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**THEMATIC REPORT ON AGRICULTURE AND LAND -
AN ASSESSMENT OF ASIAN AND PACIFIC PROGRESS**

(Item 3 of the provisional agenda)

This paper was prepared by Dr. Christopher Landon-Lane, for the Regional Implementation Meeting for Asia and the Pacific for the sixteenth session of the Commission on Sustainable Development (CSD-16). The views expressed herein are those of the author and do not necessarily reflect the views of the United Nations. The paper has been issued without formal editing.

EXECUTIVE SUMMARY

1. This background paper is intended to stimulate discussion on the theme of agriculture and land at the Regional Implementation Meeting (RIM) for the Asian and Pacific region in preparation for the 16th and 17th sessions of the Commission for Sustainable Development (CSD) in 2008 and 2009 respectively. The objective is to provide background to assist the RIM to produce an in-depth and consolidated review of implementation of international action programmes on agriculture and land in the region for CSD 16, and assist the RIM to identify policy options to address key challenges to be presented at CSD 17.

2. The wide scope of this paper, agriculture and land, includes forestry and fisheries and overlaps with themes of the other background papers presented to the RIM on rural development, desertification, drought and climate change.

3. Each country, and the region as a whole, must formulate policies, plans and develop institutions that will impact positively on agriculture and land use, ensure that the increasing demand for land and water resources be sustainably met, while supporting the development of a vibrant rural sector for food, fibre, income and other needs. Climate change is already showing that this challenge must be met in a context of increasing risk for agriculture and food production, and that all nations must bear the cost of mitigation and adaptation to long-term impacts.

4. The region has experienced strong economic growth but also rapid population increase which will continue to have profound economic and social change. Economic, demographic and environmental trends, many of them common across the region, lead to a rationale for prioritizing key challenges for each subregion regarding the development of more environmentally and socially sustainable economic activity patterns. Economic growth still remains the overriding goal of countries in the region to lift growing populations out of poverty, but it is clear this cannot be sustained at current rates of use of non-renewable resources, and at current rates of degradation of so-called renewable resources. Each country in the region has experienced the limited capacity of land, water, and biodiversity to renew its productivity. Demand for food and non-food agriculture, its processing and distribution, is increasing demands on ecosystem services and all countries in the region must continue to implement commitments to ensure the carrying capacity of their natural resource base is not exceeded. The statements made by the Intergovernmental Panel on Climate Change (IPCC) and recently at meetings of the Asian and Pacific Economic Cooperation forum and UN Framework for Climate Change (Sydney and New York, 2007, respectively), confirm that there is political awareness of climate change, but governments, agricultural industries and our societies continue to pursue the rapid economic growth paradigm, and continue to increase unsustainable consumption of food, fishery, forestry and agricultural products.

5. East Asia, South Asia and Indonesia are challenged by large populations, and must prioritize policy and action to slow the rate of land degradation, restructure the agricultural sector in order to improve the productivity and sustainability of agriculture, and also to reduce use of woodland and agricultural residues for energy. Restructuring policy must create income opportunities for the rural poor to meet hunger and poverty alleviation goals. Food and energy policy must balance use of agricultural land and water resources for bio-fuel and food production. In light of trade globalization and

sustainability, continued effort needs to be made to improve food safety and optimize fertilizer and agrochemical use to reduce impacts on health and environment.

6. South-east Asia and the Pacific Islands are also challenged by population growth and restructuring to reduce income dependence on agriculture. For many of these countries, fragile environmental assets are often their major comparative economic advantage in the global economy. There is a need to prioritize implementation of policies for sustainable land and forest management, protection of the coastal marine environment from land-based activities, and adaptation to the impacts of climate change. Some developing countries have good potential for agricultural growth through sustainable gains in productivity, but policies and technology development must prioritize sustainable agriculture and agribusiness practices to ensure the poor benefit from managing their resources sustainably. Policy on land tenure must encourage investment in sustainable land use. Strengthening and harmonizing regional bio-security is an increasingly important risk management policy in the context of globalization and rapid transfer of disease.

7. Many of the Central Asian economies have experienced and recovered from the big adjustments and instability of the last decade, however poverty and undernourishment, desertification and infrastructure development are serious challenges. Trans-boundary animal diseases, and climate change risk mitigation and adaptation policy need to be prioritized.

8. South and Southwest Asia is also challenged by rural poverty and food security, despite strong progress agricultural production in the last decade. Countries with a narrow agricultural economic base and large rural populations will need policies to facilitate restructuring to provide alternative rural and national income opportunities. Policy priorities must be built on stable governance, legal frameworks, and on principles of equity. Risk management and adaptation policies for the impacts of climate change impact especially in mountainous areas and river deltas.

9. The situation of Small Island Developing States (SIDS) differs markedly from that of the bigger countries in the Asia-Pacific region due to the small land sizes, isolation and scattered nature of the more than 7,500 islands that make up the 22 countries and territories in the Pacific subregion and Indian Ocean islands. Here the effects of smallness and dispersal including dis-economies of scale, high population densities, distance from the main trading centers, small markets, fragile ecosystems and frequency of natural disasters incur greater harm to these economies than they do to bigger countries. Agriculture and rural development are logical policy responses to the current situation in many Pacific SIDS where urbanization spurred on by limited economic opportunities in agriculture and decades of policy neglect in many Pacific SIDS has raised urban populations to more than one third of national populations and urban growth to twice that of the national population growth rate.

SETTING THE SCENE

10. The situation in Asia and the Pacific is characterized by rapidly changing economies and societies. In addition to its newly-acquired status as the production centre of the world, it is also becoming the breadbasket to the world. Asian and Pacific

countries have made the fastest and biggest poverty reduction gains, improving the lives of 250 million people in two decades. Despite progress in recent decades, Asia and the Pacific continues to be home to the bulk of the poor in the world. In 2005, in Asia and the Pacific, about half a billion people are not able to meet basic food requirements of 2100 kcal, and nearly 2 billion people are near-poor or earn below US\$2 a day¹.

11. For growth to continue, policy questions must be asked – how can yield increases, and the level of agricultural production be sustained to meet demand from increasing population? What kinds of agricultural technologies are most sustainable? How can rural restructuring be achieved to improve agricultural efficiencies and productivity, without marginalizing rural poor? Policy also still needs to address the substantial numbers of people vulnerable to food insecurity, due to social and economic isolation, weak governance and conflict, disaster, and those countries with little comparative advantage facing negative effects of globalization. Many farmers, fishers and foresters are exceedingly vulnerable to floods, droughts and cyclones as well as less frequent events such as earthquakes and tsunamis. Absolute income gaps between the richest and poorest as well as between rural and urban areas in terms of the quality of life and livelihood opportunities are widening. Agricultural diversity, bio-security, trade, employment and support for sustainable development of local agricultural industry remain important aspects of sustainable food and agriculture policy.

12. Trade liberalization and globalization are seriously impacting food and agriculture. Food production is increasingly promoted by large-scale commercial enterprises and competitive smaller agricultural farmers. Food for self-consumption is often cheaper in the market than through production in subsistence farming. While globalization is facilitating efficient transfer of food, it also increases bio-security risks from trans-boundary diseases, weeds, and unintended genetic drift, for example from genetically-modified crops. The choice of crops grown in the global agricultural market is increasingly driven by manufacturing market demand and consumer trends, which may threaten agricultural biodiversity and increase specialization, depending on local policy and comparative advantage.

13. Biological diversity in agriculture is essential for sustainability – it reduces disease build up, improves ecological stability (reduces plagues and pest population explosions), and is an effective risk management strategy both long-term and annually. It also provides options for different types of farmers and farming systems, besides offering choice to consumers. From this perspective and in a context of regional and global trade, countries need to identify and protect their comparative advantages, for example in developing organic industry and cautious exploration of biotechnology applications.

14. Asia is home to more than half of the world's population. Over this century, Central Asia is expected to almost double in population, and South Asia will surpass China and East Asia. Simultaneously, the Pacific OECD countries are likely to shrink in population size and experience extreme population ageing (for example, 50 per cent of the population in Japan over 60)². Despite a decline in Asia's population growth rate, the number of people is forecast to increase by some 2 billion between 1995 and 2050. Most

¹ Tadao Chino, Nomura Research Institute, keynote speech at FAO WFD 2006

² Wolfgang Lutz, Sergei Scherbov, Warren Sanderson, *The end of population growth in Asia*, Journal of Population Research, May, 2003

of this growth will occur in the next three decades³. The unprecedented economic and population growth in the Asian and Pacific region over the past three decades has had profound impacts on agriculture and competition for land and water resources. There is limited further land available that is suitable for agriculture, but water is increasingly scarce. Meanwhile Asian demand for food will continue to grow, increasing by 40 per cent from 2000 to 2025. The Asian and Pacific region has the lowest per capita availability of natural resources, and there is continuing loss of food growing land to non-food crops, urbanization, infrastructure, degradation and climate change. The latest Global Environment Outlook⁴ has reported that water supply is a serious threat as demand for irrigation soars, estimating that only one in ten of the world's major rivers reaches the sea all year round (China's Yellow River and Australia's Murray River have both failed to flow to the sea in recent years). The report also found that each person's "environmental footprint" has on average grown to 22 hectares, exceeding the biological carrying capacity of 15 hectares per person. Policies for sustainable management of agricultural resources, information for decision-making, and capacity to implement action plans should remain a high priority for many countries, but awareness, commitment and funding remain constraints.

