

EAST AND SOUTH ASIA AND THE PACIFIC

CHAPTER 1

CONTEXTUAL REALITIES

Coordinating Lead Authors: Arturo S. Arganosa (Philippines) and Revathi Balakrishnan (USA)

Lead Authors: Li Xiande and Fu Qin (China)

Contributing Authors: Zhu Xiaoman (China), M. Monirul Qader Mirza (Canada)

Review Editors: Indu Grover (India), Rajendra Shrestha (Nepal)

9	Key Messages.....	2
10	1.1 IAASTD Framework.....	4
11		
12	1.2 ESAP Agroecological Production Systems.....	4
13	1.2.1 Agroecology, climate and natural resources	
14	1.2.1.1 Forest resources	
15	1.2.1.2 Water resources	
16	1.2.1.3 Aquatic resources	
17	1.2.1.4 Livestock	
18	1.2.1.5 Plant biodiversity	
19	1.2.2 Production potential	
20	1.2.2.1 Farm size	
21	1.2.2.2 Farming systems	
22	1.2.3 Production constraints	
23	1.2.3.1 Degradation of natural resources	
24	1.2.3.2 Natural hazards	
25	1.2.3.3 Pests and pathogens	
26		
27	1.3 Demographics.....	17
28	1.3.1 Regional demographic trends	
29	1.3.2 Accelerated urbanization with a significant rural population	
30	1.3.3 Agricultural labor: feminization, child labor and unpaid work	
31	1.3.4 Education: gender and rural disparities	
32	1.3.5 Migration: labor movements and capital gains	
33		
34	1.4 Human Well-being.....	23
35		
36	1.5 Trade.....	26
37	1.5.1 Agricultural GDP in ESAP	
38	1.5.2 Trade flows: main players, commodities and partners	

1 **Key Messages**

2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37

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

1 Trade Organization (WTO), have achieved little progress, regional free trade agreements have been
2 promoted to develop regional trade blocks and strengthen intraregional trade, like the free trade
3 agreement between China and the Association of Southeast Asian Nations (ASEAN).

4

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

10

1 **1.1 IAASTD Framework**

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

5
6 Agriculture in this report is defined broadly to include crops, livestock and pastoralism, fisheries, biomass,
7 and agricultural goods and services, and land management, such as forestry and agroforestry.

8
9 Variations in grouping of countries adopted by different UN agencies under ESAP affect using United
10 Nations (UN) data to arrive at generalizations on regional trends. The countries that make up ESAP
11 (Table 1-1) are different in size, geography, agroecological systems, production systems, culture,
12 religion and political systems, economic performance and social development. The complex regional
13 realities are shaped by historical trends, agroecological environments, farming practices, contradictions
14 surrounding agriculture trade and aid to farmers, and investment in agriculture knowledge, science and
15 technology. Collectively these affect AKST generation and application with significant variation in
16 processes and outcomes in achieving the goals of development and sustainability in ESAP countries.

17
18 **[Insert Table 1.1]**

19
20 The conceptual framework (Figure 1-1) provides guidance on common concepts and terminology and
21 enables systematic analysis and appraisal of the primary goals of the assessment. It illustrates links
22 among several components and the process, methods and tools for addressing them. Components
23 include direct drivers of change: availability and management of natural resources, climate change, labor,
24 energy and AKST use; and indirect drivers: economic change, demographic change, changes in level and
25 availability of education, sociopolitical changes, changes in infrastructure, agricultural knowledge, science
26 and technology. The assessment focuses on interactions among the drivers to understand how to
27 facilitate development and sustainability goals.

28
29 **[Insert Figure 1.1]**

30
31 **1.2 ESAP Agroecological Production Systems**

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

37

1 **1.2.1 Agroecology, climate and natural resources**

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

7
8 ESAP has very divergent climatic zones, from temperate to arid. Monsoon, the region's most important
9 climate feature, is the wind system that dominates the climate of South Asia and the area around the
10 Indian Ocean. Differential heating and cooling of landmass and oceans between summer and winter
11 creates seasonal reversals of direction. The wind blows from the northeast, toward the sea, in winter—the
12 dry monsoon—and from the southwest, toward the land, in summer—the wet monsoon (Banglapedia,
13 2006).

14
15 Annual rainfall varies from over 10,000 mm in parts of the Central Highlands of Papua New Guinea to
16 almost zero in the Gobi and Australian deserts. Likewise, across the region there is considerable variation
17 in recorded temperatures. During the winter months in Mongolia the temperature commonly falls below
18 zero, whereas in the summer months in the arid regions of Pakistan and Australia daytime temperatures
19 can rise to over 50 °C.

20
21 Rainfed agriculture is restricted in many countries to that period coinciding with the monsoon. However, in
22 some of the more humid parts of the region rainfall occurs throughout the year, giving a 12-month
23 growing season. In the northern and high-altitude parts of the region the length of growing season is
24 curtailed by low temperatures, below 5 °C. Tropical cyclones and typhoons are a feature in much of the
25 region and result in heavy downpours, with the risk of high runoff and flooding. The worst effects of the
26 strong winds, tidal surges and heavy rainfall are mostly felt in coastal and island areas; the influence of
27 some cyclones may extend into the interior of the Asian continent. Islands in the Pacific and the Philippine
28 archipelago are especially vulnerable. The smallest islands cannot deflect typhoons and cyclones and are
29 not large enough to moderate climatic circulation patterns. They are vulnerable to drought and other climate
30 events, which can destroy complete ecosystems. The effects of climate variability and change on
31 agriculture are projected to steadily manifest directly in changes in land and water regimes. Changes in
32 the frequency and intensity of drought and flooding and the amount of storm damage are expected.
33 Climate change is expected to result in long-term water and resource shortages, worsening soil
34 conditions, drought and desertification, disease and pest outbreaks on crops and livestock and sea level
35 rise. Vulnerable areas are expected to experience losses in agricultural productivity, primarily from
36 reduction in crop yields (Rosenzweig et al., 2002).

