create appropriate technological approaches, governance structures and solutions. Solutions that may help build resilience to the fluctuating market conditions and natural and man-made disasters. Innovation is also about being proactive and taking a long-term view when designing rules and regulations to achieve the desired outcomes for the economy, environment and society. The key is a strategic response to market failure.

In short, **innovation** and **foresight** are about forging a path from the current situation towards a sustainable future. In the context of the national development process, agricultural development, as stated by the Pacific leaders (PIFS, 2004), is about strengthening national sustainable development strategies (NSDS)-based planning, budgetary allocation processes and decision-making processes, reflecting an ecosystem-based development and management approach.

National sustainable development strategies

National sustainable development strategies (NSDS) have been regarded as an integrated planning approach to achieve sustainable development and are defined as '...a participatory and cyclical process of planning and action to achieve economic, ecological and social objectives in a balanced and integrated manner' (International Union for the Conservation of Nature [IUCN], International Institute for Environment and Development [IIED], 1993). The Organisation for Economic Co-operation and Development (OECD) Development Assistance Committee (DAC) has defined an NSDS as:

A co-ordinated set of participatory and continuously improving processes of analysis, debate, capacity-strengthening, planning and investment, which integrates economic, social and environmental objectives of society, seeking trade-offs where this is not possible.

OECD DAC, 2001

As agreed to in the Johannesburg Plan of Implementation (JPOI) and the Mauritius Strategy for Implementation of the Barbados Programme of Action (MSI), NSDS-based decision-making processes involve holistic and programmatic approaches to achieve sustainable development.

A similar process, but with emphasis on scientific and analytical methodology that focuses on the 'how' aspect of NSDS-based planning and development, is advocated under ecosystem-based

management (EBM). The Ecological Society of America (ESA) has identified eight key elements of EBM including sustainability, goals, ecological models and accountability.²

Land tenure³

For systematic development of the agricultural sector, Pacific islands are faced with a more fundamental issue of access to land, which is a major constraint to substantive growth in the agricultural sector throughout the Pacific. Access to land, a critical factor of production, is restricted because of limited endowments in many small island nations, high population growth and institutional constraints arising from misalignment of customary land tenure and the introduced land administration system, reflecting private ownership.

Land is an important source of subsistence and commercial activity as well as a source of cultural identity (Boydell, 2001). For most rural Pacific island communities, even on the smaller atolls, from 20 up to 90 per cent of their real income (cash plus non-cash) comes from the land, including forestry, agriculture and terrestrial biodiversity. Arable land is limited, varying from less than 1 per cent in Marshall Islands to 24 per cent in Tonga. Recent increases in population have had a direct impact on land use and the relatively small areas of land available for economic development. In many small island states (SIDS) such as Marshall Islands, Nauru and Tuvalu, there is a population density of more than 300 per square kilometre (UNESCAP, 2004). The combination of limited arable land and high populations places major constraint on agricultural development.

Throughout the region, a dual system of traditional (communal) land and land ownership exists in parallel with the introduced notion of ownership of land of the colonising powers. Despite being colonised, indigenous people were not alienated from their land and the majority (83–100 per cent) is customary. In traditional societies, land is often communally owned and unalienable, making it hard for customary owners to access for economic activities. Land provides a sense of identity, a sense of belonging and relationships expressed in concepts such as *vanua* in Fiji, *fenua* in Tuvalu and *enua* in Cook Islands. As Batibasaqa et al. (1999) comment, *vanua* is 'an environment in its totality, including natural and human aspects'. It is an integrative concept bringing together ecological, geophysical, social, spiritual and economic dimensions. The notion of resource ownership, including the nature of individual and group ownership and systems of inheritance, and social relationships (Hviding, 1996), is also a key element of traditional concepts.

In the modern world, land is primarily a commodity, to be owned as private property and used and traded by owners in their own interest and within the boundaries set by formal market and legal systems. Privately-owned land is accepted as collateral by commercial banks for providing credit for economic activities. Where land is leased, a clear definition of rights and conditions including tenure is required before banks will provide loans.

The customary land system is poorly defined and understood. In most countries the boundaries have not been surveyed nor formalised and ownership is not often clear. This lack of clarity makes it difficult for members of communal groups and outsiders to access land for forestry or agricultural development, even ecotourism. In many instances, even where access is available, this has provoked disputes and conflicts. Land-based conflicts in recent times include in Bougainville, Solomon Islands, Vanuatu, Cook Islands and Fiji, just to mention a few countries.

