EAST AND SOUTH ASIA AND THE PACIFIC

CHAPTER 1

CONTEXTUAL REALITIES

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Key Messages

1. East and South Asia and Pacific (ESAP) has considerable diversity in agroecological zones, which affects the resources available for production systems. Changes in resources have implications for productivity and sustainability of production systems. This region was rich in natural resources and biodiversity but is vulnerable to disasters and faces losing biodiversity. Decreasing farm size poses a major constraint to agricultural productivity and adoption of AKST (agricultural knowledge, science and technology). Wide variations in agriculture demand diverse AKST to ensure productivity and sustainable development.

2. People are the wealth of ESAP. Since this region is home to three of the world’s most populous countries, investing in people will yield development dividends. The demographics of the region are changing rapidly, due to a remarkable decline in fertility and increase in life expectancy. Developing countries in the region have a relatively large youthful population, with labor supply advantages compared to Organisation for Economic Co-operation and Development (OECD) countries with rapidly aging populations.

3. Urbanization in the region has accelerated in the last five decades, with implications for demand for food and a significant rural population lacking basic services and education demanding attention on rural development. The agricultural labor force is changing, with increased participation of mostly underpaid and unpaid females, children and family. The region has made significant gains in education and literacy. But educational attainment has been marked by gender and rural disparities, with uneven gains in human capital. The region also has had high international and internal migration, leading to labor flight but with remarkable growth in remittances received.

4. Human welfare in the region has improved overall, but South Asia continues to have a high concentration of poverty and poor nutrition. Significant disparities in well-being have been observed between urban and rural areas. Rural communities have experienced increasingly greater poverty, with many women among the rural poor. Persisting poverty and food insecurity within ESAP developing countries require public assistance programs to provide safety nets for the marginalized population. Two current threats to human well-being in the region are HIV and AIDS and the highly pathogenic avian influenza, both of which have adverse effects on the rural economy.

5. Stringent trade barriers adopted by industrial countries have constrained international trade in the region. The AKST system has been challenged by the task of assisting farmers in ESAP to adopt good farming practices and improve the quality of exportable produce and commodities to overcome import constraints, such as food safety standards. As multinational negotiations, such as with the World
Trade Organization (WTO), have achieved little progress, regional free trade agreements have been promoted to develop regional trade blocks and strengthen intraregional trade, like the free trade agreement between China and the Association of Southeast Asian Nations (ASEAN).

6. Domestic trade in agriculture has played a sizeable role in national economies of the region, although it has not often been explicitly addressed in discussions on the effects of trade on agriculture. As urbanization increases and economic conditions improve, the demand for high-quality and high-value agriculture commodities should expand. This domestic demand would affect trade in agriculture.
1.1 IAASTD Framework

An assessment is a critical, objective evaluation and analysis of information, including local knowledge, designed to meet user needs and support decision making. It is an application of experts’ judgment in providing scientific answers to policy questions, quantifying the level of confidence wherever possible.

Agriculture in this report is defined broadly to include crops, livestock and pastoralism, fisheries, biomass, and agricultural goods and services, and land management, such as forestry and agroforestry.

Variations in grouping of countries adopted by different UN agencies under ESAP affect using United Nations (UN) data to arrive at generalizations on regional trends. The countries that make up ESAP (Table 1-1) are different in size, geography, agroecological systems, production systems, culture, religion and political systems, economic performance and social development. The complex regional realities are shaped by historical trends, agroecological environments, farming practices, contradictions surrounding agriculture trade and aid to farmers, and investment in agriculture knowledge, science and technology. Collectively these affect AKST generation and application with significant variation in processes and outcomes in achieving the goals of development and sustainability in ESAP countries.

[Insert Table 1.1]

The conceptual framework (Figure 1-1) provides guidance on common concepts and terminology and enables systematic analysis and appraisal of the primary goals of the assessment. It illustrates links among several components and the process, methods and tools for addressing them. Components include direct drivers of change: availability and management of natural resources, climate change, labor, energy and AKST use; and indirect drivers: economic change, demographic change, changes in level and availability of education, sociopolitical changes, changes in infrastructure, agricultural knowledge, science and technology. The assessment focuses on interactions among the drivers to understand how to facilitate development and sustainability goals.

[Insert Figure 1.1]

1.2 ESAP Agroecological Production Systems

The ESAP region covers South and East Asia and the Pacific. The countries are diverse in population, size, economy and agroecological zones and the resource base varies. This resource base, among and within countries, determines the prevalent production system. Under each production system, crops, livestock, fisheries, forestry or in any combination, there is a set of appropriate AKST, which may come from external or internal sources—including traditional ones.
1.2.1 Agroecology, climate and natural resources

The agroecological zones in ESAP countries range from warm arid tropics to cool subtropics. This diversity is important because agricultural production systems are sensitive to local climate, soil and other biophysical attributes, making them less transferable (Pardey et al., 2006). The agroecological zone determines the vegetation and the length of the growing period. ESAP has eight major agroecological zone classifications.

ESAP has very divergent climatic zones, from temperate to arid. Monsoon, the region’s most important climate feature, is the wind system that dominates the climate of South Asia and the area around the Indian Ocean. Differential heating and cooling of landmass and oceans between summer and winter creates seasonal reversals of direction. The wind blows from the northeast, toward the sea, in winter—the dry monsoon—and from the southwest, toward the land, in summer—the wet monsoon (Banglapedia, 2006).

Annual rainfall varies from over 10,000 mm in parts of the Central Highlands of Papua New Guinea to almost zero in the Gobi and Australian deserts. Likewise, across the region there is considerable variation in recorded temperatures. During the winter months in Mongolia the temperature commonly falls below zero, whereas in the summer months in the arid regions of Pakistan and Australia daytime temperatures can rise to over 50 °C.

Rainfed agriculture is restricted in many countries to that period coinciding with the monsoon. However, in some of the more humid parts of the region rainfall occurs throughout the year, giving a 12-month growing season. In the northern and high-altitude parts of the region the length of growing season is curtailed by low temperatures, below 5 °C. Tropical cyclones and typhoons are a feature in much of the region and result in heavy downpours, with the risk of high runoff and flooding. The worst effects of the strong winds, tidal surges and heavy rainfall are mostly felt in coastal and island areas; the influence of some cyclones may extend into the interior of the Asian continent. Islands in the Pacific and the Philippine archipelago are especially vulnerable. The smallest islands cannot deflect typhoons and cyclones and are not large enough to moderate climatic circulation patterns. They are vulnerable to drought and other climate events, which can destroy complete ecosystems. The effects of climate variability and change on agriculture are projected to steadily manifest directly in changes in land and water regimes. Changes in the frequency and intensity of drought and flooding and the amount of storm damage are expected. Climate change is expected to result in long-term water and resource shortages, worsening soil conditions, drought and desertification, disease and pest outbreaks on crops and livestock and sea level rise. Vulnerable areas are expected to experience losses in agricultural productivity, primarily from reduction in crop yields (Rosenzweig et al., 2002).
In contrast, climate change is also expected to result in some beneficial effects, particularly in temperate regions. Lengthening growing seasons, carbon fertilization and improved conditions for crop growth are forecast and should stimulate gains in agricultural productivity in high-altitude regions, such as Northern China and Mongolia (Mendelsohn et al., 2004).

In ESAP agriculture land is the primary resource. Land categories are arable permanent crops, permanent pasture, and forests and woodlands. East Asia has the biggest total land area among the major regions in Asia, with more than 1 billion ha, followed by Southeast Asia and South Asia. China leads all the ESAP countries with a 932,743,000 ha, followed by Australia, India and Indonesia. Countries in the Pacific Islands and Maldives have the least land area.

In arable and permanent croplands, South Asia has the largest area because India tops all ESAP countries, with 202,835,000 ha. East Asia comes next with 160,796,000 ha, followed by Southeast Asia with 95,361,000 ha. Industrial countries Australia, Japan and New Zealand have a combined 56,043,000 ha of arable and permanent cropland. China has 400,001,000 ha and Mongolia 129,300,000 ha permanent pasture, giving East Asia the highest potential for livestock production for ruminants. Australia has 391,565,000 ha of permanent pasture area, which also provides the country the opportunity to produce a lot of ruminants.