37

1 In contrast, climate change is also expected to result in some beneficial effects, particularly in temperate
2 regions. Lengthening growing seasons, carbon fertilization and improved conditions for crop growth are
3 forecast and should stimulate gains in agricultural productivity in high-altitude regions, such as Northern
4 China and Mongolia (Mendelsohn et al., 2004).

5
6 In ESAP agriculture land is the primary resource. Land categories are arable permanent crops,
7 permanent pasture, and forests and woodlands. East Asia has the biggest total land area among the
8 major regions in Asia, with more than 1 billion ha, followed by Southeast Asia and South Asia. China
9 leads all the ESAP countries with a 932,743,000 ha, followed by Australia, India and Indonesia. Countries
10 in the Pacific Islands and Maldives have the least land area.

11
12 In arable and permanent croplands, South Asia has the largest area because India tops all ESAP
13 countries, with 202,835,000 ha. East Asia comes next with 160,796,000 ha, followed by Southeast Asia
14 with 95,361,000 ha. Industrial countries Australia, Japan and New Zealand have a combined 56,043,000
15 ha of arable and permanent cropland. China has 400,001,000 ha and Mongolia 129,300,000 ha
16 permanent pasture, giving East Asia the highest potential for livestock production for ruminants. Australia
17 has 391,565,000 ha of permanent pasture area, which also provides the country the opportunity to
18 produce a lot of ruminants.

19
20 1.2.1.1 Forest resources

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

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

33
34 The Asia and Pacific region is also home to the world's greatest concentration of mangroves. Once
35 thought of as coastal wasteland, mangroves have been destroyed at alarming rates for agriculture,
36 aquaculture and firewood. Up to half of mangrove destruction in recent years has been prompted by the
37 desire to create shrimp farms (UN Atlas of the Sea, 2002). Over the last 20 to 30 years, with the help of

1 the UNESCO Mangrove Programme and other international initiatives, government planners and fisheries
2 experts have become more aware of the many roles that mangroves play as a nursery for many coastal
3 and aquaculture fish species, as a key buffer that reduces the impact of sediment flows onto offshore
4 reefs and as a barrier to protect against storm surges and tsunamis (Vannucci, 1997). About 90% of all
5 marine organisms spend some portion of their life cycle within mangrove systems (Adeel and Pomeroy,
6 2002). Mangroves have some commonality with open access natural forests in management (subchapter
7 2.2.5).

8
9 ESAP has over 552 million ha of forests, of which 477 million ha are natural. However, only about 249
10 million ha have been available and suitable for harvesting (Waggener, 2001). The natural forests
11 throughout ESAP up until very recently have been seen mostly as a vast natural source of raw timber for
12 export income. However, there is general agreement on the need to change from a focus on timber
13 exploitation to an emphasis on management for sustainable, multiple-use natural forests (Enters, 1997).
14 In the face of increasing deforestation, many countries across ESAP, including China, New Zealand,
15 Philippines, Sri Lanka, Thailand, and Vietnam, imposed several partial, temporary or selective bans on
16 logging in natural and old growth forests. The results of these restrictions have been mixed and a number
17 of case studies have indicated that bans can have unanticipated effects on timber supply, forest
18 harvesting, transport, processing and consumption of forest products and on forest residents and those
19 who depend on forestry for their livelihoods (Waggener, 2001).

20
21 Plantation forestry is another form of management in the region. In 2000, ESAP accounted for 61% of
22 global forest plantations. Five ESAP countries accounted for 55% of the world's forest plantations and
23 91% within Asia and the Pacific (Brown and Durst, 2003). This is a rather new phenomenon, with the
24 average age of Asia's industrial plantations less than 15 years (FAO, 2001).

25
26 With diminishing availability of large-diameter timber from natural forests in the region, plantation forestry
27 is expected to become the dominant source for wood in ESAP. The region has more than 80% of forest
28 plantations in the tropics. At present, most legally produced industrial wood in the region is sourced from
29 plantations. Most plantation forestry in the region can be described as intensive management of
30 monocultures for producing a relatively narrow range of products and species; the main species are
31 pines, teak, poplars, acacias and eucalypts (Enters, 1997).

32
33 Because of the extent of plantations in China and their short rotation, most of Asia's plantation forests are
34 aged less than 15 years. This has come mostly from a rapid acceleration in plantation establishment in
35 China and the short rotation generally used. This sector has considerable diversity in ownership,
36 management, scale of operation and products. Plantations were established to meet the need for several
37 different products, including fuelwood, poles, wood chips and furniture wood, and various estate crops

1 including rubber, oil palm and coconut. Until 25 years ago, forest plantations were largely smallholder or
2 government operated. The trend now is for increasing private investment and management of forest
3 plantations to meet an increasing demand for wood for pulp, furniture and particleboard. Smallholder
4 plantations have sprung up to meet this market in the Philippines (Garrity and Mercado, 1994; Pasicolan
5 et al., 1997).