Governance of customary land and associated resources remains a major challenge for the Pacific countries. They must rationalise their communal land ownership and management by formally recording landowning units and land parcels, develop an institutional system for use of land resources, including forest, and environmental biodiversity values and amenities that will

ensure customary ownership is not threatened, while encouraging secure leasing of land that can satisfy traditional and modern demands. The challenge facing almost all the Pacific countries is how to allow access to customary land to members of the landowning group and outsiders while providing an appropriate level of clarity and security in tenureship, without the owners alienating their land.

In the Pacific, as in other parts of the world, many of the interventions have been piecemeal and narrowly framed in the context of specific thematic perspectives rather than taking a systematic look at the entire issue of sources of conflict – customary land ownership, different dimensions of property rights over land, land use and access, and land management. Often interventions have focused on individual issues such as economic growth (tenure security and land rights), agriculture (improving agricultural productivity), and environment (resolving land disputes or supporting sustainable use of natural resources).

Ideally, an appropriate land tenure and administration system design will incorporate the whole spectrum of issues and depend on local circumstances and context. It will reflect among other things key stakeholders and actors involved, their interests and behaviour, the dynamics of the relationship between them and their interaction with the local social, economic and political factors. The dynamics of these interactions would be conditioned by the history of the country; existing formal enabling environment, including the nature of land ownership; use and management rights and responsibilities; the relationship between formal and informal land management systems; the strength of the government machinery to enforce the law and the level of trust in the government and traditional decision-makers (Ramirez, 2002).

In national assessments carried out, for example, for the World Summit on Sustainable Development (WSSD), the Barbados Programme of Action+10 (BPOA+10) and the Pacific Plan, countries have acknowledged that they have limited technical capacity to implement many of the international and regional commitments, including those on land management. In practical terms there is a need, at the national level, to determine and implement specific changes in land policies, land tenure and administration, including reviewing organisational arrangements, national legislation and various decision-making processes. These practical issues have not been adequately addressed in a systematic manner or holistically, if at all, and there is an urgent need to address practical methodological issues that reflect considerations of commitments made internationally as well as those made by forum leaders in regional declarations and decisions.

From a practical point of view, the subject of land-based conflict management – i.e. prevention and resolution – is a governance issue. It is about organisational and institutional⁴ arrangements that can provide appropriate incentives to all actors and stakeholders so that their individual and collective decisions do not produce conditions that may become a source of grievance and instead produce an environment of peace and stability. Thus conflict prevention requires a systematic approach to a potential conflict situation and adopting a peace-building methodology that is context-specific.

To ensure productive access to and use of land, PICs need national land reform that is both based on and sensitive to continuing customary ownership, by facilitating a better interface between indigenous and western science and information to ensure sustainable land use. Each country would need to define its own solution, although it could be guided by some common principles underpinned by land resource information. This information should be gathered and integrated into a planning process that is sensitive to local customs. These should relate to land ownership and be adapted to community/local-level land management planning for in situ use of natural

forests, including non-timber forest products and ecotourism, and alternative land-based activities such as agriculture.

Despite sharing some key characteristics of land ownership, each country has its own specific institutional, cultural and economic challenges. No single model can be applied throughout the region. There also lies the need for a new breed of innovators – researchers, analysts and institutional designers – to develop policies and institutional designs. These must encourage commercial use of customary land without threatening the underlying customary ownership, ensuring fair market-based returns to land owners and resource users and equitable sharing of benefits among the current and the future customary landowners.

With this backdrop, the chapter briefly describes:

- The status of agriculture, including land, its 2050 vision
- Challenges in the agricultural sector
- Innovations – NSDS, Pacific Plan and regional integration
- Concluding remarks

Status of agriculture and its 2050 vision

Agriculture, generally based on smallholder farming, is a major source of economic activity and rural employment in PICs. Agriculture, although generally not a major contributor to GDP (representing 20–40 per cent), is often the main source of export earnings, regionally representing around 50 per cent. Agriculture accounts for over 85 per cent of foreign exchange and contributes substantially to total employment, around 30–80 per cent (McGregor, 2006).

The predominant smallholder agroforestry farming systems in PICs provide for a generally high level of food security. Traditionally, farming systems evolved to provide the households with adequate staple root crops and fruits throughout the different seasons. Fresh produce marketing – both domestic and export – grew out of the gradual move by many PICs from subsistence towards cash economies. Marketing started on the premise that the household, having attained food security, would market the excess produce to accumulate household income. For the larger PICs, the agricultural sector has grown to include more specialised production of specific commodities and to larger scales of production of sugarcane, palm oils, coffee, cocoa and recently kava. Smallholder agriculture has proved to be generally more robust and productive, even in the face of adversity. This was evident in Solomon Islands recently, in the case of humanitarian disaster associated with ethnic conflict, and in Bougainville, where the Papua New Guinea (PNG) government blocked imports some 15 years ago, but in neither instance has there been an indication of severe food shortage.