1.2.1.1 Forest resources
Forests cover about 25% of Asia and the Pacific. The Pacific Islands, with 65% forest cover, and insular Southeast Asia, with 53%, have the highest proportion of land-user forest. Papua New Guinea has the largest rainforest coverage in the Pacific region and accounts for the third largest block of tropical rainforest in the world (Chatterton et al., 2000). South Asia has relatively little forest cover.

Although ESAP contains only about 5% of the world’s forests, it accounts for about 25% of forest loss over the last decade. The Philippines has had the highest rate of deforestation, followed by Pakistan, Thailand and Malaysia. However, the largest losses have occurred in Indonesia and Myanmar (Waggener, 2001). Between 1990 and 2000 the region experienced considerable decline in forest cover, with the greatest decline in the islands of Southeast Asia, followed by continental Southeast Asia and the Pacific Islands (Waggener and Lane, 1997). Forests in the South Pacific are being removed at an unsustainable rate (ESCAP, 2000).

The Asia and Pacific region is also home to the world’s greatest concentration of mangroves. Once thought of as coastal wasteland, mangroves have been destroyed at alarming rates for agriculture, aquaculture and firewood. Up to half of mangrove destruction in recent years has been prompted by the desire to create shrimp farms (UN Atlas of the Sea, 2002). Over the last 20 to 30 years, with the help of
the UNESCO Mangrove Programme and other international initiatives, government planners and fisheries experts have become more aware of the many roles that mangroves play as a nursery for many coastal and aquaculture fish species, as a key buffer that reduces the impact of sediment flows onto offshore reefs and as a barrier to protect against storm surges and tsunamis (Vannucci, 1997). About 90% of all marine organisms spend some portion of their life cycle within mangrove systems (Adeel and Pomeroy, 2002). Mangroves have some commonality with open access natural forests in management (subchapter 2.2.5).

ESAP has over 552 million ha of forests, of which 477 million ha are natural. However, only about 249 million ha have been available and suitable for harvesting (Waggener, 2001). The natural forests throughout ESAP up until very recently have been seen mostly as a vast natural source of raw timber for export income. However, there is general agreement on the need to change from a focus on timber exploitation to an emphasis on management for sustainable, multiple-use natural forests (Enters, 1997). In the face of increasing deforestation, many countries across ESAP, including China, New Zealand, Philippines, Sri Lanka, Thailand, and Vietnam, imposed several partial, temporary or selective bans on logging in natural and old growth forests. The results of these restrictions have been mixed and a number of case studies have indicated that bans can have unanticipated effects on timber supply, forest harvesting, transport, processing and consumption of forest products and on forest residents and those who depend on forestry for their livelihoods (Waggener, 2001).

Plantation forestry is another form of management in the region. In 2000, ESAP accounted for 61% of global forest plantations. Five ESAP countries accounted for 55% of the world’s forest plantations and 91% within Asia and the Pacific (Brown and Durst, 2003). This is a rather new phenomenon, with the average age of Asia’s industrial plantations less than 15 years (FAO, 2001).

With diminishing availability of large-diameter timber from natural forests in the region, plantation forestry is expected to become the dominant source for wood in ESAP. The region has more than 80% of forest plantations in the tropics. At present, most legally produced industrial wood in the region is sourced from plantations. Most plantation forestry in the region can be described as intensive management of monocultures for producing a relatively narrow range of products and species; the main species are pines, teak, poplars, acacias and eucalypts (Enters, 1997).

Because of the extent of plantations in China and their short rotation, most of Asia’s plantation forests are aged less than 15 years. This has come mostly from a rapid acceleration in plantation establishment in China and the short rotation generally used. This sector has considerable diversity in ownership, management, scale of operation and products. Plantations were established to meet the need for several different products, including fuelwood, poles, wood chips and furniture wood, and various estate crops.
including rubber, oil palm and coconut. Until 25 years ago, forest plantations were largely smallholder or government operated. The trend now is for increasing private investment and management of forest plantations to meet an increasing demand for wood for pulp, furniture and particleboard. Smallholder plantations have sprung up to meet this market in the Philippines (Garrity and Mercado, 1994; Pasicolan et al., 1997).

Agroforestry has come to mean many different things, but in its simplest form it refers to incorporating and using trees in farming. The focus has been primarily on smallholders. The practice gained widespread attention by government agencies and nongovernmental organizations as a way to address a range of soil conservation objectives and meet livelihood needs. Because of its potential for increased food security, poverty reduction and environmentally sound land management, a CGIAR-supported international research centers is now devoted to agroforestry research and development. Agroforestry is defined as a dynamic, ecologically based, natural resources management system that, by integrating trees with other crops and enterprises on farms and in the agricultural landscape, diversifies and sustains production. Tree farms and nut plantations managed as a monocrop are not considered agroforestry (Beetz, 2002).

1.2.1.2 Water resources

Except for Australia and some of the Pacific Islands, ESAP is relatively well endowed with water resources: for a total area with 21% of the world’s land surface, it has 28% of its water resources. Water endowments vary widely among the countries. The figure of 2,000 m³ for each person annually is usually used as an indicator of water scarcity; China was reaching this limit, while India had 1,700 m³ and the Republic of Korea only 1,450 m³. For Asia as a whole, about 80% of the water withdrawals are for agriculture—the range is from 95–96% for Bangladesh, Bhutan and Sri Lanka to 50–60% in Japan, Republic of Korea, Malaysia and Vietnam. For the Pacific, the water withdrawals varied from about 1% in Papua New Guinea to 75–78% in Australia and Fiji.

The hydrology of ESAP is dominated by the monsoon climate, which induces large interseasonal variations in river flows. In this situation, average annual river flow is a poor indicator of the water resources available. In the absence of regulation, most of the water flows during a short season when it is usually less needed. In Bangladesh, for example, the surface flow of the driest month was only 18% of the annual average; in Indonesia, it was 17 percent. In India, the flow distribution of some rivers in the monsoon period represents 75 to 95% of the annual flow. In North China, 70 to 80% of the annual runoff is concentrated between May and September (FAO, 2006a).

Water in shallow underground aquifers has been significant in developing and diversifying agricultural production in the region, particularly in China and India. Groundwater offers a primary buffer against the
vagaries of climate and surface water. Because groundwater is available on demand, crops irrigated with it are often more productive than those irrigated with surface water.

1.2.1.3 Aquatic resources

ESAP countries contributed 64% to the total global fishery production in 2004 (FAO, 2007). ESAP fisheries are vital for food security, supplying valuable animal protein, minerals and vitamins. Fisheries generate employment, reduce poverty and earn revenue through domestic and export trade. People use all sizes and types of fish, discarding little. Fisheries products come from two sources: capture of wild fish, shrimp and other aquatic organisms from the sea and inland open water bodies, and aquaculture in fresh water or in brackish or marine waters.

The increase in ESAP fish production in recent years has largely been attributed to the significant development of aquaculture. As opposed to the stagnation or decline in capture fisheries, aquaculture production has increased at a rapid rate. As a result of aquaculture knowledge, science and technology have been constantly generated and refined.

A significant increase in the global human population, reduced supply of food fish, high prices for exportable aquatic species from the open water and increased demand for them has stimulated aquaculture to quickly develop and flourish. Many rural farmers urgently need increased income from their limited and gradually shrinking agricultural landholdings to meet the minimum necessities of life. Farming aquatic organisms is a profitable proposition; this activity has been rapidly gaining importance for producing food, creating employment, reducing poverty and increasing earnings through domestic and export trade.

Within ESAP in 2004, seven countries, China, India, Indonesia, Japan, Philippines, Thailand and Viet Nam, produced the most by volume from aquaculture, including aquatic plants. China alone produced 41,661,660 tonnes, or 78 percent. The next six countries accounted for 17 percent, the remaining countries 5 percent.