6
7 Agroforestry has come to mean many different things, but in its simplest form it refers to incorporating and
8 using trees in farming. The focus has been primarily on smallholders. The practice gained widespread
9 attention by government agencies and nongovernmental organizations as a way to address a range of
10 soil conservation objectives and meet livelihood needs. Because of its potential for increased food
11 security, poverty reduction and environmentally sound land management, a CGIAR-supported
12 international research centers is now devoted to agroforestry research and development. Agroforestry is
13 defined as a dynamic, ecologically based, natural resources management system that, by integrating
14 trees with other crops and enterprises on farms and in the agricultural landscape, diversifies and sustains
15 production. Tree farms and nut plantations managed as a monocrop are not considered agroforestry
16 (Beetz, 2002).

17 18 1.2.1.2 Water resources

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

27
28 The hydrology of ESAP is dominated by the monsoon climate, which induces large interseasonal
29 variations in river flows. In this situation, average annual river flow is a poor indicator of the water
30 resources available. In the absence of regulation, most of the water flows during a short season when it is
31 usually less needed. In Bangladesh, for example, the surface flow of the driest month was only 18% of
32 the annual average; in Indonesia, it was 17 percent. In India, the flow distribution of some rivers in the
33 monsoon period represents 75 to 95% of the annual flow. In North China, 70 to 80% of the annual runoff
34 is concentrated between May and September (FAO, 2006a).

35
36 Water in shallow underground aquifers has been significant in developing and diversifying agricultural
37 production in the region, particularly in China and India. Groundwater offers a primary buffer against the

1 vagaries of climate and surface water. Because groundwater is available on demand, crops irrigated with
2 it are often more productive than those irrigated with surface water.

3

4 1.2.1.3 Aquatic resources

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

11

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

16

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

24

25 Within ESAP in 2004, seven countries, China, India, Indonesia, Japan, Philippines, Thailand and Viet
26 Nam, produced the most by volume from aquaculture, including aquatic plants. China alone produced
27 41,661,660 tonnes, or 78 percent. The next six countries accounted for 17 percent, the remaining
28 countries 5 percent.

29

30 1.2.1.4 Livestock

31 Millions of rural households in ESAP countries depend on domesticated animals for food, farm power and
32 income. The region is home to 30% of the world's livestock species. Developing Asian countries had the
33 world's highest growth rates of production and consumption of food from livestock (Steinfeld et al.,
34 2006ab). The dynamic Asian livestock sector is growing at a rate between 3.5 and 5% annually—more
35 rapidly than crops such as cereals, vegetables and pulses—driven partly by increasing population, rising
36 incomes and changes in consumer lifestyles.

37

1 Livestock production in Asia and the Pacific grew rapidly from 1992–1994 to 2002–2004, with the most
2 rapid growth occurring in China, 93%; Viet Nam, 93%; and the Philippines, 79% (FAO, 2006b). For the
3 region as a whole, all categories of livestock products grew rapidly. The most rapid production growth
4 was in poultry, 83 percent, and eggs, 78%. Rapid growth in poultry and egg production was widespread
5 throughout the region. Production of milk exhibited strong growth in East Asia, 136 percent; Southeast
6 Asia, 65 percent; South Southwest Asia, 52 percent; and the industrial economies, 33 percent). Pork
7 production grew 50% for the region, with strong growth in Southeast Asia, 55%; East Asia, 53%; and the
8 Pacific Islands, 44%. Although most ESAP countries were technically capable of increasing production in
9 meat, milk and eggs, most faced shortages of key feed ingredients. As a result, there was a large and
10 burgeoning world trade in feed crops. On the other hand, the drive by livestock growers to serve urban
11 markets led to intensive production, with problems of livestock waste, land management and distribution
12 of meat products. Awareness increased of the potential for transmitting diseases from animals to humans,
13 particularly with the bird flu, or avian influenza, crisis. Diseases affecting animals and humans could
14 spread rapidly across the region, creating transboundary epidemics. Concerns remained about the rising
15 demand for livestock feed, increased need for veterinary services and training, loss of genetic resources
16 and need for extension for profitable livestock opportunities for small-scale producers (FAO, 2006b). More
17 than half the small-scale farmers in Asia rely on livestock as a major source of income and nutrition.
18 However, small-scale producers have mostly not been a part of the rapid rise in intensive animal
19 production (FAO, 2006b).

20
21 In population, the figures from 1994 to 2004 for all the livestock and poultry species showed no definite
22 trends. Ruminant numbers seemed not to have increased, except goats, which increased by almost 100
23 million over ten years. Buffalo populations declined by more than 10 million in ten years. Pigs and poultry,
24 nonruminants, increased, with chickens increasing by almost 10 billion from 1994 to 2004. Growth in
25 production of poultry and pork resulted in a growing shift away from pasture systems. As livestock
26 production became more intensified, feed shifted from locally available resources to commercial feed
27 concentrates, particularly in pig and poultry production (Steinfeld et al., 2006b).

28 29 1.2.1.5 Plant biodiversity

30 ESAP encompasses parts of three of the world's eight biogeographic realms and includes the world's
31 highest mountain system, the second largest rainforest complex and more than half the world's coral
32 reefs. The rainforests of Southeast Asia contain more than 25,000 species of flowering plants, equivalent
33 to about 10% of the flora of the world. The region as a whole encompasses two-thirds of the world's flora.
34 Almost all nations in the region, except Singapore and Brunei Darussalam, depend heavily on harvesting
35 natural products directly.

36

1 Flora and fauna of the region are increasingly threatened, but only a few countries have designated more
2 than 15% of their land as protected areas. The drive for increased agricultural production has resulted in
3 loss of genetic diversity. The area of land under rice cultivation rose by only 25% between 1960 and
4 1970, although production rose by 77% by replacing traditional varieties with higher-yielding, semidwarf
5 varieties. More than 100,000 varieties of rice were found in Asia early in the 20th century. In 2002 there
6 were less than a dozen modern rice varieties being planted on 70% of land being cultivated for rice
7 (Dano, 2002). In Indonesia, 1,500 varieties of rice disappeared from 1975 to 1990 (see subchapter 2.4.1).