With this broad overview, it is important to recognise the large diversity in Pacific agriculture, and different ways in which it might develop in the future. Based on diversity in island size, resource endowments and the nature of national economy, Pacific islands can be categorised into four groups (see table 6.2) (McGregor, 2006):

- **Category 1:** relatively large countries of Melanesia with substantial natural resource endowments – PNG, Fiji, Solomon Islands, Vanuatu and New Caledonia. They have the best natural resources (more than 90 per cent of land) and the highest populations (more than 85 per cent of the region's population). In Western Melanesia (PNG, Solomon Islands and Vanuatu), agriculture is the main source of employment and livelihoods.

- **Category 2:** the middle-sized Polynesian countries – Tonga and Samoa. These countries have modest land resources, low population growth, and high levels of remittances. Agriculture is an important source of export earnings.
- **Category 3:** land-poor micro-states, predominantly atolls – Cook Islands, Kiribati, Tuvalu, Federated States of Micronesia, Marshall Islands, Niue, Palau and Tokelau. These are among the tiniest nations on earth, spread over a vast area of ocean. They have limited land resources but vast marine resources, and thus agriculture is relatively less important. Some have small but important cash income from copra, with Cook Islands and Niue earning income from diversified agricultural exports; papaya in Cook Islands and taro in Niue. They are highly vulnerable to natural and man-made disasters.
- **Category 4:** agriculture is of limited importance – Nauru, American Samoa, Guam and Northern Marianas. Some, such as Nauru, have limited scope for subsistence agriculture and are largely dependent on imported food products.

In general, for all the categories of islands, the long-term future vision for the agricultural sector would comprise different combinations of domestic and export-based production systems. Agriculture, led by smallholder farming systems, would be the main source of domestic food security as well as a source of food to support growing urban populations, in some cases tourism, throughout the region. Primarily in larger Melanesian countries, sophisticated smallholder and larger enterprises taking advantage of the free trade environment under WTO are expected to produce traditional, new horticultural and tree crops for export in which they have particular comparative advantage. Over time, with increasing fossil fuel prices and emphasis on renewable energy, the agricultural sector is expected to become an important source of affordable and environmentally friendly biofuels, particularly on large islands, complementing the decreasing levels of imported fossil fuels. Each PIC has identified increasing reliance on renewable energy as a major development goal.

Agricultural sector challenges

Agricultural challenges in the Pacific are multifaceted. Major challenges are largely as a result of the ‘small islands large oceans’ phenomenon, small domestic markets and economies that rely on limited export commodities, highly vulnerable to market fluctuation. Large distances between the PICs and their main export markets mean high transportation costs and reduced ability to compete in the global markets. Added to this are domestic conditions that significantly affect local production and marketing, including some outdated production technologies, poor infrastructure, poor enabling environment for policies, and the presence of often inappropriate research and development institutions (WSSD, 2005).

Farm production technologies and practices

Increasing production in the Pacific has often relied on traditional farming practices of expanding land area under cultivation, heavier use of fertilisers or pesticides and larger labour inputs. Some mechanisation has occurred, but mainly on larger farms. Small-scale technologies are available in Asia, but are not easily obtainable. There is limited innovation into the breeding of local crop varieties for increased productivity, selection of varieties for characteristics demanded by consumers or for disease resistance.

Many farmers are finding that environmental problems are on the increase, such as sugarcane growers and ginger farmers in Fiji. Some exercise poor farm management, cultivating lands not

suitable for agriculture or not carrying out soil conservation. Farmers do not generally adopt available efficiency-raising technologies. Resource-saving technologies for minimising soil erosion from sloping lands are not very common, although extension workers have promoted this for several decades and there are pockets of success.

Farmers often take short-term effects of prices and costs into account, without a longer-term view. In the face of rising fertiliser and pesticide prices, farmers often cut their use to reduce costs, without necessarily considering alternative farming practices. Although extension workers have been promoting more integrated approaches, such as integrated nutrient and pest management, these have not been adopted across the region. Considerable systematic efforts are required to encourage farmers to adopt such resource-saving and environmentally friendly practices.

In many instances, farmers will need to invest in labour, management skills and knowledge, approach farming in a holistic manner and adopt it as a business venture, while also adopting resource-conserving and efficiency-improving technologies.

Enabling environment – infrastructure, government policies and institutions

Inadequate infrastructure, inappropriate or poor government policies and institutions have been the source of major impediments to private sector-led agricultural development throughout the Pacific.