1.2.1.4 Livestock

Millions of rural households in ESAP countries depend on domesticated animals for food, farm power and income. The region is home to 30% of the world's livestock species. Developing Asian countries had the world's highest growth rates of production and consumption of food from livestock (Steinfeld et al., 2006ab). The dynamic Asian livestock sector is growing at a rate between 3.5 and 5% annually—more rapidly than crops such as cereals, vegetables and pulses—driven partly by increasing population, rising incomes and changes in consumer lifestyles.
Livestock production in Asia and the Pacific grew rapidly from 1992–1994 to 2002–2004, with the most rapid growth occurring in China, 93%; Viet Nam, 93%; and the Philippines, 79% (FAO, 2006b). For the region as a whole, all categories of livestock products grew rapidly. The most rapid production growth was in poultry, 83 percent, and eggs, 78%. Rapid growth in poultry and egg production was widespread throughout the region. Production of milk exhibited strong growth in East Asia, 136 percent; Southeast Asia, 65 percent; South Southwest Asia, 52 percent; and the industrial economies, 33 percent). Pork production grew 50% for the region, with strong growth in Southeast Asia, 55%; East Asia, 53%; and the Pacific Islands, 44%. Although most ESAP countries were technically capable of increasing production in meat, milk and eggs, most faced shortages of key feed ingredients. As a result, there was a large and burgeoning world trade in feed crops. On the other hand, the drive by livestock growers to serve urban markets led to intensive production, with problems of livestock waste, land management and distribution of meat products. Awareness increased of the potential for transmitting diseases from animals to humans, particularly with the bird flu, or avian influenza, crisis. Diseases affecting animals and humans could spread rapidly across the region, creating transboundary epidemics. Concerns remained about the rising demand for livestock feed, increased need for veterinary services and training, loss of genetic resources and need for extension for profitable livestock opportunities for small-scale producers (FAO, 2006b). More than half the small-scale farmers in Asia rely on livestock as a major source of income and nutrition. However, small-scale producers have mostly not been a part of the rapid rise in intensive animal production (FAO, 2006b).

In population, the figures from 1994 to 2004 for all the livestock and poultry species showed no definite trends. Ruminant numbers seemed not to have increased, except goats, which increased by almost 100 million over ten years. Buffalo populations declined by more than 10 million in ten years. Pigs and poultry, nonruminants, increased, with chickens increasing by almost 10 billion from 1994 to 2004. Growth in production of poultry and pork resulted in a growing shift away from pasture systems. As livestock production became more intensified, feed shifted from locally available resources to commercial feed concentrates, particularly in pig and poultry production (Steinfield et al., 2006b).

1.2.1.5 Plant biodiversity
ESAP encompasses parts of three of the world’s eight biogeographic realms and includes the world’s highest mountain system, the second largest rainforest complex and more than half the world’s coral reefs. The rainforests of Southeast Asia contain more than 25,000 species of flowering plants, equivalent to about 10% of the flora of the world. The region as a whole encompasses two-thirds of the world’s flora. Almost all nations in the region, except Singapore and Brunei Darussalam, depend heavily on harvesting natural products directly.
Flora and fauna of the region are increasingly threatened, but only a few countries have designated more than 15% of their land as protected areas. The drive for increased agricultural production has resulted in loss of genetic diversity. The area of land under rice cultivation rose by only 25% between 1960 and 1970, although production rose by 77% by replacing traditional varieties with higher-yielding, semidwarf varieties. More than 100,000 varieties of rice were found in Asia early in the 20th century. In 2002 there were less than a dozen modern rice varieties being planted on 70% of land being cultivated for rice (Dano, 2002). In Indonesia, 1,500 varieties of rice disappeared from 1975 to 1990 (see subchapter 2.4.1).

The Indo-West Pacific is the key area for shallow-water marine biodiversity. Coastal habitat loss and degradation, combined with increased sediment, nutrient and pollutant discharge into coastal areas, is a major cause of concern, particularly for the island countries. The rates of loss of coral reef and mangrove habitat in this region are among the highest in the world. Thailand alone lost about 0.2 million ha of mangrove forest from 1961 to 1993. Conversion of mangrove forest to shrimp aquaculture and the use of unsustainable fishing practices, such as blast fishing, were widespread. However, the effects of such unsustainable practices on regional biodiversity are difficult to quantify.

Although terrestrial biodiversity loss has been a major concern, actual losses still have to be quantified. As much as 70% of major vegetation types in Indo-Malaya have been lost, with a possible associated loss of up to 15% of terrestrial species. Dry forests suffered 73% loss and moist forests 69%, while wetlands, marsh and mangroves were reduced by 55%. Overall habitat losses were most acute in the countries of the Indian subcontinent, the People’s Republic of China, Thailand and Vietnam (ESCAP, 1995b).

The underlying causes of biological diversity loss in the region include international trade, particularly the trade in timber, which results in habitat loss; population growth, leading to accelerated rates of change in land use; poverty and demand for common access resources, leading to their unsustainable consumption; introduction of nonnative species, leading to destruction of predator and prey equilibrium; and improper use of agrochemicals, leading to loss of aquatic species. Other major reasons include loss of keystone species, extensive deforestation and habitat loss, increased trafficking in animals and animal body parts, widespread conversion of land to agriculture and construction of large-scale dams.

In response, national governments have implemented conventions related to biodiversity and are taking measures to protect biologically rich areas. Twenty-nine ESAP countries had ratified the Convention on Biological Diversity by 1 May 1996. Several regional conventions covering parts of ESAP dealt with specific aspects of biological diversity; the most significant were the Convention on Conservation of Nature in the South Pacific (Apia Convention), the ASEAN Agreement on the Conservation of Nature and
Natural Resources (ASEAN Agreement), and the Convention on the Protection of the Natural Resources and the Environment of the South Pacific (SPREP Convention).

Progress in designating protected areas has generally been positive. It is clear that almost all countries in the region understand the importance of establishing terrestrial and aquatic natural reserves by creating national parks, wildlife sanctuaries and gene pool reserves. The number and area of protected areas in both South and Southeastern Asia has increased dramatically. The Pacific region has also shown a major increase in the number of protected areas, although the increases have been less dramatic.

Biological diversity has finally been accepted as a legitimate issue nationally and internationally in ESAP, with conventions on biological diversity and designation of protected areas. However, patterns of unsustainable use and conflicting policies contribute to continued losses throughout the region. With only 10 to 30% of natural habitats remaining in many countries, any further decrease will have serious consequences for biodiversity (ESCAP, 1995a). High rates of population and economic growth in most countries of the region suggest even greater losses will occur, unless decisive action is taken. Such action could include intensifying protected-area systems and zoological parks, botanical gardens, gene resource centers, seed banks and tissue culture techniques.

1.2.2 Production potential
1.2.2.1 Farm size

In general, the diversity in concepts used to define small farms makes definition difficult. By applying a common approach of size of landholdings or livestock numbers the overwhelming majority of these farms (87%) were in Asia. In Asia, China alone had almost half of world’s small farms, followed by India with 23%. Other leaders in the region, in descending order include Indonesia, Bangladesh and Vietnam. Despite steady economic growth in many Asian countries over the decades, small farms still dominate in rural areas (Nagayets, 2005). Small farms characterize agriculture in Asia and small Pacific Island countries, while extremely large farms dominate in Australia. In wealthier countries such as Japan and the Republic of Korea, average farm size has been increasing, but at a slow pace. For example, between 1956 and 2003, average farm size in Japan increased just 0.60 ha. The increase in the Republic of Korea from 1969 to 2002 was 0.58 ha (Fan and Chan-Kang, 2003). In contrast, national average farm size is still decreasing in most Asian developing countries. For example, average farm size in Nepal decreased from 0.95 ha in 1992 to 0.79 ha in 2002. Similar trends occurred in Pakistan and the Philippines during the 1990s (FAO, 2006b). In India research demonstrated an association between decreasing farm size and more hunger and poverty. The study documented that the incidence of hunger among farmers with landholdings less than 0.5 ha was 32% and the incidence of poverty was 38%; the likelihood of being affected by hunger dropped to 12% and poverty dropped to 13% for farmers who cultivated more than 4 ha (Singh, 2004). But farms are becoming larger in dynamic agricultural areas close to large cities, such
as Suphan Buri province near Bangkok, Thailand. From 1993 to 2003, total agricultural land in Suphan
Buri declined, but the number of agricultural households declined even more rapidly. Families migrated to
Bangkok or assumed nonagricultural rural jobs. Active land rental markets have been important in the
land consolidation in Suphan Buri (Dawe, 2005).