8
9 The Indo-West Pacific is the key area for shallow-water marine biodiversity. Coastal habitat loss and
10 degradation, combined with increased sediment, nutrient and pollutant discharge into coastal areas, is a
11 major cause of concern, particularly for the island countries. The rates of loss of coral reef and mangrove
12 habitat in this region are among the highest in the world. Thailand alone lost about 0.2 million ha of
13 mangrove forest from 1961 to 1993. Conversion of mangrove forest to shrimp aquaculture and the use of
14 unsustainable fishing practices, such as blast fishing, were widespread. However, the effects of such
15 unsustainable practices on regional biodiversity are difficult to quantify.

16
17 Although terrestrial biodiversity loss has been a major concern, actual losses still have to be quantified.
18 As much as 70% of major vegetation types in Indo-Malaya have been lost, with a possible associated
19 loss of up to 15% of terrestrial species. Dry forests suffered 73% loss and moist forests 69%, while
20 wetlands, marsh and mangroves were reduced by 55%. Overall habitat losses were most acute in the
21 countries of the Indian subcontinent, the People's Republic of China, Thailand and Vietnam (ESCAP,
22 1995b).

23
24 The underlying causes of biological diversity loss in the region include international trade, particularly the
25 trade in timber, which results in habitat loss; population growth, leading to accelerated rates of change in
26 land use; poverty and demand for common access resources, leading to their unsustainable
27 consumption; introduction of nonnative species, leading to destruction of predator and prey equilibrium;
28 and improper use of agrochemicals, leading to loss of aquatic species. Other major reasons include loss
29 of keystone species, extensive deforestation and habitat loss, increased trafficking in animals and animal
30 body parts, widespread conversion of land to agriculture and construction of large-scale dams.

31
32 In response, national governments have implemented conventions related to biodiversity and are taking
33 measures to protect biologically rich areas. Twenty-nine ESAP countries had ratified the Convention on
34 Biological Diversity by 1 May 1996. Several regional conventions covering parts of ESAP dealt with
35 specific aspects of biological diversity; the most significant were the Convention on Conservation of
36 Nature in the South Pacific (Apia Convention), the ASEAN Agreement on the Conservation of Nature and

1 Natural Resources (ASEAN Agreement), and the Convention on the Protection of the Natural Resources
2 and the Environment of the South Pacific (SPREP Convention).

3
4 Progress in designating protected areas has generally been positive. It is clear that almost all countries in
5 the region understand the importance of establishing terrestrial and aquatic natural reserves by creating
6 national parks, wildlife sanctuaries and gene pool reserves. The number and area of protected areas in
7 both South and Southeastern Asia has increased dramatically. The Pacific region has also shown a major
8 increase in the number of protected areas, although the increases have been less dramatic.

9
10 Biological diversity has finally been accepted as a legitimate issue nationally and internationally in ESAP,
11 with conventions on biological diversity and designation of protected areas. However, patterns of
12 unsustainable use and conflicting policies contribute to continued losses throughout the region. With only
13 10 to 30% of natural habitats remaining in many countries, any further decrease will have serious
14 consequences for biodiversity (ESCAP, 1995a). High rates of population and economic growth in most
15 countries of the region suggest even greater losses will occur, unless decisive action is taken. Such
16 action could include intensifying protected-area systems and zoological parks, botanical gardens, gene
17 resource centers, seed banks and tissue culture techniques.

18

19 **1.2.2 Production potential**

20 1.2.2.1 Farm size

21 In general, the diversity in concepts used to define small farms makes definition difficult. By applying a
22 common approach of size of landholdings or livestock numbers the overwhelming majority of these farms
23 (87%) were in Asia. In Asia, China alone had almost half of world's small farms, followed by India with
24 23%. Other leaders in the region, in descending order include Indonesia, Bangladesh and Vietnam.
25 Despite steady economic growth in many Asian countries over the decades, small farms still dominate in
26 rural areas (Nagayets, 2005). Small farms characterize agriculture in Asia and small Pacific Island
27 countries, while extremely large farms dominate in Australia. In wealthier countries such as Japan and the
28 Republic of Korea, average farm size has been increasing, but at a slow pace. For example, between
29 1956 and 2003, average farm size in Japan increased just 0.60 ha. The increase in the Republic of Korea
30 from 1969 to 2002 was 0.58 ha (Fan and Chan-Kang, 2003). In contrast, national average farm size is still
31 decreasing in most Asian developing countries. For example, average farm size in Nepal decreased from
32 0.95 ha in 1992 to 0.79 ha in 2002. Similar trends occurred in Pakistan and the Philippines during the
33 1990s (FAO, 2006b). In India research demonstrated an association between decreasing farm size and
34 more hunger and poverty. The study documented that the incidence of hunger among farmers with
35 landholdings less than 0.5 ha was 32% and the incidence of poverty was 38%; the likelihood of being
36 affected by hunger dropped to 12% and poverty dropped to 13% for farmers who cultivated more than 4
37 ha (Singh, 2004). But farms are becoming larger in dynamic agricultural areas close to large cities, such

1 as Suphan Buri province near Bangkok, Thailand. From 1993 to 2003, total agricultural land in Suphan
2 Buri declined, but the number of agricultural households declined even more rapidly. Families migrated to
3 Bangkok or assumed nonagricultural rural jobs. Active land rental markets have been important in the
4 land consolidation in Suphan Buri (Dawe, 2005).