With limited road infrastructure and air and sea transport, communication has been an important reason for low, even stagnant, agricultural productivity and a relatively high cost of production, transportation and marketing (Fleming and Hardaker, 1995; Hardaker and Fleming, 1994). Adequate roads are a basic necessity for marketing. In PNG, for example, the creation of Highland Highway led to the establishment of the coffee industry, PNG's most important source of livelihood.

However, in many of the Category 1 Melanesian countries, this condition is not met. Where it is met, as in Fiji, the cost of maintenance is so high that road conditions deteriorate rapidly. Similarly, for all PICs with a large number of small islands, interisland shipping services are vital. Throughout the region, interisland shipping to remote islands has declined overall due to the demise of the copra industry and migration to 'urban' areas.

It is not just the presence of poor physical structure that has impeded key transport services. Regulatory and incentive structures and policies that discouraged competition have also hampered interisland shipping services. Pacific islands commonly use distortionary policies, often in response to single issues, and these have slowed the pace of agricultural development.

Pacific island states are highly regulated, generating significant costs. Many countries also have many trade-distorting policies, such as self-sufficiency in rice in PNG and Solomon Islands. Such policies often prop up agricultural industries that are not viable.

Price stabilisation schemes have also been used to support failing agricultural activities and discouraged investment into other crops. Price subsidies on fertilisers and pesticides have encouraged excessive use, often leading to contamination of the environment.

Due to poor government policies and regulatory environments, the costs of economic activities are often high in comparison to their neighbours. It takes some five to almost ten times as long to start a business in the PICs as it does, for example, in New Zealand (Dhar and Luthria, 2005).

Poor telecommunications have affected many developments in rural areas, including agriculture. This, however, is gradually changing in some countries. One example is Fiji, where the recent

boom in, and increased range of, mobile phones has meant that growers, buyers and transport providers have all begun to benefit from instant communication.

Farmers and marketers in western Melanesia lag behind considerably. Recently in Solomon Islands there have been signs of improvement; the People First Network is leading the way in developing internet-based communications in remote islands. Farmers and fishermen and women are able to access market price information remotely and negotiate better prices.

The use of parastatal monopolies to market commodities, such as cocoa, is another example of poor governance structures that have discouraged private sector development. Poor performance of such parastatal bodies can be found in countries such as Fiji, Samoa and Vanuatu. The cocoa industries barely exist in Fiji and Samoa, and the Vanuatu industry is performing poorly. In contrast, in PNG, the government stayed out of marketing of tree crops but there has been competitive selling of coffee, cocoa and palm oil, increasing the importance of these industries as a source of rural GDP and employment in PNG.

Co-ordination and harmonisation of development partner support

PICs face major challenges in co-ordinating and harmonising development partner support. As was recognised in the JPOI and MSI, development partner support tended to be project-based, piecemeal and often reflecting donors' priorities rather than recipient countries' needs and main concerns. One of the results of this has been ineffective, often wasteful use of donor resources in the Pacific (Hughes, 2005). In response to such ineffective use of development partner resources globally, donors have made the Paris Declaration for Improving Aid Effectiveness and are also committed to the Pacific Principles of Aid Effectiveness to help co-ordinate their support. This alone cannot help increase aid effectiveness. For this process to be effective, further innovations are required to strengthen national government and sectoral agencies' ability to prioritise and cost their priorities, and thus to be in a position to better engage with development partners.

Innovation – NSDS strengthening

To realise the sustainable development vision of the Pacific region, agriculture, people, products, policies and practices must come together, where people are empowered to take advantage of opportunities and freely respond to domestic and export market demands. From a national planning and development perspective, a new way of thinking is required. As noted by Dalal-Clayton and Bass (2002, p.29), this will include:

- a move away from producing and implementing fixed development plans, which are 'blue print' approaches, towards adopting an adaptive process that is continuously being reviewed and improved,
- a move away from seeing development as the government's responsibility towards a situation where it is the responsibility of society as a whole,
- a move away from centralised and controlled decision-making towards a process which is participatory and involving all relevant stakeholders in a concerted effort and in a transparent negotiation process,
- a move from a focus on outputs (projects, legislations, plans) towards a focus on systems and outcomes (impacts) on people, and the quality of participation and management process,
- a move from sectoral planning towards an integrated holistic planning, and
- a move from donor-driven 'projects' towards domestically-driven development.

For the agricultural sector, strengthening of national policies requires a change in direction and the adoption of a systems approach. This would involve the application of old knowledge but in new ways, using existing knowledge to create a new and more holistic understanding of the agricultural system, as well as the innovation in customary land management.

Many of the challenges require a change in the approach of all concerned: policy-makers, the private sector, scientists, researchers, policy analysts and farmers. Strengthening national agricultural policies and sector plans linked to NSDS could provide a solid foundation for this change.