15. Although the agricultural sector continues to grow, it is declining in relative importance in Asia, both in terms of its contribution to GDP and its share of the labour force. Farm households are diversifying their sources of income toward services and industry, or leaving the agricultural sector altogether. While this restructuring reflects increasing commercialization, vertical integration, mechanization, processing, and aggregation of farm resources to achieve economic and other efficiencies unavailable to small farmers, it also reflects increasing and higher income off-farm employment opportunities for rural poor. Much of the off-farm labour is easier to access by men, leaving women to care not only for family but also farming. The feminization of agriculture extends into women's critical roles in produce marketing and their primary responsibility for consumption choices and therefore nutrition. In less-developed areas of Asia, women's role in fetching water means they are the first to experience impacts from loss of water supply and pollution. Policy needs to ensure that small farmers - including women - are not left out of the growth process, and are specifically empowered to effectively participate and benefit from it. With greater investment in agricultural enterprise and security in tradable land tenure, farmers and firms are tending to pay more attention to ensuring the long-term viability of their productive assets, therefore manage them sustainably. Advances in infrastructure, communications and education, as well as increases in costs of farm inputs, will see this trend continue. A proposed goal is that people engage in agriculture by choice rather than by default, and to achieve this goal alternative livelihoods to farming must be available.

16. The Pacific SIDS subregion has the lowest economic growth rate in all the subregions of the ESCAP. The best economic performer in the Pacific SIDS registered growth rates of 7 per cent in 2006 but the average for the subregion was only 3.8 per cent compared to the average growth rate of 7.3 per cent for the other four developing Asian subregions. Poor economic performance and the overall dearth of development opportunities exacerbated urbanization and emigration from the subregion with migration principally to the United States for Micronesian countries and to New Zealand and Australia in the case of the other island countries. Unemployment remains high and despite efforts to develop the employment potential in agriculture, fisheries

³ World Population Assessment and Projection, 1996. United Nations Population Division

⁴ No. 4, October 2007, New York.

and rural development urbanization persist and there is a clear deterioration in a range of social indicators including poverty, crime, suicide and substance abuse, HIV AIDS and lifestyle diseases.

17. There has been no shortage of efforts to tackle development issues including those mentioned here. The subregional approach or regionalism promoted by the Pacific Island Forum and regional organizations and blueprinted in the Pacific Plan is one strategy that the subregion has approved. However implementing the Plan at the national level will not be easy because of the great diversity in country situations. Certainly in agriculture, fisheries and rural development the lack of profitability and so investor confidence in this sector and the difficulty of reversing urban drift are likely to continue to be the main stumbling blocks. The Pacific SIDS region has begun to look for other strategies including emigration and a focus on urban management as partial means of addressing the urbanization problem.

18. Many high island countries especially in Melanesia have vibrant trade in forestry products but failure to observe sound logging practice has given rise to unacceptable environmental impacts. A number of countries particularly Papua New Guinea also have mineral extraction industries that unfortunately have been centers of much conflict between traditionalist/environmentalist and economic interest.

Table 1 Key Issues raised in Regional official forums

Key Issue
Effects of trade on food security and poverty reduction
Adjustment and restructuring in major Asian economies - implications for food security, poverty and gender in the rest of the region.
Reducing vulnerability to natural disasters - and promoting a sustainable livelihood approach for rehabilitation and reconstruction.
Bio-security, trans-boundary animal diseases and avian influenza
Bio-energy
Bio-technology
Bio-diversity
Integrated production systems
Organic agriculture
Ethics
Climate change

Source: 2006 FAO (i) Asia-Pacific Regional Conference; and (ii) Conference on Priority Areas for Interdisciplinary Action

19. **Key challenges** regarding the development of more environmentally and socially sustainable land use and patterns of growth in the agricultural economy are raised in the following paragraphs.

20. **Developing comparative advantage, reducing poverty and improving sustainable resource management under globalization:** Global and national food production and distribution systems are increasingly integrated as firms and farmers have taken advantage of opportunities to reduce market uncertainties and gain supply chain efficiencies through advances in communications, monitoring, transport, technology and workforce education. The three key challenges the region faces are (i) restructuring agriculture using internal and external diversification into comparative

advantages, (ii) developing supporting infrastructure, and (iii) ensuring that the small-holder has adequate opportunities to compete in the global market place. Globalization can give individual countries opportunity to concentrate on commodities and processes for which they have comparative advantage, such as rice in Thailand and cotton in Pakistan. Policy co-ordination among trading countries could promote efficiencies in use of natural resources, labour and infrastructure by reallocating production, processing and financial resources beyond national boundaries. In small island developing states like East Timor and mountainous countries like Lao PDR with limited comparative advantage, the challenge is balancing food import and pricing policy with the need to ensure viability of rural communities.

21. A significant emerging challenge is the greater bio-security risk from globalization, even as it improves distribution of agricultural technologies and food. Bio-security management, trans-boundary animal diseases and avian influenza⁵ were key issues in recent regional forums, after the region witnessed rapid spread of certain diseases with severe impacts on agriculture and human health. Bio-security requires not only stronger border controls and development of market access protocols (for example for disinfection treatment), but also communication and bilateral or multi-lateral agreements. Honey bee decline is a new example emerging in the region causing collapse of about 75 per cent of New Zealand's honey industry⁶. A related trade issue is also maintaining produce integrity, product safety and quality assurance. Who bears the costs of testing, identity preservation, segregation, risk of rejected shipments and loss of markets as a result of unintended contamination, for example with genetically modified (GM) material, is a controversial issue⁷. Many Central and West Asian countries are challenged by dryland and rangeland sustainability and rely on regional trade to obtain livestock fodder during lean seasons. Herders are vulnerable to climate change, weeds, and trans-boundary diseases.

22. **Restructuring the farm sector for greater environmental sustainability and equitable participation:** The nature of farming is changing in most developing Asian countries. Labour-intensive small-scale family farms are being aggregated into more efficient, mechanized large-scale farms, generally without real increases in food prices, especially in the more affluent main production areas with good infrastructure for market access, irrigation and electrification such as the fertile plains, river valleys and deltas of Australasia, South-east Asia, Central Asia and parts of China and India. Despite this, there are still too many unsustainable small farmers in hilly and vulnerable areas, including Lao PDR, PDR Korea, Western Asia, South Asia and western China. While this restructuring brings agricultural productivity gains and reduced direct population pressure on farm land, there needs to be policy and market mechanisms to ensure the restructured farm sector is more sustainable than what it replaced. Risks and challenges to sustainability include land degradation, overuse of agro-chemicals, fertilizer, and antibiotics, pollution from intensive animal production, and diminishing genetic diversity. The rural poor, particularly women must be able to participate in the benefits of restructuring, particularly through private and public investment in better agricultural resource management and for education and infrastructure to provide essential services and employment to accommodate, where necessary, the urban drift of rural people out of unsustainable situations.

⁵ FAO 2006: (i) Priority Areas for Interdisciplinary Action; (ii) Asia Pacific Regional Conference

⁶ NZ Apiculture Association, 2007

⁷ Discussed at FAO Priority Areas for Interdisciplinary Action; see also www.geneethics.org

23. While the trend in rural depopulation continues in Pacific SIDS, the rural and outer islands are still home to around 75 per cent of people in this subregion. Semi subsistence agriculture remains the main livelihood activity. Any market-based restructuring of the sector should generate employment for ordinary often unskilled labour in this sector. Jobless growth as would be the result of capital-intensive investment would not be proper for the socioeconomic development of many Pacific SIDS. In the case of Fiji's reform to its sugar industry, cane farmers and workers are likely to be the greatest losers hence policy should ensure that they are properly compensated for their losses. Investment in more efficient transport and communication with rural areas should improve the efficiency in mutual economic support between rural dwellers and their urban counterparts.