5
6 Urbanization created pressure on maintaining agricultural land and production. In 2005, the net loss of
7 arable land was 361,600 ha, about 0.3%, of which 138,700 ha was used for construction. From 1998 to
8 2005, farmland decreased by 7.6 million ha, about 6.2% of the total amount of arable land. The per capita
9 area of cropland in China was only 0.93 ha in 2005, 40% of the world average. To achieve a higher
10 production rate from the small remaining area of cultivatable land, China became the world's largest
11 consumer of fertilizers and the second largest of pesticides. Consequently, much cultivated land and farm
12 produce have been contaminated, especially with pesticide residues (Fu et al., 2007).

14 1.2.2.2 Farming systems

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

24
25 Rainfed mixed farming covers the largest area within the subcontinent and, with the exception of a small
26 area in northern Sri Lanka, is confined to India. This system covers 147 million ha, with about 59% under
27 cultivation. Rice, wheat, pearl millet, sorghum, a wide variety of pulses, many oilseeds, sugarcane,
28 vegetables and fruit are grown. About 16% of the cultivated area is irrigated. About 126 million bovines
29 and 64 million small ruminants are partially integrated with cropping. In many instances, relatively small
30 areas are irrigated from reservoirs. In recent decades, tube wells have contributed to stable cereal
31 production. Vulnerability stems from substantial climatic and economic variability. Poverty is extensive
32 and its severity increases markedly after droughts.

33
34 Three farming systems predominate in the land area in East Asia and the Pacific: upland intensive mixed
35 19%, pastoral 20%, arid 20%. These can be further classified, depending on the production systems.

36

1 Upland intensive mixed farming is found in uplands and hills of moderate altitude and slope in humid and
2 subhumid agroecological zones. The total area of the system is 314 million ha, with an agricultural
3 population of 310 million—the second most populous system, after lowland rice, in the region. The
4 cultivated area is 75 million ha, of which less than one-quarter is irrigated. This is the most widespread
5 and most heterogeneous farming system in the region, including some remnant shifting cultivation, with
6 major areas in all countries of East and Southeast Asia. The system is the cultivation of a wide range of
7 mostly permanent crops, but the specific crops preferred depend on geography, climate, slope, terracing
8 and water regime. A significant crop area, mainly rice, is irrigated from local streams and rivers. Livestock
9 production is important in most farm livelihoods. The area has 52 million large and 49 million small
10 ruminants. Livestock contribute draft power, meat, cash income and savings. Off-farm work is an
11 important source of income for many poor households.

12

13 Pastoral farming is found in semiarid and arid temperate plains and hills, with fewer than 120 growing
14 days annually. The system is extensive in western China and much of central and northern Mongolia. It
15 covers 321 million ha but has no more than 42 million agricultural people. The cultivated area is just over
16 12 million ha, with about 20% irrigated in dispersed zones. The system is dominated by transhumant
17 pastoralism, characterized by mixed herds of camels, cattle, sheep and goats extensively grazing native
18 pasture. Irrigated crops include cotton, barley, wheat, pulses, peas, broad beans, potatoes and grapes;
19 sericulture is sometimes practiced. Severe poverty, often triggered by drought or severe winters, with
20 consequent loss of livestock, is common in both pastoral and irrigated areas.

21

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

29

30 Except for Australia, most nations in the Pacific are relatively small islands and atolls. On the small
31 islands as on most other small islands, traditional agriculture is agroforestry, where trees are planted and
32 protected for their great variety of functions and products, including food. Food or fruit trees and shrubs
33 are most common in permanent village tree groves and intercropped in home gardens. They included a
34 wide range of coconut palms, banana and plantain cultivars, breadfruit, edible pandanus (screw pine)
35 varieties (especially on atolls), fruit trees, nut and seed trees, and kava (a root used for a traditional
36 alkaloid social beverage). Most of these species are aboriginal, pre-European introductions, but some are
37 indigenous.

1
2 Atoll islands have among the most infertile soils in the world and almost no surface freshwater sources.
3 Despite inadequate land, soil and water and relatively high populations, atoll societies have developed
4 sophisticated subsistence agroforestry systems based on coconut, breadfruit, pandanus, native fig,
5 bananas (on the wetter islands) and giant swamp taro. This pit cultivation uses leaves of salt-tolerant
6 coastal trees and plants as mulch and fertilizer. It is also used for important staple tree crops to ensure
7 their survival in the atoll.

8

9 **1.2.3 Production constraints**

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

13

14 1.2.3.1 Degradation of natural resources

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

20

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

28

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

33

34 Unscrupulous application of technology eventually resulted in overfishing and depletion of ocean fish
35 stocks. Despite caution from scientists, many rich marine fishing grounds all over the world have been
36 excessively exploited for years. Aquatic habitat change or destruction from massive construction of
37 embankments for flood control, drainage, irrigation, temporary damming of rivers, excessive surface water

1 withdrawal, aquatic pollution from pesticides, indiscriminate release of industrial effluent and unplanned
2 construction of rural roads and culverts that obstructed fish movement have all contributed to the
3 destruction of fisheries.