A strengthened NSDS-based sectoral planning, policy and budgetary process, would, among other things, mean:

- Agricultural development and resource conservation are treated as integral parts of the broader national development, providing economic growth, basic human livelihood and security. Sustainable economic development cannot be achieved without adequately addressing the issue of sustainable livelihood, equitable distribution, food and other forms of security. The ability of the state to manage these conflicts through traditional law enforcement needs to be considered, together with the formal system of dispute resolution.
- The adoption of a systems view of decision-makers and actors, where stakeholder-based approach is adopted in national and sectoral development planning and policy formulation. In such a stakeholder-based approach, all relevant groups – land owners, farmers, processors, marketers, transport providers, environmentalists, government, the private sector, churches, youth and women’s groups – are involved in problem analysis, solution identification, strategic planning, and implementation.
- The adoption of a systems view of policies, rules and regulations, where governments take a broader view in linking policies related to trade, competition and economic regulations, private sector development, environment protection and conservation, subsidies to farmers and other stakeholders and targeted taxes, as part of an integrated system working to generate maximum benefits.
- The adoption of a systems- and outcomes-focused view of science–economics–people–policy analysis, where governments and other decision-makers would consider all forms of information and knowledge (scientific, economic, social and environmental, as well as traditional knowledge) when designing policies and institutions. A balanced three pillar, economic, social and environmental-based approach would thus be adopted.
- The adoption of a systems view of the production–supply–demand–consumption value chain and development–conservation interaction. Researchers, policy-makers, farmers, environmentalists and research and development (R&D) specialists would take into account not only technical issues, such as appropriate breed, agronomy, pests and diseases and environmental conservation issues, but also market conditions, demand, and supply, prices and costs which determine profitability of agricultural and ecotourism ventures.
- The adoption of a systems view of conservation and production, where particular attention is paid to the issue of biodiversity of plant genetic material, protection and conservation of farmers’ varieties, traditional knowledge and intellectual property rights. It would mean that in response to dangers posed to plant genetic resources (PGR) by socio-economic shifts, climate change and pest and disease outbreaks, a regional and international approach to conservation, protection and best utilisation of plant genetic resources will be adopted.
- The adoption of an approach where the enabling environment of customary property rights and land administration systems will be redesigned to meet the challenges of encouraging

equitable access to customary land by the members of landowning groups as well as other investors. It will encourage equitable sharing of the benefits from the use of land and minimise conflict.

To develop, as well as fully operationalise such a strengthened NSDS-based agricultural sector plan, a new breed of innovators and knowledge managers is required. Macro-economic planners and fiscal management must think differently and recognise the relevance of strengthened sector plans and medium-term budgeting processes, and work with line ministries to develop appropriate prioritised and costed sectoral plans.

Agricultural scientists and researchers would need to adopt an EBM approach with a focus on 'client first'/'farmers first' or 'client first'. Such an approach in analysis, policy and institutional design and development would mean focusing on the issue of maximising long-term income stream at minimal costs and risks, equitable development and minimising scope for intra and intergenerational conflict.

Maximising profit for farmers would involve identifying those characteristics that are demanded by consumers and then, for example, setting the breeding programme that targets that goal. This is in contrast to the traditional focus of breeders and researchers on maximising yield and outputs. Farmers would need innovations that would help them adopt regenerative technologies (Pretty, 1995), including integrated pest management, integrated nutrient management, farming practices that encourage land rehabilitation and prevent soil and nutrient loss, and reduced contamination and pollution of the environment. Another set of innovators may be required, e.g. when dealing with many trade-related technical issues. Thus, for example in the area of biosecurity and quarantine control, PICs could expect to benefit from national biosecurity law that complies with the WTO-SPS agreement and Convention on Biological Diversity.

Policy-makers would need a new type of analyst, who can provide them with evidence-based policy advice reflecting bioeconomic benefits and costs, to select different policy options. Each of these clients requires digested and integrated interdisciplinary analysis-based advice that balances the three pillars of sustainable development – economic, social and environmental goals. This, too, requires innovation in national and regional organisational structures, and for those structures to be flexible enough to allow the bringing together of expertise from different disciplines, as required.

When faced with challenges of increasing access to customary land, countries should use robust information systems to engage with customary land owners and land administrators, researchers and politicians from all camps. They will collectively arrive at a common understanding of key issues associated with the nature of ownership rights, decision-making rights, rights to use and lease alienation rights. They will work with lawyers and institutional designers, government land administrators and land managers, and traditional decision-makers. Together they will design and develop appropriate enabling institutional and governance environments for increased economic activities while minimising the scope for disputes.