24. **Maintaining agricultural diversity for food and non-food production demands:** While low food prices are critical to the poor, distribution and retailing in urban areas relies on sustainable production, viable business systems and adequate infrastructure. Food producers must be able to absorb increasing costs of fuel, water and other farm inputs. Food prices will also increasingly reflect prices and profitability of non-food agricultural products, particularly bio-fuels, paper and plantation forest products. Though current policies favoring rice and wheat in all Asian countries have in the past led to increased production, future yield increase of these crops from conventional breeding and gene manipulation is likely to be less spectacular.

25. Direct consumption of secondary crops as food has fallen continuously for the last two decades, however, the production of secondary crops is still expanding due to increases in the use as raw materials for industry. As for 'traditional' processing, production of maize oil, soybean oil and beer from barley is increasing. The growth in demand for secondary crops induced by processing industries in China, Japan, Indonesia, Korea and India will provide opportunities to secondary crop farmers. Secondary crop farmers are predominantly poor and live in remote or marginal areas in Asia. If they have access to industrial markets and can also contribute to local food supplies, they will be instrumental in alleviating hunger and poverty in future⁸.

26. Policy promoting agricultural diversification through secondary food crops has potential to alleviate rural poverty in developing countries. At farm level, diversification can improve overall farm sustainability and reduce the challenge of limited land availability by using crops which are better suited to local micro-environments, provide crop rotations to break disease cycles, and result in reduced water demands and improved risk management. Effective diversification requires vertical and horizontal linkages between farm production and the processing industry supported by appropriate government policies. They include: (i) food diversification; (ii) promoting the development of secondary food crops based processing industry; (iii) infrastructure development; (iv) farm technology and extension services; (v) farm credit; (vi) land tenancy; and (vii) agribusiness partnerships. The marginal revenue increase per rise in costs for secondary crops is better than rice. Many areas have comparative advantage in a specific crop production, while other areas show less competitiveness.

27. **Optimum food and nutrition impacts are challenged by changing marketing and consumption patterns** driven by globalization of trade, increasing incomes, advances in processing and storage, communications and food safety concerns. Food

⁸ Sugino Tomohide, et al. "Identification of Pulling Factors for Enhancing Sustainable Development of Diverse Agriculture in Selected Asian Countries (AGRIDIV)" ESCAP, Working paper No.99. Bogor., 2006

production, processing and retail industries are responding to competition for the consumer, not always consistent with sustainable development goals. While there are Asian countries with malnutrition due to insufficient calorie, vitamin and mineral intake (such as Tajikistan, DPR Korea and Nepal), in many other countries, there is increasing consumption of highly processed foods with added sugar, salt, fats, flavour enhancers and preservatives. Under-nutrition is being replaced by obesity, diabetes, dietary deficiencies, allergies and other dietary problems especially in urban areas of east, south-east and central Asia and the Pacific Islands. On the positive side, due to increasing demand for food which is safe, healthy, produced humanely, sustainably and traded fairly, in many developing countries there has been growing adoption of food industry best practices and standards-based quality management systems. Further improvement in food and agriculture quality and safety is a challenge.

28. The food consumption mix throughout Asia, especially in urban and more developed areas has shifted from a diversified mix of grains, pulses, tubers and root crops to a diet in which the share of expenditure on these food sources in the household budget has declined. Rice and wheat, especially rice, have become the staple food, supported by substantial institutions and investments in related infrastructure and agribusiness. Balancing consumer choice, food production efficiency and sustainability, and nutritional outcomes is a challenge for the private sector supported by enlightened public sector policy and regulation of food standards which also meet WTO, SPS and Codex Alimentarius agreements. Micronutrient deficiencies, obesity, diabetes and other forms of “hidden hunger” are a challenge for the region due to the changing consumption patterns, demands for convenient food to store and distribute, increase in consumption of commercially-prepared foods, and agro/food industry and retail restructuring. Both private sector and government are challenged to build on the role of women to achieve positive responses to these issues.

29. **Technology development to meet massive demand on food security, while limiting environmental impact:** Spectacular increases in agricultural production in the past were mainly due to productivity gains on practically the same amount of agricultural land from breeding, increased use of fertilizer and pesticides. Asia’s population will increase by some 2 billion by 2050⁹, with huge increase in demand for food and agricultural products. Food grain demand will rise by about 40 per cent from the present level of 650 million tons¹⁰. India’s population will increase by an additional 401 million by 2025, also China (260 million), Indonesia (78 million), and Bangladesh (62 million). In both urban and rural areas food products will mainly be bought rather than self-produced. The food security challenge will be not only how to increase the total production of food, but also to ensure access to food through affordable processing, storage and distribution. As fossil fuels become scarce and costs rise, the challenge must be met with limited available appropriate farmland, and without degrading land, natural forests, and water resources. The impact of transition away from fossil fuel energy on food security, will be linked to rise in commodity prices, but the sustainability of bio-fuels is being questioned¹¹. Localized food systems may be necessary. Future increase in food productivity will require major breakthrough in new varieties and sustainable commercial farming systems that are more efficient, rather than more

⁹ World Population Assessment and Projection, 1996. United Nations Population Division

¹⁰ Tadao Chino, *ibid.*

¹¹ UN-Energy Publication (<http://esa.un.org/un-energy/pdf/susdev.Biofuels.FAO.pdf>); also recent reports by the BBC, Bangkok Post, Guardian news, and the Joint OECD-FAO Report www.oecd.org/dataoecd/6/10/38893266.pdf

intensive. Aquaculture development will increasingly replace ocean fisheries, which have been in serious decline since late last century. Premium prices and secure market access are incentives for technologies which enable sustainable farming and safe food practices certified to international standards such as IFOAM, GlobalGAP, and China's Green Food Standard. Other incentives to stimulate sustainable farming technologies may parallel the energy sector, including carbon credits (emerging for forestry), incentives for returning urban waste as composted farm fertilizer (supported for example by municipal authorities in major Australian cities), biogas for rural energy from livestock waste (successful incentives for example applied in China, Viet Nam, and Bangladesh), and modernization of irrigation and water control technologies.

COMMITMENT TO SUSTAINABLE AGRICULTURE AND LAND USE

(a) Important commitments and stakeholders in Asia-Pacific

30. International commitments¹² to sustainable agriculture and land use have been made by Asian and Pacific governments at regional and international official forums and through treaties and codes of practice. The private sector, including the finance sector¹³ has also increasingly committed to sustainable codes. Commitments are wide ranging but increasingly relevant, recognizing the population will continue to increase substantially in an ecosystem with limited biological and physical resources. Accounting for the challenges identified above, the most important commitments for Asia are to poverty and hunger sustainable technologies, diversity, renewable energy, land use planning and administration, market mechanisms, and financing implementation (summarized in Table 2). UN agencies, such as CSD secretariat, FAO, CBD, UNCCD, GEF and also WB, IFAD, ADB and GATT (WTO), and regional organizations, bilateral donor agencies and other bodies are stakeholders encouraged to work with national governments to implement these commitments and to continue the stakeholder dialogue on SARD-related initiatives.

Table 2 Summary of key Agriculture and Land Commitments for Asia and the Pacific ¹⁴

<p><i>Improve Food security, hunger, nutrition</i></p> <ul style="list-style-type: none"> - increase sustainable food production and food security [A21/14.1; CSD-8, 8/4, para 2] and halve number of undernourished people in world by 2015 [PFIA21/63; CSD-8, 8/4, para 5]; incorporated in Millennium Declaration [JPOI/40 a]
<p><i>Promote sustainable agricultural technologies</i></p> <ul style="list-style-type: none"> - intensify agriculture by diversifying the production systems, minimizing environmental and economic risks [A21/14.25], pursuing an ecosystem approach to SARD, considering impacts of agriculture on natural ecosystems [CSD-8, 8/4, para

¹² Including: Agenda 21 of the World Summit on Sustainable Development 1992; World Food Summit 1996; Johannesburg Plan for Further Implementation of A21; Commission for Sustainable Development session 8; UN Framework Convention on Climate Change; Global Programme of Action for the Protection of the Marine Environment from Land-based Activities; UN Statement of Principles for the Sustainable Management of Forests; International Code of Conduct on the Distribution and use of Pesticides.