4

5 1.2.3.2 Natural hazards

6 Natural disasters are grouped in three specific categories: hydrometeorological disasters, including
7 floods, wave surges, storms, droughts, extreme temperatures, forest and scrub fires, landslides and
8 avalanches; geophysical disasters, divided into earthquakes, tsunamis and volcanic eruptions; and
9 biological disasters, covering epidemics and insect infestations. ESAP suffers frequent natural disasters
10 with considerable human and economic loss. The most recent and dramatic natural disaster, which
11 caught the world’s attention and empathy, was the 2004 tsunami. Since 2000, the region has suffered
12 major earthquakes, floods, tsunami and pestilence. “Both hydrometeorological and geophysical disasters
13 have become more common, becoming respectively 68 and 62% more frequent over the decade. This
14 reflects longer-term trends. However, weather-related disasters still outnumber geophysical disasters by
15 nine to one over the past decade. Among natural disasters, floods are the most reported events in Africa,
16 Asia and Europe, while windstorms are most frequent in the Americas and Oceania” (IFRCRC, 2004).
17 Among the top 50 countries with major economic loss from natural disasters are 14 countries from ESAP,
18 with Japan ranked second, China third, India sixth and Indonesia eighth (Table 1-2) (Guha-Sapir et al.,
19 2004).

20

21 **[Insert Table 1.2]**

22

23 Frequent disasters make agriculture and land-based production in ESAP a high-risk venture. The
24 livelihoods of communities dependent on agriculture and natural resources and with limited diversification
25 are vulnerable. Landslides across the southern Philippines in December 2003 killed 200 people and left
26 thousands homeless, reigniting the disaster prevention debate. From 1971 to 2000, natural disasters
27 killed 34,000 Filipinos. From 1990 to 2000, 35 million people were severely affected by natural disasters
28 (IFRCRC, 2004). A windstorm in 2002 led to considerable land and crop loss, affecting 100 million people
29 in China (Guha-Sapir et al., 2004). For many countries in South and East Asia floods have become
30 annual, alternating with drought. In the Pacific, cyclones present constant threats to livelihoods. In
31 Thailand, the 2004 tsunami had a devastating effect on the livelihoods of villagers in over 400 fishing and
32 farming communities along the Andaman coast. Many of the communities’ livelihood assets were lost
33 (FAO, 2006d). Lost livelihoods and basic productive assets were similar in other countries affected by the
34 tsunami, such as India, Indonesia, the Maldives and Sri Lanka. Since 2004 Indonesia has been affected
35 by many disasters—tsunami, avian influenza, volcanic eruption, haze and floods—that have taxed the
36 capacity of government to manage disaster and tested people’s resilience.

37

1 Disasters are further obstacles to overcome in trying to reduce poverty and achieve sustainability. In the
2 region, increasingly emphasis has been placed on early warning systems for disaster, information access
3 for local disaster-prone communities, community approaches in disaster management and risk reduction,
4 on exploration of strategies to improve agriculture extension, and on local government support for
5 community approaches.

6 7 1.2.3.3 Pests and pathogens

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

12
13 *Highly pathogenic avian influenza.* Since 2004, the highly pathogenic avian influenza epidemic
14 presents a high risk to small-scale farmers in EASP who practice mixed farming, combining crops
15 and livestock. The emergency officially began in December 2003, when a highly contagious avian
16 influenza struck chickens on a farm near Seoul, Republic of Korea, and spread rapidly across the
17 country. Within weeks, simultaneous outbreaks in Cambodia, China, Indonesia, Japan, Lao PDR,
18 Thailand and Viet Nam had devastated domestic fowl. The impact has been distributed within the
19 entire poultry market chain, affecting producers, consumers and employees in the retail industry. In
20 some areas, farmers lost more than half their poultry (FAO, 2005a).

21 22 **1.3 Demographics**

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

28 29 **1.3.1 Regional demographic trends**

30 People are the wealth of East and South Asia and the Pacific. The region encompasses three of the
31 world's most populous countries and developing countries that have a relatively large youthful population.
32 China, India, Indonesia, Bangladesh and Japan are among the top ten in population size (U.S. Census
33 Bureau, 2008). From 2000 to 2005, three countries in ESAP were among the six countries in the world
34 that had half the world's estimated 77 million annual increase in population. These countries and their
35 rate of increase were India, 21%; China, 12%; and Bangladesh, about 4%. India is expected to overtake
36 China as the most populous country in the world by 2035 (ECOSOC, 2004).

37

1 The population of the Pacific Islands reached about 8.6 million in 2004, an increase of approximately 1.7
2 million people over the past ten years. Population distribution remained largely unchanged: the five
3 largest countries and territories that comprise Melanesia had the vast majority, 86.4%, of the regional
4 population, followed by much the smaller island countries and territories of Polynesia, 7.4%, and
5 Micronesia, 6.2%. Two out of every three Pacific Islanders live in Papua New Guinea. Fiji's population is
6 25% larger than ten Polynesian island countries and territories combined. The fertility rate in the Pacific
7 Islands is still moderately high, while mortality is declining, contributing to increased population
8 (Haberhorn, 2004).

9
10 In ESAP, since people are the fundamental resource for sustainable development, investment in people
11 would bear development dividends. Human resource-centered strategies present opportunity for
12 sustainable development but also present enormous challenges to ensure equitable access to education,
13 productive assets, goods and services to the billions of people. Transforming a large reserve of human
14 resources to human capital and driving development will be the core challenge for achieving development
15 with social sustainability.

16
17 In Asia fertility declined remarkably. The average number of children born to Asian women declined by
18 more than half, from 5.4 in 1970 to 2.4 in 2003. Average life expectancy of Asian men and women
19 increased about 15 years over the same period. Life expectancy for males increased from 52 years in
20 1970 to 66 years in 2003; for females, from 54 to 70 years (Hugo, 2005), overtaking men's life
21 expectancy in nearly every country. In some Asian countries, however, girls were more likely than boys to
22 die during early childhood and in others an unusual preponderance of male births pointed to sex
23 selectiveness (Westley, 2002). Between 1950 and 2005 in most of the region's countries women gained
24 and improved the sex ratio trend of the number of males per 100 females. Sex ratio also indicates gender
25 equity by reflecting women's chances of survival. The population sex ratio improved either with decrease
26 in female to male difference or with female gains over males. A few exceptions were Brunei Darussalam,
27 India, Samoa and Tonga (UNDESA, 2004).