Urbanization created pressure on maintaining agricultural land and production. In 2005, the net loss of
arable land was 361,600 ha, about 0.3%, of which 138,700 ha was used for construction. From 1998 to
2005, farmland decreased by 7.6 million ha, about 6.2% of the total amount of arable land. The per capita
area of cropland in China was only 0.93 ha in 2005, 40% of the world average. To achieve a higher
production rate from the small remaining area of cultivatable land, China became the world’s largest
consumer of fertilizers and the second largest of pesticides. Consequently, much cultivated land and farm
produce have been contaminated, especially with pesticide residues (Fu et al., 2007).

1.2.2.2 Farming systems

Within the diverse agroecological systems and variations in natural resources, the region has developed
unique farming systems. Rice–wheat and rainfed mixed farming cover about half of the land in South
Asia. Rice–wheat farming is characterized by a summer paddy crop followed by an irrigated winter wheat
crop, sometimes with a short spring vegetable crop. Rice–wheat farming covers a broad swathe across
India and Pakistan, from the Indus irrigation area in Sindh and Punjab and across the Indo-Gangetic plain
to the northeast of Bangladesh. About 60% of rice–wheat land is cultivated, about three-quarters irrigated.
The system integrates crops and livestock significantly; about 119 million cattle are used for draft power,
milk and manure for composting. About 73 million small ruminants are kept, principally for meat. The area
has 484 million people, 254 million in agriculture.

Rainfed mixed farming covers the largest area within the subcontinent and, with the exception of a small
area in northern Sri Lanka, is confined to India. This system covers 147 million ha, with about 59% under
cultivation. Rice, wheat, pearl millet, sorghum, a wide variety of pulses, many oilseeds, sugarcane,
vegetables and fruit are grown. About 16% of the cultivated area is irrigated. About 126 million bovines
and 64 million small ruminants are partially integrated with cropping. In many instances, relatively small
areas are irrigated from reservoirs. In recent decades, tube wells have contributed to stable cereal
production. Vulnerability stems from substantial climatic and economic variability. Poverty is extensive
and its severity increases markedly after droughts.

Three farming systems predominate in the land area in East Asia and the Pacific: upland intensive mixed
19%, pastoral 20%, arid 20%. These can be further classified, depending on the production systems.
Upland intensive mixed farming is found in uplands and hills of moderate altitude and slope in humid and subhumid agroecological zones. The total area of the system is 314 million ha, with an agricultural population of 310 million—the second most populous system, after lowland rice, in the region. The cultivated area is 75 million ha, of which less than one-quarter is irrigated. This is the most widespread and most heterogeneous farming system in the region, including some remnant shifting cultivation, with major areas in all countries of East and Southeast Asia. The system is the cultivation of a wide range of mostly permanent crops, but the specific crops preferred depend on geography, climate, slope, terracing and water regime. A significant crop area, mainly rice, is irrigated from local streams and rivers. Livestock production is important in most farm livelihoods. The area has 52 million large and 49 million small ruminants. Livestock contribute draft power, meat, cash income and savings. Off-farm work is an important source of income for many poor households.

Pastoral farming is found in semiarid and arid temperate plains and hills, with fewer than 120 growing days annually. The system is extensive in western China and much of central and northern Mongolia. It covers 321 million ha but has no more than 42 million agricultural people. The cultivated area is just over 12 million ha, with about 20% irrigated in dispersed zones. The system is dominated by transhumant pastoralism, characterized by mixed herds of camels, cattle, sheep and goats extensively grazing native pasture. Irrigated crops include cotton, barley, wheat, pulses, peas, broad beans, potatoes and grapes; sericulture is sometimes practiced. Severe poverty, often triggered by drought or severe winters, with consequent loss of livestock, is common in both pastoral and irrigated areas.

The area of arid farming in western China and southern Mongolia covers about 322 million ha, supporting about 9 million cattle and 59 million small ruminants. Only a little over 1%, less than 4 million ha, is cultivated, of which about two-thirds are irrigated. Some large-scale irrigation is concentrated in the west; pastoralists use scattered, small-area irrigation to supplement their livelihoods. The area has about 24 million people, 17 million of whom are pastoral or agricultural. Apart from these arable areas, the dominant arid areas are used for opportunistic grazing. Poverty is extensive and, especially after droughts, severe.

Except for Australia, most nations in the Pacific are relatively small islands and atolls. On the small islands as on most other small islands, traditional agriculture is agroforestry, where trees are planted and protected for their great variety of functions and products, including food. Food or fruit trees and shrubs are most common in permanent village tree groves and intercropped in home gardens. They included a wide range of coconut palms, banana and plantain cultivars, breadfruit, edible pandanus (screw pine) varieties (especially on atolls), fruit trees, nut and seed trees, and kava (a root used for a traditional alkaloid social beverage). Most of these species are aboriginal, pre-European introductions, but some are indigenous.
Atoll islands have among the most infertile soils in the world and almost no surface freshwater sources. Despite inadequate land, soil and water and relatively high populations, atoll societies have developed sophisticated subsistence agroforestry systems based on coconut, breadfruit, pandanus, native fig, bananas (on the wetter islands) and giant swamp taro. This pit cultivation uses leaves of salt-tolerant coastal trees and plants as mulch and fertilizer. It is also used for important staple tree crops to ensure their survival in the atoll.

1.2.3 Production constraints

ESAP has rich and diverse natural resources and has assimilated agricultural science and technology to achieve remarkable agricultural productivity, although many production constraints have presented risks.

1.2.3.1 Degradation of natural resources

Environmental degradation can increase the impact of floods and landslides, just as disasters such as wildfires, droughts and floods can cause serious damage to forests, farmland and livestock. Small-scale measures to increase environmental resilience include social forestry, fish farming, drought-resistant crops and rainwater harvesting. In India, local knowledge of indigenous, hardy seeds has helped farmers recover from the loss of cash crops devastated by drought and pests (IFRCRC, 2004).

Overextraction of groundwater can result in water declining beyond the economic reach of pumping technology. Groundwater depletion is a widespread problem in many areas in the region, especially in the semiarid areas. Poorer farmers are hit the most. When near the sea or in proximity to saline groundwater, overpumped aquifers are prone to saline intrusion. Groundwater quality is also threatened by the application of fertilizers, herbicides and pesticides that percolate into aquifers. These nonpoint sources of pollution from agricultural activity often take time to become apparent, but their effects can be long lasting, particularly with persistent organic pollutants.

Capture fisheries stagnated or dwindled in most ESAP countries and other world regions. Historically, the vast sea and the lakes, rivers and canals were rich sources of fish. As the human population increased, fish and other fisheries organisms have been heavily exploited for human food. In addition, fishery products have been used as industrial raw materials for producing fish meal.

Unscrupulous application of technology eventually resulted in overfishing and depletion of ocean fish stocks. Despite caution from scientists, many rich marine fishing grounds all over the world have been excessively exploited for years. Aquatic habitat change or destruction from massive construction of embankments for flood control, drainage, irrigation, temporary damming of rivers, excessive surface water
withdrawal, aquatic pollution from pesticides, indiscriminate release of industrial effluent and unplanned
collection of rural roads and culverts that obstructed fish movement have all contributed to the
destruction of fisheries.