¹³ For example, *The Equator Principles*, <http://equator-principles.com/> recently adopted by some commercial banking groups

¹⁴ Selected from: CSD-16: S-G State of implementation report, Scoping papers on Agriculture and Land, DESA, 2007

<p>9] and based on sustainable use of renewable resources [JPOI IV 40b]</p> <ul style="list-style-type: none"> - Maintain the integrated plant nutrition approach [A21/14.85] integrated pest management (IPM) [A21/14.74], environmentally-sound agricultural pest control [CSD-8, 8/4, para 29; JPOI/40 o], and encourage organic agriculture as part of contribution to SARD [CSD-8, 8/4, para 38] - Apply the precautionary approach to develop appropriate and safe biotechnology for enhancing food security and sustainable agriculture [CSD- 8, 8/4, para 24]
<p><i>Preserve Social and Genetic Diversity</i></p> <ul style="list-style-type: none"> - implement Global Plan of Action for the Conservation and Sustainable Utilization of Plant Genetic Resources for Food and Agriculture, adopted in 1996 [PFIA21/63] and ratify International Treaty on Plant Genetic Resources for Food and Agriculture [JPOI/40 q] - Promote conservation of traditional and indigenous agricultural systems and strengthen indigenous models of agricultural production [CSD-8, 8/4, para. 7; JPOI/40 r] - Develop appropriate legal frameworks, administrative measures and appropriate strategies for the protection of biodiversity, and the risk analysis and management of genetically modified organisms. [CSD-8, 8/4 para 26]
<p><i>Implement Energy transition</i></p> <ul style="list-style-type: none"> - Initiate and encourage (by 2000) environmentally-sound energy transition in rural areas to better utilize the potential of agriculture and agro-forestry as sources of renewable energy [A21/14.94, 14.93; CSD-8, 8/4, para 11] - Expand research and transfer of technologies in renewable energy sources, including biomass and solar energy, for agricultural production [A21/14.99b; CSD-3, paras 216-217; CSD-8, 8/4, para 11]
<p><i>Improve Planning and Administration, ensure equitable participation</i></p> <ul style="list-style-type: none"> - Ensure people's participation for sustainable agriculture [A21/16-24]; enhance the role of women [JPOI/40], indigenous and community-based approaches; JPOI IV 40d; CSD8 8/3 1.3 - Ensure that policies support sustainable management of resources particularly agricultural land [A21 10.6], for the greatest sustainable benefits, and promote transition to sustainable land management [A21 10.5; CSD 3 167] and land tenure administration [CSD 8/3 4.10], accounting for land-use interdependence between rural and urban areas, ethnic minorities and women 8/3 5.g 23
<p><i>Develop Market mechanisms</i></p> <ul style="list-style-type: none"> - Employ market-based incentives for agricultural enterprises and farmers to monitor and manage water use and quality [JPOI/40 k] - Enhance access to existing markets and develop new markets for value-added agricultural products [JPOI/40 l] Complete agreements relating to agriculture under WTO's Doha trade negotiations [JPOI/92 c] - Build capacity of commodity-dependent countries to diversify exports and address the instability of commodity prices and declining terms of trade [JPOI/95]
<p><i>Mobilize Financing</i></p> <ul style="list-style-type: none"> - Reverse the declining trend in public sector finance for sustainable agriculture [JPOI/40j; PFIA21/63] Promote private sector investment to strengthen agriculture research and dissemination to farming communities [JPOI/40 j]; - Expand rural credit facilities and rural infrastructure related to processing, transportation and marketing [A21/14.33 b, and CSD-8, 8/4 para 14], attract private investment in SARD [CSD-8, 8/4 para 18]

(b) Constraints and opportunities for implementation

31. **Environmental sustainability is constrained by rural poverty, increasing population competing for agricultural resources, performance of research and development, and demand for energy.** The poor are constrained by lack of capacity to change practices or conserve resources, cannot access credit, and are not empowered. In national planning, particularly in developing countries, there is an opportunity to prioritize strategies for sustainable development and conservative use of natural resources, rather than the current priority on annual economic growth and employment at the expense of future sustainability. The opportunity is to more efficiently balance resource allocations against demands for water and land between food, non-food and plantation forestry, urban and infrastructure development. Rural poverty reduction presents significant economic opportunity. Slowing rural-urban drift is an opportunity to slow the massive infrastructure investment required in urbanization. There are opportunities to enhance sustainable land use through stronger legal frameworks for land tenure and commerce, and to develop social capital through community based initiatives such as land care groups, water user associations, farmer associations, and commodity groups. Globalization provides opportunities for sustainable poverty reduction if measures are taken to safeguard social and biological diversity, and to ensure the poor participate in benefits. Existing market dynamics in the global supply chain are generally biased towards larger producers, and it is important to point out the key role that the Government has to play to provide small-holder with adequate opportunities to compete in the global market place. Positive experiences exist across the region, including China, Thailand and Malaysia.

32. Rising energy demand for finite agricultural resources is a major constraint. The large numbers of people in poor rural areas relying on agricultural residues and scarce firewood for energy impact heavily on soil fertility and ground cover, increasing land degradation (especially noticed when oil and kerosene prices rose sharply during 2006). The emerging bio-fuel industry can provide opportunities for farmers, for sustainable use of marginal lands (e.g. with *Jatropha* sp.) and alternatives for sugar and coconut producing countries, but the strong demand for corn in many countries must be balanced by sound policy to avoid conflict between food and bio-fuel. Growing bio-fuel demand is underpinning the emergence of higher agricultural prices¹⁵. With the bio-fuels industry growing by leaps and bounds worldwide, controversy is erupting over whether the transformation efficiency is too low, and this important new energy source is truly as sustainable as it claims to be¹⁶.

33. **Declining financial resources directed to agriculture, rural development and natural resource conservation has constrained sustainable development.** For a similar amount of finance, agriculture, rural development and livelihood programmes and projects are more complex and require more human capital than infrastructure projects. The Asian Development Bank notes more failures amongst agriculture and rural development loan projects, precisely because these directly address difficult problems of rural poverty as compared to easily monitored infrastructure projects. The World Bank, however, recently recognized that investing in agriculture generates economic opportunities to pay for infrastructure and other services¹⁷. Expanding rural financial

¹⁵ OECD, www.oecd.org/document/2/0,3343,en_2649_201185_38893378_1_1_1_1,00.html

¹⁶ www.wbcsd.org/includes/getTarget.asp?type=DocDet&id=MjUyNjY

¹⁷ Annual Report 2007, World Bank

services, rural transport and facilitating private sector investment in agribusiness provides opportunities to create employment and achieve efficiency gains through contract farming, reduced post-harvest losses, and growth of employment in services. Research, development and dissemination is constrained by inadequate funding to generate and transfer sustainable agricultural technologies in many developing countries. Governments should budget to realize the opportunity for sustainable technologies and the mobility and communication capacity to disseminate them. Genetic modification (GM) of crops may provide opportunity for sustainable productivity improvements, but is constrained by apparent inability to adequately assess and control risks, and by the lack of finance directed by the main private sector proponents at the poor and food security. In regional trade workshops, several countries expressed concerns that they lack the resources for conducting cost benefit and impact analyses of the introduction of GM crops in their countries, and therefore find it very difficult to develop the appropriate legislative framework.

REVIEW OF IMPLEMENTATION

(a) Progress of Implementation

Improve Food Security and Poverty

34. Many countries in the region have experienced rapid economic development bringing gains in food security and poverty reduction, such as China, India, Turkmenistan, and Viet Nam. Rural poverty in the region declined during 1990 to 2005 from 39 to 28 per cent. While the region's performance was driven largely by China and India with their vast numbers of rural poor, major success in poverty reduction was witnessed in nearly all Asian countries with very few exceptions. There are, however nations and peoples who have not been so fortunate such as Nepal and DPR Korea. Tajikistan, while making great gains in food production, is still the poorest of the former USSR and 61 per cent of its people are undernourished. None of the developing countries in Asia and the Pacific are on track to meet all of the Millennium Development Goals by 2015. As of 2000-2002, there were still 548 million undernourished people in the developing and transition economies of Asia and the Pacific.

35. Food production increases have kept pace with population growth, but demand for food will continue to grow, especially in China, Bangladesh, India, and Indonesia. Further gains in food production will mostly come from restructuring, diversification, genetic diversity research and development, and market access. Countries with high proportion of the workforce engaged in agriculture are the least developed such as Bhutan, Lao PDR, Solomon Islands, and also the most populous such as China (64 per cent), India (66 per cent). With reference to "people's participation" - [A21-16-24] in food production, it is no longer possible to discuss this without recognition of women's role as food producers. In many Asian countries migration of men into higher paid, urban off-farm employment is causing the feminization of agriculture. Restructuring the agriculture sector will require continued investment in market access infrastructure, education and growth of non-agricultural employment for rural people especially women.