28
29 The region recorded increases in its aged population and female-headed households. The elderly
30 population grew rapidly, in both numbers and percentage. The aging population proportion in industrial
31 ESAP countries was greater than in the less industrial ones. Asia is one of the world's fastest aging
32 regions; the percentage of elderly is projected to double between 2000 and 2030, but with differences
33 among the countries (Kaneda, 2006). Industrial economies Australia, Japan and New Zealand had a
34 rapid rate of aging; by 2050, 25% of their population will be over 60. From 1950 to 2005, all but a few
35 countries in the region, Bangladesh, Maldives, Nepal and Papua New Guinea increased their population
36 aged over 60 years (UNDESA, 2004). An aging population challenges productivity and innovation in
37 agriculture, and the potential for saving and investment. It increases poverty among the rural elderly.

1
2 The decrease in fertility and the aging population in mostly industrial countries in the region contrasts with
3 a growing youthful population in developing countries. The outlook for the future in Asia is that the youth
4 population will increase to 685 million by 2040, when they will comprise 14%. While the young adult
5 population will continue to grow over the next two decades in developing countries, their numbers will
6 decrease in most OECD nations in the region (Hugo, 2005). Yet while a large youth population presents
7 developing countries with a labor pool advantage, the lack of appropriate skills will form a barrier to using
8 human resources effectively.

9 10 **1.3.2 Accelerated urbanization with a significant rural population**

11 Since 1950, Australia, China, Fiji, Indonesia, Japan, Korea DPR, the Republic of Korea and the
12 Philippines have lost rural population. This has applied to most industrial countries in the region. In most
13 developing countries, however, the urban population is less than 50% of the total. Countries that depend
14 on agriculture as the economic driver have an urban population of less than 30%; these include
15 Bangladesh, Bhutan, Cambodia, India, Lao PDR, Nepal, Papua New Guinea, Samoa, Solomon Islands,
16 Sri Lanka, Vanuatu and Viet Nam. The projection for China is that the urban population will be 60% by
17 2030 (UNDESA, 2003).

18
19 While the decrease in rural population will be minimal in Asia, the Pacific will gain rural population
20 between 2010 and 2030 (UNDESA, 2004). The Asian Development Bank estimates there will be 2.2
21 billion rural Asians by 2020 and that this population will have much lower access to health and education
22 and have less general well-being (ADB, 2000). By 2030, this region still will have a substantial rural
23 population, demanding attention to agriculture, rural livelihood strategies and investment in rural physical
24 and social service infrastructure.

25
26 Asia is expected to experience rapid urbanization from 2005 to 2030; by 2030, 55% of Asian inhabitants
27 are projected to live in urban areas. Although economic growth and prices are closely monitored drivers
28 of food demand, demographic changes—urbanization, growth in population and changes population
29 age—likely will have more profound long-term effects on the region's food system. It will be affected by
30 migration, the aging population and urban demand for a more varied diet, with a premium on convenience
31 (Coyle et al., 2004).

32 33 **1.3.3 Agricultural labor: feminization, child labor and unpaid work**

34 The overall share of agricultural employment decreased between 1995 and 2005 from 44.4 to 40.1%.
35 This decline was seen in all regions, except East Asia, where the share in agriculture remained stable.
36 With a few exceptions, from 1979 to 2002 the percentage of agricultural labor in the total labor force
37 decreased (Figure 1-2). The decline was remarkable among the wealth creators, such as Japan and

1 Republic of Korea, Australia and New Zealand. For poorer wealth producers, such as Bangladesh,
2 Bhutan, Cambodia, India, Lao PDR, Nepal, Papua New Guinea, and the Solomon Islands, however,
3 agriculture employed a large proportion of people and the rate of decrease was less. Thailand and China
4 still illustrated the dominance of agriculture in employment, although they were high-growth countries. In
5 general, for the poorer countries in the region, agriculture continues to be important for employment and
6 livelihoods.

7

8 **[Insert Figure 1.2]**

9

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

15

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

23

24 Asia was the world's most densely populated region and also had the most child labor, approximately
25 61% of the total. About one in five children in Asia worked, 21% (ILO, 1998). ESAP had the most child
26 workers in the 5-to-14 age group, about 127 million. Not all these children were classified as child
27 laborers, although they were below the minimum working age. Within ESAP child labor in agriculture was
28 common among boys and girls, and most child laborers live in rural areas (ILO, 2005). Families in poverty
29 consider child labor an asset to improve access to income and food, but a productive, literate and
30 educated asset is lost.

31

32 Unpaid women and men contribute much to economic activity but are not credited appropriately in the
33 United Nations System of National Accounts. The unpaid work within the System of National Accounts
34 boundary included unpaid work in a family enterprise or agricultural holding (ESCAP and UNDP, 2003).
35 Estimates of women in the labor force were not comparable internationally because in many countries
36 large numbers of women assist on farms or in other family enterprises without pay and countries differed
37 in the criteria to determine the extent such workers were counted as part of the labor force (World Bank,

1 n.d.). In South Asia, female official employment rates usually were low because of arbitrary definitions. If
2 definitions were revised and all activities for which women are traditionally responsible were incorporated,
3 a huge difference in activity rate would be noted (Mahabub ul Hag Development Centre, 2003). Until and
4 unless the unpaid work by men, women and children is measured as labor contribution to agriculture and
5 rural economic production, the labor contribution of rural households will not be fully accounted.