1.2.3.2 Natural hazards
Natural disasters are grouped in three specific categories: hydrometeorological disasters, including
floods, wave surges, storms, droughts, extreme temperatures, forest and scrub fires, landslides and
avalanches; geophysical disasters, divided into earthquakes, tsunamis and volcanic eruptions; and
biological disasters, covering epidemics and insect infestations. ESAP suffers frequent natural disasters
with considerable human and economic loss. The most recent and dramatic natural disaster, which
captured the world’s attention and empathy, was the 2004 tsunami. Since 2000, the region has suffered
major earthquakes, floods, tsunami and pestilence. “Both hydrometeorological and geophysical disasters
have become more common, becoming respectively 68 and 62% more frequent over the decade. This
reflects longer-term trends. However, weather-related disasters still outnumber geophysical disasters by
nine to one over the past decade. Among natural disasters, floods are the most reported events in Africa,
Asia and Europe, while windstorms are most frequent in the Americas and Oceania” (IFRCRC, 2004).
Among the top 50 countries with major economic loss from natural disasters are 14 countries from ESAP,
with Japan ranked second, China third, India sixth and Indonesia eighth (Table 1-2) (Guha-Sapir et al.,
2004).

[Insert Table 1.2]

Frequent disasters make agriculture and land-based production in ESAP a high-risk venture. The
livelihoods of communities dependent on agriculture and natural resources and with limited diversification
are vulnerable. Landslides across the southern Philippines in December 2003 killed 200 people and left
thousands homeless, reigniting the disaster prevention debate. From 1971 to 2000, natural disasters
killed 34,000 Filipinos. From 1990 to 2000, 35 million people were severely affected by natural disasters
(IFRCRC, 2004). A windstorm in 2002 led to considerable land and crop loss, affecting 100 million people
in China (Guha-Sapir et al., 2004). For many countries in South and East Asia floods have become
annual, alternating with drought. In the Pacific, cyclones present constant threats to livelihoods. In
Thailand, the 2004 tsunami had a devastating effect on the livelihoods of villagers in over 400 fishing and
farming communities along the Andaman coast. Many of the communities’ livelihood assets were lost
(FAO, 2006d). Lost livelihoods and basic productive assets were similar in other countries affected by the
tsunami, such as India, Indonesia, the Maldives and Sri Lanka. Since 2004 Indonesia has been affected
by many disasters—tsunami, avian influenza, volcanic eruption, haze and floods—that have taxed the
capacity of government to manage disaster and tested people’s resilience.
Disasters are further obstacles to overcome in trying to reduce poverty and achieve sustainability. In the region, increasingly emphasis has been placed on early warning systems for disaster, information access for local disaster-prone communities, community approaches in disaster management and risk reduction, on exploration of strategies to improve agriculture extension, and on local government support for community approaches.

1.2.3.3 Pests and pathogens

ESAP agricultural communities, as those in every other region, face risk to productivity from pests and crop and from livestock diseases. The region is recognized for its integrated pest management programs with community participation and farmer field school training methods. Yet in recent days the region has been the focus of global attention because of avian influenza.

*Highly pathogenic avian influenza.* Since 2004, the highly pathogenic avian influenza epidemic presents a high risk to small-scale farmers in EASP who practice mixed farming, combining crops and livestock. The emergency officially began in December 2003, when a highly contagious avian influenza struck chickens on a farm near Seoul, Republic of Korea, and spread rapidly across the country. Within weeks, simultaneous outbreaks in Cambodia, China, Indonesia, Japan, Lao PDR, Thailand and Viet Nam had devastated domestic fowl. The impact has been distributed within the entire poultry market chain, affecting producers, consumers and employees in the retail industry. In some areas, farmers lost more than half their poultry (FAO, 2005a).

1.3 Demographics

People in ESAP are both producers and consumers of AKST. Only a few population indicators with immense and immediate implications for AKST were explored: male and female population, aging of population, urban and rural population trend, agriculture labor disaggregated by male and female workers, child labor in agriculture, unpaid work in farming, literacy and education among men and women, migration realities and contributions of migrants to capital.

1.3.1 Regional demographic trends

People are the wealth of East and South Asia and the Pacific. The region encompasses three of the world’s most populous countries and developing countries that have a relatively large youthful population. China, India, Indonesia, Bangladesh and Japan are among the top ten in population size (U.S. Census Bureau, 2008). From 2000 to 2005, three countries in ESAP were among the six countries in the world that had half the world’s estimated 77 million annual increase in population. These countries and their rate of increase were India, 21%; China, 12%; and Bangladesh, about 4%. India is expected to overtake China as the most populous country in the world by 2035 (ECOSOC, 2004).
The population of the Pacific Islands reached about 8.6 million in 2004, an increase of approximately 1.7 million people over the past ten years. Population distribution remained largely unchanged: the five largest countries and territories that comprise Melanesia had the vast majority, 86.4%, of the regional population, followed by much the smaller island countries and territories of Polynesia, 7.4%, and Micronesia, 6.2%. Two out of every three Pacific Islanders live in Papua New Guinea. Fiji’s population is 25% larger than ten Polynesian island countries and territories combined. The fertility rate in the Pacific Islands is still moderately high, while mortality is declining, contributing to increased population (Haberkorn, 2004).

In ESAP, since people are the fundamental resource for sustainable development, investment in people would bear development dividends. Human resource–centered strategies present opportunity for sustainable development but also present enormous challenges to ensure equitable access to education, productive assets, goods and services to the billions of people. Transforming a large reserve of human resources to human capital and driving development will be the core challenge for achieving development with social sustainability.

In Asia fertility declined remarkably. The average number of children born to Asian women declined by more than half, from 5.4 in 1970 to 2.4 in 2003. Average life expectancy of Asian men and women increased about 15 years over the same period. Life expectancy for males increased from 52 years in 1970 to 66 years in 2003; for females, from 54 to 70 years (Hugo, 2005), overtaking men’s life expectancy in nearly every country. In some Asian countries, however, girls were more likely than boys to die during early childhood and in others an unusual preponderance of male births pointed to sex selectiveness (Westley, 2002). Between 1950 and 2005 in most of the region’s countries women gained and improved the sex ratio trend of the number of males per 100 females. Sex ratio also indicates gender equity by reflecting women’s chances of survival. The population sex ratio improved either with decrease in female to male difference or with female gains over males. A few exceptions were Brunei Darussalam, India, Samoa and Tonga (UNDESA, 2004).

The region recorded increases in its aged population and female-headed households. The elderly population grew rapidly, in both numbers and percentage. The aging population proportion in industrial ESAP countries was greater than in the less industrial ones. Asia is one of the world’s fastest aging regions; the percentage of elderly is projected to double between 2000 and 2030, but with differences among the countries (Kaneda, 2006). Industrial economies Australia, Japan and New Zealand had a rapid rate of aging; by 2050, 25% of their population will be over 60. From 1950 to 2005, all but a few countries in the region, Bangladesh, Maldives, Nepal and Papua New Guinea increased their population aged over 60 years (UNDESA, 2004). An aging population challenges productivity and innovation in agriculture, and the potential for saving and investment. It increases poverty among the rural elderly.
The decrease in fertility and the aging population in mostly industrial countries in the region contrasts with a growing youthful population in developing countries. The outlook for the future in Asia is that the youth population will increase to 685 million by 2040, when they will comprise 14%. While the young adult population will continue to grow over the next two decades in developing countries, their numbers will decrease in most OECD nations in the region (Hugo, 2005). Yet while a large youth population presents developing countries with a labor pool advantage, the lack of appropriate skills will form a barrier to using human resources effectively.

1.3.2 Accelerated urbanization with a significant rural population

Since 1950, Australia, China, Fiji, Indonesia, Japan, Korea DPR, the Republic of Korea and the Philippines have lost rural population. This has applied to most industrial countries in the region. In most developing countries, however, the urban population is less than 50% of the total. Countries that depend on agriculture as the economic driver have an urban population of less than 30%; these include Bangladesh, Bhutan, Cambodia, India, Lao PDR, Nepal, Papua New Guinea, Samoa, Solomon Islands, Sri Lanka, Vanuatu and Viet Nam. The projection for China is that the urban population will be 60% by 2030 (UNDESA, 2003).