36. An increase in agricultural production was a key factor in strong pro-poor growth. The region has seen positive growth in food production during 1994-2004¹⁸, with exceptions suffering recurrent disasters such as Bangladesh (floods), Australia (drought) and Fiji (political instability). Rice yields have continued to grow during 1994-2004, reflecting productivity improvements in South, East and South-east Asia. Wheat yields over the same period improved in Turkmenistan and declined in other areas of the region. Factors increasing wheat yields have been from research and development, and investment such as in Malaysia, Tajikistan, Turkmenistan, and Viet Nam, while decreasing yields have mostly been due to natural disasters such as drought worsened by land degradation and climate change (such as in Australia, China and DPR Korea).

37. The more successful countries have relied more on addressing food security issues indirectly through emphasis on rural household income and farm productivity in their strategic development approaches. Such countries implemented impressive reforms to diversify their rural economy. Perhaps the best example is Thailand; others include China and Viet Nam as well as Bangladesh, Cambodia, Lao PDR, Nepal and Sri Lanka. In India, the 10th five year plan considers diversification into higher value-added crops and upgrading irrigation infrastructure as critical for facilitating steady agricultural growth. Bangladesh, India and Lao People's Democratic Republic still have more or less 30 per cent of their respective population below the international poverty line and poverty remains a serious problem in all the region if national poverty lines are applied. Most countries are challenged by the interrelationship between food needs, social needs and responses to lack of food supply.

38. The links between quality of diet, particularly access to essential vitamins and minerals (such as vitamin A, iodine and dietary iron), and health outcomes, educational achievements and economic productivity and growth have been better understood only recently. What is now frequently referred to as "hidden hunger" affects nearly 1.5 billion persons in Asia and the Pacific. This figure far exceeds the 0.5 billion figure for the poor in the region based on an energy intake of less than 2,100 kcal, which is the main basis for calculating the severe poverty line. Hidden hunger is related to unhealthy food intake, and therefore, is a problem that also affects the non-poor population. Hidden hunger is particularly prevalent in Central Asia, the Pacific, Bangladesh, and the Philippines. Government and the rural private sector are challenged to seriously recognize and build on the role women to mitigate hidden hunger. Programmes that support nutrition education, promote investment in agriculture and food production can further supplement these efforts to tackle hidden hunger in the region. Application of social marketing, nutrition education in schools, regulation of nutritional labeling and other policies provide opportunities to improve the situation.

Promotion of Sustainable Agriculture and Rural Development

39. Countries have also seen negative impacts on land and agricultural resources appearing, often with cumulative and synergistic impacts on health, quality of life, regional stability and security, and economic well-being and competitiveness. Well recognized problems affecting both developed and developing countries such as Australia, China, Indonesia, and Pakistan include dryland salinity, acid-sulphate soils, soil erosion, landscape and river system degradation, local climatic changes, drought,

¹⁸ Selected Indicators of Food and Agriculture in the Asia Pacific Region 1995-2005, RAP Publication 2006/16, FAO, Bangkok 2006. Where not otherwise referenced, data from this publication is used throughout this discussion paper.

forest fires, trans-boundary disease migration, exotic weed infestations, and contamination of agricultural land and water.

40. Despite urbanization, the ratio of agricultural land to agricultural population in the region's developing countries has remained the same between 1994-2004. On average, the region achieved a 0.4 per cent annual increase in agricultural land, mirrored by the same rate of agricultural population increase. DPR Korea is the extreme example of over-use of land: largely mountainous with only 20 per cent of its area cultivable based on slope and other accepted land use factors, the country had now 24 per cent of its land under cultivation in 2005, indicating at least four per cent of cultivated land is unsuitable. As a result, marginal farmers are vulnerable to natural disasters and the country has the second highest rate of undernourishment (35 per cent) in the region. In contrast, Lao PDR is a similarly mountainous LDC but has less than 5 per cent of its land area under cultivation despite 76 per cent of the workforce reliant on (subsistence) agriculture.

41. With support from FAO, CGIAR, other agencies, donors and governments, there has been continuing progress on commitments to integrated production systems. FAO continues to extend the integrated nutrition approach, IPM and organic agriculture, however there is often inadequate funding by donors and governments for supporting NGOs, enabling policy and regulatory changes to foster a market-based incentive through comparative advantage. The use of organic certification in countries as diverse as China, East Timor, India, New Zealand, Papua New Guinea and other standards-based market access, environment and quality management schemes¹⁹ have provided immediate and longer-term benefits to farmers and processors from improved sustainability. Those countries with high dependence on agriculture such as Bhutan and Lao PDR, with 94 per cent and 76 per cent of workforce reliant on agriculture respectively, and those with high population growth (South Asia and East Asia), need special focus on increasing adoption of SARD.

42. Earlier productivity gains were from development of high yield varieties such as hybrid rice and maize, increased use of fertilizer and pesticides. For example, cereal production in the region doubled between 1970 and 1995. Subsequent increases in agricultural production in the region have been much reduced to about 15 per cent growth between 1991 and 2005²⁰. Some least developed countries may have scope for productivity gains through increasing fertilizer use, but other developing countries already apply intensive fertilizer rates and further intensification will have negative environmental impacts. For example the rate of fertilizer used in Lao PDR was 7kg/ha while China was 259kg/ha in 2004. Future increase in food supply will rely on higher agricultural productivity, led by commercial farming on irrigated land with good access to markets. A substantial increase from rainfed and marginal areas, using less labour, less water and less arable land will require major breakthrough in new varieties and farming systems that are more efficient, rather than more intensive. Regional commitments have been made to promote research, development and extension of integrated production systems for pests and nutrition, and to promote organic agriculture (tables 2). Farmers and agriculture research institutions expect further agricultural advances in alleviating poverty and malnutrition will be achieved through

¹⁹ E.g. GlobalGAP (formerly EUREPGAP), HACCP food safety (ISO 22000), Environmental Management Systems (ISO 14001) and Fair Trade, Dolphin-friendly fish and bird-friendly coffee accreditation.

²⁰ Selected Indicators of Food and Agriculture in the Asia Pacific Region 1995-2005, RAP Publication 2006/16, FAO, Bangkok 2006

the technology development of economical soil improvement, integrated pest and plant nutrition management, and pest tolerant varieties²¹.

43. The beef and dairy sectors provide a second example of the challenges met in the trend towards more highly intensive farming. Dairy cow breeding is increasingly drawn only from the Holstein-Fresian gene pool in countries as diverse as Fiji and China. Selected for performance in high input farming systems, grain and hay-fed cows in developed China may produce over 50 litres milk per day, compared to 4 litres per day for a typical South Asian small-farm cow. Supplementary feeding for beef and dairy cattle to increase protein conversion have led to unsustainable practices particularly in developed and transitional countries, such as rumen modification treatments with in-feed antibiotics, resulting in resistant bacteria and residues in meat and milk, and meat-derived feeds which has more recently declined in response to its links with Jakobs-Kreunzfeldt disease (JKD). Positive outcomes in terms of sustainability include increased demand for alfalfa and other soil-beneficial fodder crops in China and Central Asia. While the difference in beef and milk systems production is big, the capital and operating costs are high as are the stresses on the animals and the security of input supply. In high-intensity farming, the system's resilience can diminishes as farm operators strive for better financial margins. In response to the needs for capital and risk management, there is increasing vertical and horizontal integration with other farmers and agribusinesses.

44. Over the last decade the biotechnology industry has released genetically modified (GM) varieties including maize, rice, and canola which rely on high levels of inputs to obtain high-yield under large-scale cultivation systems. China, Indonesia, India, Viet Nam and some states of Australia have been most open to GM technologies²², all of which are countries with significant agricultural GDP, increasing food needs and major agricultural exporters. Other agricultural exporting countries such as New Zealand maintain a moratorium on GM varieties. There are a number of contentious issues with GM which re-confirm the need to apply the precautionary principle in further development of this technology. The main issue remains the internal and external costs of preventing and mitigating contamination of non-GM crops, seeds, and products. There are significant external costs of maintaining testing, segregation and identity separation from pre-production (seed production and distribution) through production, processing, bio-security in international trade and at retail level (including product labeling legislation and monitoring). There is negative consumer demand for GM products in most countries, so they are sold in lower value markets such as livestock feed, bio-fuel, food processing aids. Over 80 per cent of global canola production is GM-free and attracts price premiums of up to US\$100/mt internationally, while GM canola production is limited to two countries and has not increased since 1999²³. Escapes of GM herbicide tolerant canola in Canada and the USA, for example, have resulted in litigation by biotechnology corporations against non-GM farmers for unintended, but unlicensed use of the technology, and in return litigation by farmers seeking compensation for contamination of their crops and land with herbicide-tolerant canola weeds. While GM varieties provide some productivity gains to large-scale, irrigated and mechanized farms, there has been no commercialization of varieties to suit small-scale farmers, salt-tolerant and marginal farm land, or longer shelf-life and nutritional improvement. Solving poverty and malnutrition have not effectively been

²¹ Sugino Tomohide, *ibid*.