When taking such an integrated approach, institutional designers would adopt a harmonised and pragmatic national regulatory framework and market-based incentives that enable effective trade facilitation while establishing appropriate biosecurity operations at the border to minimise the risk of entry of exotic pests and diseases. Furthermore, trained staff and provision of equipment would help improve enforcement of biosecurity regulations and increase trade facilitation.

Knowledge, foresight and innovation – integration of NSDS – EBM-based sustainable agriculture development action plan

For agricultural development in the Pacific, the focus of knowledge, foresight and innovation will be on the entire system, addressing issues related to the country as a whole as well as each of the subsystems, their connectivity and interaction. From a practical perspective, strengthening of NSDS–EBM-based sustainable agriculture development action plans can facilitate a more systematic, transparent and accountable use of domestic resources towards priority issues on all levels. Such an approach can be particularly effective if the agricultural plan is developed using a systematic approach such as stakeholder and other situation analysis, problem tree analysis and solution and strategy formulation guided by the EBM core elements and principles (DFID, 2002). It will also be effective if explicit prioritisation of expected outcomes and outcome-based programmes of strategies and initiatives be prioritised and appropriately sequenced and costed.

A new type of researcher, policy analyst and institutional designer would work together to identify and implement the organisations, processes, policies, strategies and instruments necessary to produce the desired outcomes. A new type of decision-maker is required to strengthen domestic public–private–community partnership, and encourage private sector-led agricultural development, and to negotiate external support.

Equipped with the NSDS-linked sustainable agriculture development plan of action (prioritised and costed sector plan), member countries could be in a better position to negotiate with development partners for a co-ordinated set of technical and financial support to complement their national efforts, using the NSDS-linked sectoral plan of action as the platform for engagement. Some PICs, such as Tuvalu and Samoa, have made efforts to strengthen their NSDS-linked sector planning and budgetary process and to use their prioritised sector plans to allocate their domestic resources and use these as platforms to negotiate a more relevant package of donor assistance.

The Pacific leaders have recognised the importance of countries strengthening their NSDS and adopting a systematic approach to the development and management of agriculture and forestry sectors. In 2007, they called upon the regional organisations to assist member countries to develop NSDS-based agriculture and forestry policies, plans of action and budgetary processes. They called for the mainstreaming of conservation issues into national planning and budgetary process, involving key stakeholders (PIFS, 2007). Operationalising the forum leader's 2007 decisions is a major challenge in the region when countries have limited resources, institutions are weak and the necessary approaches are relatively new, requiring everyone concerned to think and work in an unfamiliar way.

Innovation, the Pacific Plan and regional integration

The region has recognised that for most countries, due to limited capacity, systematic and co-ordinated development can only be addressed through strengthened regional integration, relationships with developing partners and public–private–people links. Stronger partnerships are necessary between scientists, government policy and decision-makers and stakeholders whose livelihood is to be enhanced. Innovation is critical to such reforms.

At regional level, the Pacific leaders see the Pacific Plan as the main instrument for promoting their vision of regionalism to deliver real benefits for the people. The Pacific Plan articulates the philosophy of creating stronger and deeper links between the sovereign countries, through regional co-operation and integration where they add to national efforts, without compromising sovereign rights and responsibilities.

The Pacific Plan is based on the four pillars of economic growth, good governance, sustainable development and security. It contains reference to many regional strategies and initiatives under each of the four pillars, all of which have implications for the agricultural sector.

Included in the Pacific Plan are priority strategies related to:

- **Sustainable development** – strengthening national sustainable development strategies; regional strategies on conservation of natural resource and ecosystem-based management of land and marine resources; the Regional Framework for Action on Disaster Risk Reduction and Disaster Management; the Pacific Islands Framework for Action on Climate Change; and the Pacific Islands Energy Policy, in which the potentially increasing role of renewable energy, is discussed.
- **Good governance** – such as Forum Principles of Good Leadership and Accountability; and Forum Principles of Good Governance.
- **Security** – such as the Aitutaki Declaration on Regional Security Co-operation; biosecurity; and the Regional Framework of Action on Disaster Risk Reduction and Disaster Management.
- **Economics and trade** – such as the Pacific Island Countries Trade Agreement (PICTA) and the Pacific Agreement on Closer Economic Relations (PACER). Under the sustainable development agreements on regional quarantine and customs services, increasing competition and improving the regulatory environment for private sector development and implementation of the regional digital strategy.

These different international instruments, although focused on different thematic areas, have some common guiding principles and strategies. A key point emerging from these instruments is the need for **strengthened national policies, institutions and decision-making processes** that reflect the adoption of a systems approach, including in agriculture, forestry and other land-based resources and environments. This forms the major challenge for all concerned.