While the decrease in rural population will be minimal in Asia, the Pacific will gain rural population between 2010 and 2030 (UNDESA, 2004). The Asian Development Bank estimates there will be 2.2 billion rural Asians by 2020 and that this population will have much lower access to health and education and have less general well-being (ADB, 2000). By 2030, this region still will have a substantial rural population, demanding attention to agriculture, rural livelihood strategies and investment in rural physical and social service infrastructure.

Asia is expected to experience rapid urbanization from 2005 to 2030; by 2030, 55% of Asian inhabitants are projected to live in urban areas. Although economic growth and prices are closely monitored drivers of food demand, demographic changes—urbanization, growth in population and changes population age—likely will have more profound long-term effects on the region’s food system. It will be affected by migration, the aging population and urban demand for a more varied diet, with a premium on convenience (Coyle et al., 2004).

1.3.3 Agricultural labor: feminization, child labor and unpaid work

The overall share of agricultural employment decreased between 1995 and 2005 from 44.4 to 40.1%. This decline was seen in all regions, except East Asia, where the share in agriculture remained stable. With a few exceptions, from 1979 to 2002 the percentage of agricultural labor in the total labor force decreased (Figure 1-2). The decline was remarkable among the wealth creators, such as Japan and
Republic of Korea, Australia and New Zealand. For poorer wealth producers, such as Bangladesh, Bhutan, Cambodia, India, Lao PDR, Nepal, Papua New Guinea, and the Solomon Islands, however, agriculture employed a large proportion of people and the rate of decrease was less. Thailand and China still illustrated the dominance of agriculture in employment, although they were high-growth countries. In general, for the poorer countries in the region, agriculture continues to be important for employment and livelihoods.

[Insert Figure 1.2]

The World Employment Report for 2004/2005 contended that rural nonfarm activities were important for household income; this also applied to poor households engaged in agriculture (ILO, 2004). In Asia, various estimates suggested that one-third of rural labor participated in nonfarm activity. When agriculture stagnated, nonfarm employment offered a way out; these workers were pushed into this employment, not pulled by dynamic nonfarm activities (Islam, 1997).

The region’s females participated in agriculture at 33.1% for South Asia and 47.2% for East Asia and the Pacific (ILO, 2006). From 1995 to 2002 female labor continued to be important in the region’s agriculture labor force. If women’s contribution as family workers also was considered, then women were critical in the region’s agriculture (UNDP, 2005). In recent decades the debate on agricultural labor in the region focused on “feminization of agriculture,” the predominance of women in the sector. Evidence has shown that more women than men participate in agriculture. Indeed, women’s participation in agriculture is substantial and increasing (UNDP, 2004).

Asia was the world’s most densely populated region and also had the most child labor, approximately 61% of the total. About one in five children in Asia worked, 21% (ILO, 1998). ESAP had the most child workers in the 5-to-14 age group, about 127 million. Not all these children were classified as child laborers, although they were below the minimum working age. Within ESAP child labor in agriculture was common among boys and girls, and most child laborers live in rural areas (ILO, 2005). Families in poverty consider child labor an asset to improve access to income and food, but a productive, literate and educated asset is lost.

Unpaid women and men contribute much to economic activity but are not credited appropriately in the United Nations System of National Accounts. The unpaid work within the System of National Accounts boundary included unpaid work in a family enterprise or agricultural holding (ESCAP and UNDP, 2003). Estimates of women in the labor force were not comparable internationally because in many countries large numbers of women assist on farms or in other family enterprises without pay and countries differed in the criteria to determine the extent such workers were counted as part of the labor force (World Bank,
n.d.). In South Asia, female official employment rates usually were low because of arbitrary definitions. If definitions were revised and all activities for which women are traditionally responsible were incorporated, a huge difference in activity rate would be noted (Mahabub ul Haq Development Centre, 2003). Until and unless the unpaid work by men, women and children is measured as labor contribution to agriculture and rural economic production, the labor contribution of rural households will not be fully accounted.

Linguistic, ethnic and religious diversity is the hallmark of the region. About 70% of the world’s more than 250 million indigenous peoples live in Asia and the Pacific. Marginalization and poverty in many indigenous communities are closely linked to being deprived of the ability to lead lives they value (IFAD, 2002a). Ethnic diversity, while enriching the cultural heritage, in recent times has also caused ethnic conflict. Ethnic conflict adversely affects rural productivity and livelihood security (Wanasundera, 2006).

1.3.4 Education: gender and rural disparities

South and West Asia had countries with a literacy rate of about 60%. Although the East Asia and Pacific region had 91% literacy, the highest rate among developing regions, its large population was home to 17% of illiterate adults worldwide. A considerable difference among regions in literacy gains was evident in UNESCO categories. In all regions, for both adults and youth, female literacy rates were lower than those of males. More remarkable was the poor literacy gain in South and West Asia, which included two of the most populous ESAP countries, India and Bangladesh (UNESCO, 2006). In South and West Asia, on average 93% of boys and 86% of girls of the relevant age were enrolled in primary education. This region had 38% of the world’s out-of-school children, 56% girls.

In East Asia and the Pacific, on average 94% of boys and 94% of girls of the relevant age were enrolled in primary education. This region had 9% of the world’s out-of-school children, 49% of whom were girls (UNESCO, 2004). Among the small Pacific Island countries, Papua New Guinea has the greatest gender gap.

In part, the high dropout rate in rural schools and among girls should explain the differences. Available data on the rural and urban differentials in adult literacy showed rural and urban disparity. More women than men were illiterate. Rural girls also had a higher school dropout rate. As the importance of agriculture employment decreases, changes in human capital will affect nonagricultural growth. From society’s perspective, education provides a more adaptable and productive workforce, able to move with the times and adjust to technological change (Siamwalla, 2001).

In general, the region demonstrated gains in education and literacy, but with intraregional differences; it also showed improved gender parity in education, though gender gaps persist. The uneven educational achievement between genders and rural disparities present risks in transforming the large youth
population into productive human capital—a workforce that could improve global competitiveness of the 
ESAP countries in providing trained labor.

1.3.5 **Migration: labor movements and capital gains**

Asia provided half the world’s international migrants and most of the international labor migrants; it 
became the primary source of migrants to most of the world’s recipient countries. International migration 
in Asia in reached an unprecedented scale, diversity and significance, but inadequate data hamper 
understanding its extent and effect. Migration within the region was from poorer countries to more 
industrialized countries, seeking employment in agriculture and construction, while highly skilled labor 
sought employment in wealthier countries across the globe. Most international migration was 
nonpermanent labor. Movement involved mainly unskilled and semiskilled workers in low-paid, low-status, 
and dirty, dangerous and difficult (3D) jobs eschewed by local workers in the fast-growing, labor-short 
nations of Asia and the Middle East (Hugo, 2005). The capital gains through remittances from emigration 
of females were so high for some Asian governments that female labor export targets were included in 
government development programs. These migrants went out to improve economic returns, in spite of 
experiencing social and economic discrimination and personal risk. Sri Lanka had in its expatriate labor 
force more women than men (IOM, 2005).

Patterns of internal migration varied among countries of Asia, partly from variations in economic and 
cultural structures (Guest, 2003). Rural-to-urban flows still dominated migration in most Asian countries 
because of the high rural population. Women were increasingly involved, and their temporary emigration, 
economically motivated, continued to be important. The rural-to-urban migration in China was obvious. 
Social factors profoundly changed the system and the society (Asia-Pacific Migration Research Network, 
n.d.). In China, Southeast Asia and India temporary migration increased. Studies in India indicate that 
rural households migrated and improved their economic returns, in spite of the risks and family 
disruptions. Rural women also migrated with adult males or in groups of women (Deshingkar and Grimm, 
2005).