²² www.unescap.org/esd/environment/soe/2005/mainpub/documents/Part1_02.pdf

²³ Australian Bureau of Agriculture and Resource Economics, 2007

targeted by the predominant multi-national corporations promoting GM technology. Developing countries need to be fully aware of costs and management implications before adopting GM technology. The ongoing FAO Asian Bio-Net project – whose aim is to assist countries in the region to safely harness the benefits of biotechnology – produced in 2006 a benchmark document on bio-safety of genetically modified crops in Asia and a manual focusing on communicating the risks associated with the use of genetically modified crops.

Preservation of Social and Genetic Diversity

45. Preserving and utilizing social and agricultural diversity in the context of trade globalization is challenging many countries to identify and develop competitive advantage. Government and the rural private sector are challenged to seriously recognize the impacts and needs role of women rural farmers and farm workers. Government support to farm household technology for improvement in food production must ensure women are targeted. Agricultural diversity for market and climate risk management is an important dimension, for example Pakistan's narrow export base in cotton and Tonga's with vanilla and tubers. Results in exposure to market risks, crop-related risks, as well as flood and drought. Bangladesh is similarly vulnerable with 75 per cent of agricultural under intensive three-season rice, and in Lao PDR 78 per cent planted in subsistence rice.

46. Rice and wheat, especially rice, have become the staple food in production policy and the consumption bundle. This trend is partially induced by the cheap food policy adopted by artificially maintaining food prices at very low levels to protect consumers through price stabilization schemes and the implementation of production expansion programmes. Supply-side intervention has been successful in boosting production of rice and wheat in India, and rice in Indonesia, the Philippines and Thailand through productivity improvements. However, the most successful breakthroughs in productivity have occurred in more favourable agro-ecological zones and have been based on the ever more intensive use of irrigation water and modern inputs.

47. In Asia and the Pacific, however, secondary crop production is rising due to the steady improvement in yield and demand for maize, soybean, groundnut, cassava and potato is growing for feed, food and industrial manufacturing, and direct food consumption as food. Diversification into high-yield maize has increased as secondary crop instead of beans, fodder and other crops in both wheat and rice-growing countries. While beans add fertility to the soil and provide a disease break from successive grain crops, sustaining high-yield maize requires high inputs and thorough use of conservation agriculture. Maize yields have increased 2001-2004 in the region and production has grown 1.6 per cent over the region (over 20 per cent in Bangladesh and Cambodia), as a result of market demand, private investment and government-supported diversification. With increasing incomes there has been an increase in consumption of meat, dairy products and prepared foods, all of which utilize maize for livestock feeds, food manufacturing inputs (such as oil, thickeners, starch and glucose). More recent added demand for maize is coming from the burgeoning bio-fuel industry. The breeding base is increasingly narrow and varieties are selected to give high yields only with high levels of agro-inputs on good agricultural land.

Energy Transition

48. New industrial uses of agricultural products have potential to contribute to sustainable energy supplies. Biodegradable plastics based on maize and other agricultural products have the potential to substitute 30 per cent of total world plastics production from crude oil. Regarding bio-fuel, Asia and the Pacific need to boost maize production by 4.8 per cent if the 2 per cent gasoline consumption is substituted by alcohol, which is equivalent to the current ratio of ethanol use in USA. To realize poverty alleviation through exploiting this opportunity, policy support should be carefully designed since the previous booms of some crops have not necessarily succeeded in improving the welfare of the rural poor. Current price support and import trade policies for major cereals should be carefully examined for their impacts on the welfare of poor people. Governments and the international community must recognize the potential negative impacts and conflicts arising from the demand for bio-energy on land use, food and commodity prices, as an emerging issue. Cost efficiencies, opportunity cost and environmental impacts of bio-energy must be compared with alternative renewable technologies including wind and solar, as well as addressing energy conservation through, for example, energy conservation and more energy efficient technologies including in agricultural systems. For example the concept of "food miles" was raised by the UK Soil Association in 2006 to promote localized food systems, but was later proposed in 2007 as a means of banning air-freighted food imports from regions including Asia. Design of more efficient agricultural machinery and minimum tillage systems have been given more impetus from rising fuel prices.

49. Investment in rural electrification has had positive impact on deforestation, however large numbers of rural poor throughout the region still rely on crop residues for cooking and heating, resulting loss of soil organic matter and degradation of agricultural land. Biogas from livestock waste is increasingly used to reduce demand on crop residues and firewood, also reduce greenhouse gas emissions from agriculture and to meet rural energy needs. Many Asian countries and donors such as World Bank have supported initiatives on biogas such as in China, Nepal, and Viet Nam.

Improve Planning and Administration for land use and development

50. Improvements in governance, based on participation, equity, and better capacity in planning, administration and monitoring has underpinned the relative stability and investment prosperity of the Asian and Pacific region in the last decade. The exceptions are developing and transitional countries where governance has been undermined by conflict, corruption, autocracy, and inequality, and sadly there are examples in all subregions. Many Asian countries have not fully ensured women are recognized in land tenure legislation and its implementation.

51. The concept of farmer and community participation has been promoted widely and effectively by particularly through support to NGOs, but also by international organizations including UN, FAO, international financial institutions and donors. It is now considered best practice, although mobilizing resources from poor and socially damaged communities remains a challenge.

52. Land planning and management in Pacific SIDS is generally problematic according to many official account because ownership is held by tribal chiefs on behalf of his tribe, or extended family. A relaxation in the land tenure custom should contribute

to a more profitable use of land and economic development. However there are examples showing that government control of land does not automatically lead to efficient land use, in fact the contrary is more the rule than the exception. The solution lies in greater transparency and accountable land use planning and management that supplement rather than supplant market-based utilization of land either under freehold or leasehold arrangements.

Develop Market Mechanisms

53. The regionalization and globalization of agricultural markets is rapidly altering the pattern of food production and consumption. Agricultural trade and food policy must achieve a balance between reliance on cost-efficient import and distribution of cheap food, and resilience to changes and shocks which from time to time occur and have very wide impact in a global economy. Tajikistan experienced the highest regional growth in food production, noting cessation of civil war in 1997, but still has the highest rate of undernourishment (61 per cent) in the region. Uzbekistan, relying on oil and gas exports, had the least growth in food production.

54. The Agricultural Ministers' focus at the May 2006 FAO Asia Pacific Regional Conference was on trade impacts on food security and poverty reduction for a number of reasons. With more liberal trade, food and agriculture policy in the region has generally shifted from national food self-sufficiency to trade-based food security using comparative advantage and minimal regulation to keep basic food prices affordable. For example China has experienced rapid growth in domestic and export demand for its agricultural products, both for food and for bio-fuel production²⁴. Since joining the WTO in 2001, there has been 11 per cent annual increase in food exports, mainly prepared foods from the urban agro-processing sector and chicken meat. Reflecting a comparative advantage, imports are dominated by livestock feed and food manufacturing resources such as soybeans and corn. Some countries that have not developed a strong comparative advantage have maintained or strengthened a food self-sufficiency policy. Two contrasting examples of mountainous countries with food self-sufficiency policy and limited agricultural land are Kyrgyzstan and DPR Korea. Kyrgyzstan has slightly decreased both agricultural imports and exports and improved food security and reduced vulnerability. The same policy in DPR Korea has resulted in exploitation of all potentially arable land, terracing of non-arable hilly areas, and exhaustion of soils, which has since 1995 contributed to a series of natural disasters resulting in severe food shortages, increase in staple food imports and a 19 per cent decrease in agricultural exports. The impact of absence of policy to promote sustainable farming, narrow focus on rice at the expense of diverse crops suited to local conditions, isolationist marketing policy, and allocation of scarce resources to heavy industry development also contributed to food shortages in Viet Nam during the 1980s. Governments need to share and respond to regional experiences and market opportunities. Pakistan, for example has developed its fruit export industry over the last decade and made attempts to reduce reliance on exports of cotton which is prone to production risks resulting in severe income fluctuations for farmers.