The Pacific leaders have acknowledged that these regional strategies must be operationalised at national level to have any meaningful impact. Major innovations are expected within and between regional organisations. Under the Pacific Plan, and following the recent decisions made by the heads of Council of Regional Organisations in the Pacific (CROP) agencies, regional organisations are expected to provide co-ordinated and integrated policy advice to member countries. However, different regional organisations were established as autonomous organisations with their own respective governing councils and mandates. As a result, over time, regional organisations have gradually evolved to a stage where there are overlapping interests and activities, but without the range of technical and social science expertise that may be required for a particular policy analysis. At times complementary expertise are found scattered across several different organisations and have difficulty in coming together to provide comprehensive policy advice.

Recently, efforts have been made by CROP agencies to co-ordinate their respective activities, although these have been constrained by the existing institutional architecture and organisational structures. The Pacific Plan is expected to help rationalise regional institutional frameworks, organisational structures and activities and streamline the support to member countries. It is also expected to help increase aid effectiveness at regional level.

Conclusion

The agricultural sector has the potential of providing at the very least basic food security and livelihoods in all PICs. In some larger countries, it has the potential to provide the raw and

processed commodities needed to fulfil growing demand from the urban and tourism sectors, and meet the need for the foreign exchange and export trade. In this light, the agricultural sector has a critical role to play in the broader national development effort.

To develop agriculture in a sustainable and cost-effective manner, integrated NSDS-linked sectoral planning, prioritisation and budgeting processes are needed in promoting systematic and cost-effective use of domestic and development partner resources. There will be three categories of strategies: resource-conserving technologies; supportive enabling environments for policies, infrastructure and technical capacity and strengthening of institutions and decision-making processes; and stakeholders' involvement. All stakeholders, farmers, foresters, scientists, researchers, policy analysts, extension-workers, would ideally adopt a more systematic view of the world, acquire new understandings, values and methods, and become agents of change.

Central to the development of agriculture in an environment of changing needs and aspirations, global trade regimes, climate change and fluctuating social, economic and environmental conditions is the embracing of new ways of **learning**. The focus of learning would be less on **what is learned** and more on **how** it is learned, and **with whom**. It is also about harnessing the interests and energies of the people of the Pacific, using old and new ideas, scientific and traditional knowledge, and creating enabling environments that allow people to control their own destiny as well as that of their nation.

This is indeed a challenge, particularly since the traditional education system generally produces experts trained in individual subsystems, around individual discipline-based specialisations. Agronomists, breeders, macro-economists, trade economists, marketing specialists, meteorological scientists, sociologists, anthropologists and policy advisers, have been largely working in their own respective worlds often taking a one-dimensional view and tackling individual issues without necessarily looking at connectivity. There is a need to address multifaceted problems in a more holistic, integrated and co-ordinated manner to produce the synergistic outcome.

It is also a challenge when past research and policy formulations processes have largely been 'top-down', with limited if any involvement of the broader communities – farmers, processors, marketers, the private sector, and women's and youth groups. Linked to this is the challenge of enhancing the importance of traditional knowledge and wisdom.

The Pacific leaders have defined the vision and have made specific commitments towards following an integrated approach, as well as adopting a more systematic NSDS-linked sectoral planning and budgetary process to guide allocation of national and development partner resources. The challenge is now for a new breed of innovators to put their vision into operation. For research and training institutions, and regional government organisations, the challenge is to produce this new breed of innovators – scientists, researchers, policy analysts, economists, farmers and other actors and decision-makers – who can help generate new ideas to boost and sustain Pacific Plan agriculture for economic growth, sustainable food production, peace and security.