Migration in the Pacific Island countries is seen as a way to improve economic and professional 
opportunities. “The currently widely perceived disparities in economic development and welfare between 
the Pacific states, especially the smallest countries and territories of Polynesia and Micronesia, and the 
fringing metropolitan countries, have contributed to substantial migration but also increasing pressures for 
further international migration. Migration remains, in different forms, a time honored strategy from a poor 
area to a richer one in the search for social and economic mobility at home and abroad” (Connell, n.d.). 

Migrants are key contributors to wealth in their home countries. Migrant remittances are an economic 
benefit that reduce the incidence and severity of poverty in origin countries. The funds from migrants
directly increase recipients’ income and improve household consumption. Remittances reduce household economic shock in adverse times, such as crop failure and natural disaster (World Bank, 2006). Over the last decade China, India and the Philippines have received the highest remittance flows. In small economies remittances contribute significantly to foreign exchange funds in the receiving countries (World Bank, 2006). In small Pacific Island countries remittances augment household and national economies. Remittances to rural households supply capital for investment in small-scale agriculture or off-farm enterprises. Human flight turns into financial benefit for the migrants’ families and the origin countries.

1.4 Human well-being

Human well-being in ESAP improved over the last five decades, as measured in life expectancy. But persisting gaps remain in poverty reduction, general human health, food security and nutrition. Agriculture is prominent in human well-being, which includes health, nutrition, poverty and rural livelihood. These components are also related to the development goals. Country data in the region varies greatly for indicators used to measure them. Common indicators for human health include life expectancy, infant mortality and access to safe water and sanitation.

Life expectancy for babies born in 2000–2005 is 67 years for all Asia, 75 years for the Pacific and 65 years for the world. This compares with industrial country life expectancy of 75 years and developing country of 65 years. In Bangladesh, Bhutan and India life expectancy has increased by a decade or more. The extreme is Bhutan, where life expectancy for babies born from 1980 to 1985 was 48 years, compared with 63 years for those born from 2000 to 2005 (subchapter 1.3).

While the region gained remarkably in economic growth and trade links, poverty is still common. Poverty perpetuates a cluster of insecurities in health, food and nutrition. In many ESAP countries, although economic growth has led to substantial reduction in poverty, income increased unequally. In ESAP, between 1990 and 2001, the number of people living on less than US$1 a day dropped by nearly one-quarter of a billion. In developing countries of the region the proportion of the population living below the $1-a-day poverty line was 22%, although for least developed countries it was 38% (UNDP, 2006). In ESAP the least developed countries are Afghanistan, Bangladesh, Bhutan, Cambodia, Kiribati, Lao People's Democratic Republic, Maldives, Myanmar, Nepal, Samoa, Solomon Islands, Timor-Leste, and Vanuatu. It has become necessary to distinguish among “poverty”, “extreme poverty” and “deprivation”, since the region still has extreme deprivation. In 2002, at the $1-a-day measure, extreme poverty estimates revealed that almost 690 million Asian were poor. Using a more “generous” poverty threshold of US$2 a day, 1.9 billion Asians were poor, with South Asia home to the most.

As measured by FAO, 16% of the Asia and Pacific region was undernourished, but this comprised 64% of the world’s undernourished population. Since 1995–1997, Asia and the Pacific have reduced overall the
number and prevalence of undernourished people. However, recently the number of undernourished
again increased. From 2001 to 2003, India had the most, 212 million, undernourished, followed by China,
150 million. The other Asia and Pacific countries together had 162 million undernourished (FAO, 2006c).
Girls and women in poor households were included in the “hunger vulnerable” group. Poor maternal
nutrition and health can be the hub of the vicious cycle that passes hunger from one generation to
another, with reduced capacity among children with low birth weights to be productive adults (FAO,
2005b). Nutritional deficiency among women and children in South Asia is a major crisis in the making.

On average, two out of every three malnourished children in the world live in South and Southeast Asian
countries (FAO, n.d.). Malnutrition and underweight prevalence in children under 5 years in developing
ESAP countries is about 31%, compared with 28% for all developing countries. In Bangladesh, India and
Nepal nearly 50% of children under 5 years are underweight. The estimated deaths per 1000 live births of
children younger than 5 years in 2002 was less than ten for Australia, Japan, Malaysia, New Zealand and
Singapore, and around 100 for India and Myanmar. Gains in nutrition have not been equitable in the
same country nor in the region, with many poor and landless not benefiting as much as the rest of the
population. In some cases, the use of chemicals and irrigation often associated with the Green Revolution
have had a negative effect on human health, through vector- and waterborne diseases, pollution of water
supplies and direct exposure to pesticides.

Sanitation, access to potable water and nutrition could be improved for about three-quarters of people in
urban areas and one-third of the people in rural Asia and some of the developing Pacific Island nations.
Most countries in Asia improved their sources of drinking water, but about 1 billion people still did not
have access to safe drinking water (WHO, 2004; WRI, 2005).

In recent times ESAP faced threats to human well-being from economic turmoil, epidemics, and ethnic
and political conflicts. Notable were the East Asian economic crisis of the late 1990s, severe acute
respiratory syndrome (SARS) in early 2000, increasing HIV incidence, and currently, the highly pathogenic
avian influenza. ESAP countries demonstrated resilience by coping or recovering from these crises to
achieve well-being targets, but the effects remain.

The East Asian economic crisis threatened sustainable growth that undermined economic, health, food
security and educational opportunities. In 1997/1998 millions of people fell below the poverty line and
created concerns over labor rights. Women in low-paid labor were most severely affected (Jones, 1998;
Heller, 1999). In 2003 a major threat came from the SARS outbreak. It affected the regional economy and
was contained within a year, illustrating the resiliency of the countries. Recently, HIV and avian influenza
have been significant threats to human well-being, with both health risks and economic consequences.
In 2006 about 8.6 million people lived with HIV in Asia, including 960,000 people who became newly infected in 2005. In Oceania, about 7,100 people acquired HIV in 2006, bringing to 81,000 the number of people living with the virus, three-quarters of whom lived in Papua New Guinea (UNAIDS and WHO, 2006). Women comprised 13% of adults with HIV in East Asia, the Pacific, and South and Southeast Asia. In Cambodia, India, Japan, Papua New Guinea, Sri Lanka and Thailand, infection rates among women aged 15 to 24 were higher than among their male counterparts.

The human welfare effect of HIV and AIDS on economic output was likely to be felt hardest in the household. The economic impact was predicted to be severe where millions lived under US$1 a day. Two major causes for financial and material burden were a drastic increase in healthcare expenditures and severe reduction in income of patients and caregivers. In a rampant epidemic, local economic loss can accumulate and drag down national economic growth. Epidemics significantly affect the labor supply (ESCAP, 2003). The labor loss in agriculture from HIV and its economic burden on rural households affect rural economic viability and capacity to innovate. Another threat to human well-being has been the avian influenza epidemic, a human health crisis that could have adverse global economic effects.

Agricultural livelihoods and poverty

Across the region, far more poor lived in rural than urban areas (ADB, 2004). Gender-differentiated poverty and poverty among children were frequently observed and often cited. Asia and the Pacific has nearly two-thirds of the world's poor, and two-thirds of the region's poor are women. Poverty is particularly acute for rural women (ADB, 2004). The proportion of the poor in the region varied by country and within countries. In all countries, the major groups of rural poor were the landless, marginal farmers, tenants and indigenous people. The region's less favored areas were home to about 40% of the rural poor. They were rainfed farmers, forest dwellers, highlanders and indigenous peoples. Agriculture productivity was low in upland areas, where ethnic minority groups dominated (IFAD, 2002a).

In South Asia rice farming, arid and rainfed mixed farming demonstrate extensive poverty. In East Asia and the Pacific there is extensive poverty in upland intensive mixed, pastoral and arid farming. In pastoral and arid farming, drought brings on poverty. In all farming systems economic alternatives to farming that are undertaken include off-farm work.