55. There are opportunities to use market mechanisms in support of regulation to ensure equitable distribution and pricing of the agricultural resources and environmental services critical for food and rural livelihood security. Various

²⁴ Source: Inst. of Market Economy, Development and Research Center of the State Council of China

mechanisms – especially strengthening ownership and full-cost accounting – can reflect the value-added per unit of resource used, the costs of externalities impacting the value of the resource, and efficient distribution of the resource. In a regional example, a water authority (private, co-operative or public entity) commercially managing water catchment and supply in accordance with pollution regulation ideally sets prices to cover costs and sustain the resource which provides its income. Functioning markets ensure that farmers and processors add sufficient value to a litre of water to cover its purchase and costs of mitigating downstream impacts to meet water quality regulations. There are examples of active water rights trading arrangements in India, which by strengthening the value of water as a farm input and directly involving local stakeholders, provide incentives to protect the water catchment area and finance efficient transmission infrastructure. Water pricing policy allows variation between users, for example in Viet Nam where irrigation companies sell water to agricultural users that is bought from a water resource scheme supplier (which usually controls a dam, reservoir and main distribution systems), and downstream municipal authorities sell water via metered infrastructure to urban users at higher unit rates. Areas that have good water resources may harvest and sell water to others, for example Kyrgyzstan exports irrigation water to Kazakhstan. Problems arise where environmental services like rainfall harvesting and water use are not accounted for. For example in certain Australasian countries an impact of the rapidly growing Eucalyptus plantation forestry industry in upper catchments is drastic reduction of rainfall runoff into streamflows which provide irrigation and municipal supplies²⁵. Young plantations draw massive amounts of water compared to the mature forests which they replace, but since rainfall is in effect a free environmental service (and forestry is typically a powerful industry lobby), government is hesitant to regulate to introduce full accounting of the impact on the water resource and its marketing, even though the impact of conversion of mature forest to plantation may halve or more the supply to downstream users. The result is conflict, increasing scarcity and cost at a time when demand for irrigation is increasing, and there are urban water restrictions due to drought. In this case there could be a water pricing mechanism applied for example on the value added per unit of water by farming into food compared with wood pulp for paper. Governments need to develop more mature water policy and regulation to achieve more equitable and sustainable water management.

Adequate Financing

56. More than 200 FAO field projects were operational in 34 Asia-Pacific countries covering crops, agricultural support systems, soil and water, livestock, fisheries, forestry, food security, nutrition, food safety and quality, agricultural policy support, the environment and rural development. Total project delivery reached US\$39.1 million in 2004 and is expected to reach US\$42 million in 2005. In the first eight months of 2005, 30 new projects became operational with a total budget of US\$33 million²⁶. In line with other donors, ADB's financial support to agriculture and rural development has changed significantly since the 1990s²⁷. Direct investments in agriculture and natural resources have increasingly been replaced by other related rural investments in response to the changing demands of the region. In support of its poverty reduction strategy, ADB has

²⁵ Source: Tasmanian Farmers and Graziers Association

²⁶ Report on FAO Activities in Asia and the Pacific Region (2004–05) with a Focus on the Achievement of the World Food Summit (WFS) Target and the Millennium Development Goals (MDGs), and Actions Taken on the Recommendations of the 27th APRC. FAO 28th APRC, Jakarta 2006

²⁷ Tadao Chino, *ibid.*

made large investments in rural transport, rural electrification, rural microfinance and rural governance, all contributing to agricultural productivity and environmental outcomes. ADB's recently adopted Medium-Term Strategy II for 2006–2008 also mentions rural infrastructure as a high priority.

57. Foreign aid for agriculture and rural development has continued to decline. From a total of over US\$9 billion per year in the early 1980s, it fell to less than US\$5 billion in the late 1990s. Meanwhile, an estimated 854 million people around the world remain undernourished. Only investment in agriculture – together with support for education and health – will turn this situation around. Most of the world's farmers are small scale farmers. As a group, they are the biggest investors in agriculture and they must either be able to profit from farming or find alternative income and make way for efficiencies of restructuring into large-scale farming. World Bank, after following an infrastructure policy similar to ADB has recently returned lending priority to agriculture, in response to its own research re-confirming the primary, and essential role of agriculture in developing economies.

58. In many Asian and Pacific countries, agriculture may contribute a minor share to GDP. However, when forward linkages such as agro-business and marketing, and backward linkages such as seeds and fertilizers are considered, the agriculture sector comprises a major share of national growth. It is estimated, for example, that in the Philippines about 74 per cent of GDP is related to agriculture.

59. Increasing the volume of public investment in agriculture is of absolute necessity and it is crucial to make such assistance more effective. One major mechanism is the Global Donor Platform for Rural Development, a consortium of 26 donor development agencies, which FAO co-chairs with Germany's Federal Ministry for Economic Cooperation and Development. The platform seeks to improve donor aid effectiveness and focus action on achieving the Millennium Development Goals. While increased development assistance, public investment and debt relief are key elements, equal importance should be given to private sector investment. Commercial farmers, traders, input suppliers, agro-processors and transnational agribusinesses all contribute to a global system of investment in agricultural production, marketing and trade. But, importantly, small farmers themselves are amongst the biggest investors in agriculture.

60. "Promoting profitable partnerships" is the new model for cooperation between the public and private sectors²⁸. This means finding new ways of bringing together producers – small farmers and cooperatives – with agribusiness and governments to create profitable ventures. It places primary responsibility on governments to create stable socio-political conditions, establish legal frameworks for access to land and water, enforce grades and standards, foster a better climate for private investment and provide essential rural infrastructure.

(b) Risks from Climate Change

61. Climate change is challenging agriculture with increasing uncertainty and variability, particularly in terms of water and temperature regimes. Crops, livestock and people are increasingly suffering from disastrous floods and droughts, for example in Australia, Bangladesh, China, DPR Korea, Pakistan and Viet Nam. More gradual but

²⁸ FAO Secretary-General's speech, World Food Day 2006.

measurable changes in thermoclines and annual precipitation present risks unless trend monitoring and forecasting is conducted, and measures taken to adapt. Variable and diminishing rainfall and other forms of precipitation including highland snow, melting to supply spring sown crops and pastures, puts high risks on dryland farming and grazing in western China, Central Asia, West Asia, Australia and the Himalayan region. Vulnerable areas may need to be abandoned. Farming systems, practices, forecasting and financial supports need to be developed that facilitate annual cropping only in good seasons while leaving ground fallow otherwise. Livestock grazing must be mobile and supported by access to grown fodder as a risk management strategy. Especially in Central Asia, herd size and dispersion will need to be managed to be sustainable under increasing the risk of dry seasons.

62. Perennial crops may suffer reduced yields and may no longer be suited to their location. For example, along the southern and western Himalayan region, yields from long-established areas of temperate fruits are increasingly erratic because of warm winter temperatures and declining precipitation. Farmers and itinerant farm workers face greater risk of loss of important income sources, and there will be significant adaptation costs including development of adapted varieties, further impetus for rural-urban migration, training in new vocations and alternative livelihood development

63. Forests, forest industries and the communities that rely on them face similar climate change risks and uncertainties such as with species selection and expected growth rates, the ability of forest to regenerate after logging, performance of plantations, and also increased risk of fire.

64. Fisheries, aquaculture and mariculture face risks in terms of sub-optimal water temperature for growth or survival of cultured or wild species (such as has caused coral bleaching in the Pacific and Indian Ocean Islands). Rising sea-levels risk mariculture, and saline intrusions into groundwater and scarce agricultural land, particularly worsening vulnerability of small island developing states (SIDS, such as Maldives, FSM, Kiribati, Marshall Island and Tuvalu). Long before these atoll nations disappear under rising sea level, they would have become quite inhospitable and uninhabitable.

POLICY OPTIONS

(a) Policy options and reforms to address key priorities

65. Asia was particularly successful in reducing income poverty. Agriculture, both production of food as well as broader forward and backward linkages in the rural economy, played a major role in this success story. However, the ADB estimates that less than one-third of the income of Asia's rural poor now comes from the sale of agriculture products²⁹. Policy for poverty reduction which progresses SARD in rural areas could be twofold:

- First, supporting market production, through rural infrastructure such as roads and harbors, research, trade and regional cooperation; and

²⁹ Tadao Chino, *ibid.*

- Second, promoting rural diversification through off farm employment, mobility, and development of innovative and high-value products and industries such as organic food, natural ingredient cosmetics and herbal medicine, non-timber forest products, added-value plantation forest products and bio-fuels.

66. Both strategies rely significantly on the dynamics of the private sector. The public sector will continue to have a major role, and the development of the private sector, as another source of investment in partnership with the public, is also important to put agricultural growth on a sustainable path. In today's context, closer cooperation with the private sector is critical, particularly to promote supply chains that benefit the poor's income opportunities in the worldwide-web of integrated markets. This will also protect the poor from being overwhelmed by globalization. Public investment in primary and post-agricultural production, particularly in rural infrastructure, creates the enabling environment for the eventual private capitalization and commercialization of agriculture.