Table 6.1 Key characteristics of Pacific island countries

<i>Country</i>	<i>Land area (km²)</i>	<i>Population</i>	<i>Geographic type</i>	<i>Importance of agricultural sector</i>
American Samoa	240	68,700 (2002)	High islands, with a few atolls	Minor. Some subsistence and limited market gardening
Cook Islands	180	20,400 (2002)	High islands and atolls	Important. Main export earner. Subsistence a significant component of GDP
Federated States of Micronesia	702	133,150 (2000)	High islands and atolls	Some. Small export earnings, some domestic cash income, and some subsistence
Fiji	18,376	824,700 (2000)	High islands. A few minor atolls	Fundamental. Main employer and net foreign exchange earner. Subsistence a significant proportion of GDP
French Polynesia	3,521	233,500 (2000)	High islands and atolls	Some. Small export earnings, domestic cash income, and subsistence
Guam	549	163,941 (2003)	High island	Limited. Some domestic market gardening
Kiribati	726	98,600 (2003)	Predominately atolls	Considerable. Important for subsistence. Copra is important for outer-island cash income and some foreign exchange
Marshall Islands	720	73,600 (2002)	Atolls	Limited. Some subsistence and income earned from copra
Nauru	21	12,329 (2001)	Raised coral island	Insignificant
New Caledonia	19,103	220,000 (2000)	High island	Important, particularly in the south
Niue	258	2,145 (2003)	Raised coral island	Significant. Subsistence and some root crop exports
Palau	475	19,000 (2001)	High islands and atolls	Some. Market gardening
Papua New Guinea	461,690	5,100 000 (2003)	High islands – a few small atolls	Fundamental. Overwhelming source of employment. Provides a significant proportion of net export earnings. Subsistence is a significant component of GDP
Samoa	2,934	178,200 (2003)	High islands	Fundamental. Traditional agriculture is the underlying strength of economy
Solomon Islands	29,785	470,000 (2004)	High islands and a few atolls	Fundamental. Predominant source of employment. Provides a substantial proportion of net export earnings. Subsistence is a significant component of GDP
Tokelau	12	1,400 (2003)	Atolls	Some. Subsistence
Tonga	696	108,200 (2003)	High islands and a few small atolls	Fundamental. Agriculture has led economic growth recently
Tuvalu	26	11,000 (2002)	Atolls	Some. Subsistence and some cash income from copra
Wallis and Futuna	255	14,900 (2003)	High islands and atolls	Some. Subsistence
Vanuatu	12,189	199,500 (2003)	High islands and a few small atolls	Fundamental. Predominant source of employment. Provides a substantial proportion of net export earnings. Subsistence is a significant component of GDP

Table 6.2 Island groupings and 2050 vision for the agricultural sector

<i>Country grouping</i>	<i>Current status</i>	<i>Expected 2050 vision</i>
Category 1: relatively large countries of Melanesia and best natural resource endowments – PNG, Fiji, Solomon Islands, Vanuatu and New Caledonia	Have large natural resource endowments (more than 90 per cent of land), have highest populations (more than 85 per cent of the region’s population)	Higher efficiency of traditional food production and increased household food security Increased volume and quality of domestically marketed foods
	In Western Melanesia (PNG, Solomon Islands and Vanuatu), agriculture is the main source of employment and livelihoods	Increase in quality and quantity of commodities where countries have comparative advantage (coffee, cocoa and palm oil in PNG and Solomon; horticulture and spices in Fiji) Diversified agricultural export base, focusing on horticultural commodities of comparative advantage, such as tree crops indigenous nuts and spices Use of agricultural crops, such as coconut and sugarcane for biofuel Domestic urban and tourism-led increased agricultural produce
Category 2: middle sized Polynesia – Tonga and Samoa	Countries have modest land resources	Smallholder farming systems remain core to food security, underpinned by remittances
	Tonga enjoyed agriculture-led growth with the development of squash and vanilla. The economy is highly vulnerable because of the high dependence on squash	Increased domestic market for agricultural food, with improvements in diet reducing lifestyle diseases
	Samoa was the lead taro exporter before the taro blight disease decimated the industry. These economies have low population growth, and high level of remittances	Improved quality and export of commodities such as squash based on environmentally sustainable production, and quality vanilla Increased export of traditional foods to Tongans and Samoans living abroad Increased horticultural exports from Samoa based on crops such as papaya and rambuttan
Category 3: land-poor micro-states, predominantly atolls – Cook Islands, Kiribati, Tuvalu, Federated States of Micronesia, Marshall Islands, Niue, Palau and Tokelau	These are the smallest nations on earth, spread over a vast area of ocean. They have limited land resources but vast marine resources, and thus agriculture is relatively less important	Increased household food security as a result of improved gardening techniques, increased composting, growing of tolerant fruit trees, overcoming pests and diseases Diversified coconut industry, moving away from copra to biofuel and edible oil production
	Some have small but important cash income from copra, with Cook Islands and Niue earning income from diversified agricultural exports; papaya in Cooks, and taro in Niue. They are highly vulnerable to natural and man-made disasters	
Category 4: agriculture is of limited importance – Nauru, American Samoa, Guam and Northern Marianas	Some, such as Nauru, have limited scope for subsistence agriculture and are largely dependent on imported food products	Limited scope to increase household security through increased composting of human and other organic wastes

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Notes

1. This chapter extensively draws on a PIFS paper presented at the CTA/USP Regional Workshop, Innovations and Foresight for Boosting Agriculture, 16–19 July 2007, Suva, Fiji.
2. http://www.esa.org/science_resources/ [accessed February 2011].
3. Based on the PIFS 2007 project proposal on Land Management and Conflict Minimisation, Suva: Fiji.
4. Institutions are defined as rules and regulations (formal institution) and custom and norms (informal institution).