Alternative systems to access food

Most of the developing countries in the region have a large population dependent on agriculture; the region also has many food-deficit, low-income countries. The region is home to many hungry people and rural poor. Farming systems include off-farm work as a livelihood strategy. Hence, the government and external agencies such as the UN and nongovernment organizations deployed programs to improve access to food and increase rural employment. The remarkable achievement in poverty reduction in
China and India have come from public investment in rural areas. Public investments, particularly in human capital, physical capital, and science and technology, have been used to stimulate economic growth and reduce poverty. This investment in rural areas, where most of the poor reside, has been important in reducing rural poverty (Thorat and Fan, 2007). FAO recommended a twin-track approach to quickly reduce hunger and poverty. One track would create opportunities for the hungry to improve livelihoods and the second would require direct and immediate action to enhance access to food (FAO, 2002). These programs could take different forms, such as direct food assistance, food for work, and rural nonfarm employment. Rural public works programs generate nonfarm employment and reduce poverty. These programs would be complementary because they would mitigate income fluctuation (IFAD, 2002b).

Both food and cash transfers have increased household resources. The multidimensional nature of malnutrition and the nonlinear link between food consumption and nutrition make it difficult to attribute a nutritional outcome to either food or cash. A combination of food and cash transfers should be considered more widely, especially if done under a national social protection program (Gentilini, 2007). Policies to improve science and technology in rural areas, investment in rural areas to increase labor productivity, improved access to nonfarm work and direct food assistance all help decrease rural poverty and improve access to food. However, effective implementation and monitoring will require good collaboration among the stakeholders involved.

1.5 Trade

1.5.1 Agricultural GDP in ESAP

Trends in the agricultural share in national economies were not homogeneous across ESAP. Agriculture was very important in South Asia. It was important in South Asia trade. Though slowly declining in the past ten years, compared with industrial Europe, the share of agriculture in the gross domestic product (GDP) was high in East Asia and the Pacific and in South Asia (Table 1-3). Trade reform in export partners, particularly OECD countries, will affect a significant share of the population. East Asia and the Pacific has been a net agricultural exporter for most of the past two decades. The region’s trade position after the WTO was created, however, fluctuated. The region became a net importer in 1996, followed by rapid growth in net exports in 1998. South Asia is a net agricultural importer in a region in which India is the only country that is a net agricultural exporter. It is also dominant in the region’s exports.

[Insert Table 1.3]

The agricultural share in GDP and in total trade has declined over the last decades in many ESAP countries, but it remains a significant source of employment, income and economic activity. The share of agriculture in the GDP ranges from 14 to 57%, from Kiribati to Myanmar; agriculture and agricultural products represent a large share of regional exports. Products include natural rubber, palm oil, rice, fruits
and vegetables, mainly exported to the United States, Europe and Japan. Imports are primarily cereals
and dairy products, mainly from the United States and Europe. Many countries in this region trade a large
share of their GDP, mostly in primary or processed primary products. Tariffs and market access are
important to East Asian exporters, but in the region, agricultural protection remains considerably higher
than industrial protection.

The economy of East Asia and the Pacific has grown rapidly and poverty has fallen. The GDP of this
region grew 8.5% in 2004. The number of East Asians living on less than US $2 a day declined by about
250 million between 1999 and 2004. Countries in the region were on track to meet the Millennium
Development Goal for poverty reduction, although there was wide variation in progress across and within
countries. China exerted strong economic influence through trade and cross-border production networks.
China’s growth helped strengthen economic integration within East Asia and increased the region’s
integration into the global economy. Many countries were considering how to maximize the opportunity
China presented, while managing the challenges. High prices for natural resources, especially oil, likely
will slow growth in the years ahead. Several other risks also threaten to reduce the rate of growth.

Most of the population in South Asia depend on agriculture and related activities for their livelihood.
Despite more than five decades of policy commitment to industrialization, agriculture still is important for
most of the countries. All countries in South Asia are low and middle income (Table 1-3). The share of
agriculture in total GDP ranges from 18 to 40%, from Sri Lanka to Nepal.

The share of agricultural products in total exports has declined significantly over the past two decades.
However, in net foreign exchange earnings, agriculture is much more important than it appears in gross
export earnings. The decline in agriculture’s share in total exports in these countries cannot be explained
solely by the rapid growth in exports of manufactured products. There is considerable evidence that the
region lost market share in several agricultural products in which they had comparative advantage,
because some countries hold a significant antiexport bias in their incentive structures. South Asian
agricultural exports have a significant share of world trade in only five products: spices, rice, tea, oilseeds
and jute. In all other major internationally traded agricultural goods, South Asia has less than 4% of the
market share.

1.5.2 Trade flows: main players, commodities and partners
ESAP countries’ trade dynamics are vibrant and marked by complex and growing bilateral and multilateral
trade agreements. The Asian trade has gone global, with ESAP countries emerging as exporters and
importers. Cross-border agriculture trade has increased. In these countries agriculture trade is also
important in domestic economies and is driven by the increasing purchasing power of a growing middle
class. But aggregate data on agricultural domestic market effects are difficult to obtain and analyze, since
some trade happens informally and in rural and urban links. Hence, this subchapter focuses on international trade in ESAP.

In import and export trade value, Japan, China, Australia, Thailand and South Korea are the top five countries in ESAP, followed by Malaysia, Indonesia, India, New Zealand and Singapore. Japan with US$71 billion and China with US$66 billion were also the leading traders in the world in 2004.

As for exports, China ranks fifth and Australia sixth in the world. They are the biggest exporting countries in ESAP, followed by Thailand, Malaysia, Indonesia, New Zealand and India.

Japan is the biggest importer in the region, also the second biggest importer in the world, just behind the United States. China is the biggest exporter and also one of the biggest importers in the region, ranking fourth in the world. Other big agricultural importers are South Korea, India and Malaysia.

If the ASEAN countries are regarded as a group, the large traders in the region are China, Japan, ASEAN, Australia, New Zealand, South Korea and India. The Pacific countries, even though copra and cocoa beans are important, occupy only a marginal place in total trade value.

In products traded, Australia and New Zealand export mainly livestock products, especially mutton and lamb, beef, milk products and wool. Indonesia and Malaysia export palm oil and rubber. Thailand, Vietnam, Cambodia and India export a large amount of rice and fisheries products. The main world rice exporters come from ESAP, especially from ASEAN countries. China exports mainly vegetables, fruits and maize. India, Sri Lanka and China are the major world exporters of teas. The Pacific countries export copra, cocoa beans and, to a lesser extent, raw sugar.

Japan, China and South Korea are the three biggest importers; Japan and South Korea import most of their agricultural products, mainly cereals and meat products. Japan is low in food self-sufficiency, importing about 60% of its supply. China and India import mainly land-intensive products, such as soybeans, wheat, cotton and edible oils. Since Singapore has almost no agriculture, it relies almost entirely on food imports.

Apart from internal trade among countries in the region, USA, Brazil and Europe were the main providers of agricultural products to ESAP. The USA, Europe and Russia were the main destinations for ESAP agricultural exports. However, trade within the region is important. For example, 66% of China’s exports go to Asia, Japan and Korea alone accounting for more than 40% of China’s total export. ASEAN is also an important trade bloc, with strong trade relations among members.
Australia and New Zealand had close trade relationships with Pacific countries; they were the major exporters to these countries and the main importers from them. Australia has long been the major source of imports for many of the Pacific Island economies and its importance has increased significantly, except in Tonga and Vanuatu. For agricultural products as a whole, New Zealand had a relatively small import share, except in Fiji, Samoa and Tonga, and that share declined in recent years.

Asian economies are more important as suppliers of imports than as markets for exports for Pacific Island countries, except for Papua New Guinea, the Solomon Islands and Vanuatu. They had a significant import share in many Pacific Island countries, which increased quite sharply in Fiji and Papua New Guinea. However, their share in the imports of Samoa and Tonga eroded considerably and the United States became a much more important import source.