67. Government policies should facilitate greater trade and regional cooperation, and allowing developing countries fair access to markets for agricultural exports should be a priority. Free and fair trade in agriculture, together with the trade investment that it brings, has greater potential than aid to generate resources to mitigate poverty and hunger. In the Pacific SIDS region, regionalism (i.e. acting collectively to tackle priority issues) is a strategy that has received the support of the 16 member countries of the Pacific Island Forum and include initiatives in trade development, agriculture, fisheries, communication and transport and in the social sectors of education, health, HIV AIDs, gender and the environment.

68. Externalities, outsourced onto the environment, are perverse subsidies and have created a market failure. The result is not only asset degradation, rather than long-term wealth creation, but also products and services of those sustainable industries which internalize or prevent environmental costs or damage are seen to be more expensive. By not recognizing this market failure, countries and societies reduce their options to achieve sustainability and sustainable development.

69. The new agenda also calls for a new partnership between governments, donors and the private sector. A vibrant and dynamic private sector can drive development, but governments need to create an environment conducive to such private sector growth. This will involve agricultural and trade reforms, rural infrastructure, and research and development. Governments also need to promote environmental investments for a more sustainable future of agricultural production. Further, there is a need to promote new innovative mechanisms for financing and enhancing knowledge support to the emerging needs of the region. This will also comprise a much closer look at public-private partnerships and the provision of regional public goods including infrastructure and trade.

(b) Opportunities and lessons learned for expediting implementation

70. Experience in implementation is providing a growing body of best practice tools and policy instruments to engage stakeholders in more sustainable interactions between the environment and the economy. Research on incentive design, market-based instruments, and institutional analysis is increasingly being used effectively to identify

and design policy solutions that are economically sound while fully accounting for the environmental context, market trends and human behaviour³⁰. Promoting application of environmental economics as best practice in design and assessment of policy, investment projects and regulatory institutions, is an opportunity to expedite implementation in future. A clear lesson is that the costs of preventing harm are significantly lower than the costs of cleaning up, mitigating, or offsetting - dryland salinity in Australia, China, Central Asia and West Asia provides a good example of this.

71. The last decade has seen emergence of new financing opportunities including through carbon trading schemes and growth of sustainable and ethical investment schemes listed in capital markets. International financial institutions such as the ADB have recently established carbon credit funds. The private sector is also a growing source of finance for carbon sequestration and environmental improvements programmes. The Carbon Disclosure Fund represents some 215 institutional investors with approximately US\$31 trillion of funds under management. The CDF seeks investment opportunities that do not carry a carbon exposure risk and this is starting a trend where risk, liability and long-term opportunity are emerging as stronger investment signals than they have been in the past.

72. At consumer level, some regional airlines such as Virgin and Qantas have implemented schemes by which passengers pay a small premium to offset carbon emissions from their travel, and the proceeds are used to finance projects including reforestation and improved land management in developing countries. There is considerable scope for expediting commitments to achieve sustainable agriculture and especially forestry by designing and implementing projects and programmes linked to carbon markets. Carbon markets also bring into play other ways of abating, mitigating or offsetting emissions.

73. Market-based instruments, of which carbon markets are the most prominent, have been successfully applied to some resources and issues, such as water pricing based on actual cost of supply, opportunity cost, shadow pricing and value-added. Pricing can be staggered to avoid disadvantaging the poor. There is opportunity to develop further systems which monetize today benefits which will accrue in the future.

74. Much of the region's growth is generated by the private sector, which critically depends on the surety of a legal framework, well-developed infrastructure and continuing economic stability. These are public goods that development assistance can support in order to promote socially and environmentally sustainable growth. Competitive neutrality is being compromised because the companies who invest in positive change - those who are at the forefront of sustainability - are in competition with companies - or in some cases government entities - who do not base their decision making or their future competitive edge on sustainability. Sorting out the issues of competitive neutrality and risk are fundamental to sustainable development and only Government intervention has sufficient power to deal with this.

75. At the macro-economic level, if Governments provide a sustainability-enabling framework it will effectively reduce costs to consolidated revenue; regulation can remove institutional blockages; and government procurement and investment

³⁰ See for example www.CSIRO.au/sustainable_ecosystems

benchmarks can create 'friendly markets' of considerable magnitude. Other government tools include education, standards, facilitation, and creation of demonstration sites.

76. There is a need to increase investments in science and technology including biotechnology, and other research and training. In today's context, technology research is also important for the development of industrial agriculture to meet new energy demands such as the demand for bio-fuels and for the demands of the booming paper and furniture industries in Asia. Governments should consider using both monetary and non-monetary incentives to promote R&D. The donor community must continue to support international agricultural research agencies to generate and transfer technology in Asia and the Pacific. Some of the major research on vegetables, trees, cereals, and legumes has been done with the support of private companies. Again, involvement of the private sector in these efforts will also be important.

77. There is also a need to expand irrigation potential and diligently protect the environment to ensure the sustainability of the productive potential of all factors of agricultural and rural production. Demands to address rural environment issues, with particular emphasis on soil conservation and flood protection, are growing in the region. All development stakeholders have to pool their efforts to meet some of the challenges of the future.

78. While adequacy of production and supply of food is one factor, providing the means to the poor to buy these is another critical aspect of ensuring food security. Most of today's rural poor live in dryland and wetland areas, or coastal and upland regions. They have little opportunity to compete with commercial agriculture. Therefore, the bulk of the population, particularly the chronically poor, the landless poor, and the poor on marginal lands, require income sources other than agriculture. Food production may give them some livelihood, perhaps also some better nutrition, but it will not lift them out of poverty. Thus, efforts towards agriculture and rural development should focus on expanding the income earning opportunities - both farm and off-farm - of the poor.

79. In line with other donors, ADB's financial support to agriculture and rural development has changed significantly since the 1990s. Direct investments in agriculture and natural resources have increasingly been replaced by other related rural investments in response to the changing demands of the region. In support of its poverty reduction strategy, ADB has made large investments in rural transport, rural electrification, rural microfinance and rural governance, all directly affecting agricultural productivity and environmental poverty. ADB's recently adopted Medium-Term Strategy II for 2006-2008 also mentions rural infrastructure as a high priority.

80. There is now a widely shared understanding of the need to raise investment and research in rural development and rural poverty reduction. Despite rapid urbanization all over Asia, the rural economy can be a driver of growth if it is properly linked to national, global and regional markets. Support to agriculture continues to be an important intervention to sustain growth and reduce poverty. However, a more comprehensive approach to poverty reduction would be needed that incorporates the broader realities in which the rural poor live today. It should address nutritional and other vulnerabilities of the poor, and generate off-farm employment opportunities - many of which are related to the food industry. These efforts must also comprehensively address the whole range of environmental issues facing us today.

81. In the new global scenario, public and private investments in rural infrastructure and science and technology are becoming increasingly important. There is a growing consensus that investments in agriculture, particularly in rural infrastructure (such as transport and communications, energy and water) need to be scaled up and new ways of mobilizing public and private finance resources for food security need to be explored. Governments and the donor community have a major role to play here.

82. For the development community the implications of this new paradigm of rural and agricultural development include diversified lending and provision of knowledge products in both farm and non-farm agriculture, in the key areas of agribusiness, rural infrastructure, support services (research, finance and markets), and ecosystem management.

(c) Addressing Climate-related risks

83. Our region is highly vulnerable to risks and negative impacts from climate change. Many countries and people have been in a state of denial until recently. This situation is made all the more difficult as transition to less intensive and damaging production and consumption processes is perceived to be about short-term cost rather than long-term gain. Countries are still grappling with the global conundrum that primary production is not being properly valued and that damage that is inflicted on the resource base is largely uncoded. An economic system developed that rewarded broad scale degradation rather than real wealth creation. As a result, current estimates of the economic costs of environmental degradation in developing countries are high, for example the Chinese Ministry of Agriculture estimates the loss of agricultural production due to land degradation is equivalent to about 30 per cent of agricultural GDP, not including the downstream costs of damage to infrastructure, water quality and river navigation. Perhaps the most intricate cost to compute is the physical loss of an entire country due to sea level rise. Novel ways of computing the value of a country to its citizens both now and in the future and its value to the world would need to be invented and costs ascertained.

84. Although most countries have now agreed that climate change is happening and will continue to have major impacts, and that carbon-related emissions are a major causal factor, few countries in the region have developed detailed policy for sustainable growth in a carbon-constrained economy. Energy transition to reduced carbon emissions must cover household energy use and needs including fuel for cooking and heating, and mitigate gender impacts of greater workload for women, changes in cooking and diet, that occur when household energy needs are not met.

85. The private sector's wealth generation and innovation is fundamental to developing the technology and systems that will be necessary to tackle climate change and other current and inter-generational sustainability issues. But for technology to be effectively commercialized and deployed, Governments need to provide an enabling framework. Incentives may involve the taxation system to reward sustainable development.