6
7 Linguistic, ethnic and religious diversity is the hallmark of the region. About 70% of the world's more than
8 250 million indigenous peoples live in Asia and the Pacific. Marginalization and poverty in many
9 indigenous communities are closely linked to being deprived of the ability to lead lives they value (IFAD,
10 2002a). Ethnic diversity, while enriching the cultural heritage, in recent times has also caused ethnic
11 conflict. Ethnic conflict adversely affects rural productivity and livelihood security (Wanasundera, 2006).

12 13 **1.3.4 Education: gender and rural disparities**

14 South and West Asia had countries with a literacy rate of about 60%. Although the East Asia and Pacific
15 region had 91% literacy, the highest rate among developing regions, its large population was home to
16 17% of illiterate adults worldwide. A considerable difference among regions in literacy gains was evident
17 in UNESCO categories. In all regions, for both adults and youth, female literacy rates were lower than
18 those of males. More remarkable was the poor literacy gain in South and West Asia, which included two
19 of the most populous ESAP countries, India and Bangladesh (UNESCO, 2006). In South and West Asia,
20 on average 93% of boys and 86% of girls of the relevant age were enrolled in primary education. This
21 region had 38% of the world's out-of-school children, 56% girls.

22
23 In East Asia and the Pacific, on average 94% of boys and 94% of girls of the relevant age were enrolled
24 in primary education. This region had 9% of the world's out-of-school children, 49% of whom were girls
25 (UNESCO, 2004). Among the small Pacific Island countries, Papua New Guinea has the greatest gender
26 gap.

27
28 In part, the high dropout rate in rural schools and among girls should explain the differences. Available
29 data on the rural and urban differentials in adult literacy showed rural and urban disparity. More women
30 than men were illiterate. Rural girls also had a higher school dropout rate. As the importance of
31 agriculture employment decreases, changes in human capital will affect nonagricultural growth. From
32 society's perspective, education provides a more adaptable and productive workforce, able to move with
33 the times and adjust to technological change (Siamwalla, 2001).

34
35 In general, the region demonstrated gains in education and literacy, but with intraregional differences; it
36 also showed improved gender parity in education, though gender gaps persist. The uneven educational
37 achievement between genders and rural disparities present risks in transforming the large youth

1 population into productive human capital—a workforce that could improve global competitiveness of the
2 ESAP countries in providing trained labor.

3

4 **1.3.5 Migration: labor movements and capital gains**

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

18

19 Patterns of internal migration varied among countries of Asia, partly from variations in economic and
20 cultural structures (Guest, 2003). Rural-to-urban flows still dominated migration in most Asian countries
21 because of the high rural population. Women were increasingly involved, and their temporary emigration,
22 economically motivated, continued to be important. The rural-to-urban migration in China was obvious.
23 Social factors profoundly changed the system and the society (Asia-Pacific Migration Research Network,
24 n.d.). In China, Southeast Asia and India temporary migration increased. Studies in India indicate that
25 rural households migrated and improved their economic returns, in spite of the risks and family
26 disruptions. Rural women also migrated with adult males or in groups of women (Deshingkar and Grimm,
27 2005).

28

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

35

36 Migrants are key contributors to wealth in their home countries. Migrant remittances are an economic
37 benefit that reduce the incidence and severity of poverty in origin countries. The funds from migrants

1 directly increase recipients' income and improve household consumption. Remittances reduce household
2 economic shock in adverse times, such as crop failure and natural disaster (World Bank, 2006). Over the
3 last decade China, India and the Philippines have received the highest remittance flows. In small
4 economies remittances contribute significantly to foreign exchange funds in the receiving countries (World
5 Bank, 2006). In small Pacific Island countries remittances augment household and national economies.
6 Remittances to rural households supply capital for investment in small-scale agriculture or off-farm
7 enterprises. Human flight turns into financial benefit for the migrants' families and the origin countries.

9 **1.4 Human well-being**

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

16
17 Life expectancy for babies born in 2000–2005 is 67 years for all Asia, 75 years for the Pacific and 65
18 years for the world. This compares with industrial country life expectancy of 75 years and developing
19 country of 65 years. In Bangladesh, Bhutan and India life expectancy has increased by a decade or more.
20 The extreme is Bhutan, where life expectancy for babies born from 1980 to 1985 was 48 years, compared
21 with 63 years for those born from 2000 to 2005 (subchapter 1.3).

22
23 While the region gained remarkably in economic growth and trade links, poverty is still common. Poverty
24 perpetuates a cluster of insecurities in health, food and nutrition. In many ESAP countries, although
25 economic growth has led to substantial reduction in poverty, income increased unequally. In ESAP,
26 between 1990 and 2001, the number of people living on less than US\$1 a day dropped by nearly one-
27 quarter of a billion. In developing countries of the region the proportion of the population living below the
28 \$1-a-day poverty line was 22%, although for least developed countries it was 38% (UNDP, 2006). In
29 ESAP the least developed countries are Afghanistan, Bangladesh, Bhutan, Cambodia, Kiribati, Lao
30 People's Democratic Republic, Maldives, Myanmar, Nepal, Samoa, Solomon Islands, Timor-Leste, and
31 Vanuatu. It has become necessary to distinguish among “poverty”, “extreme poverty” and “deprivation”,
32 since the region still has extreme deprivation. In 2002, at the \$1-a-day measure, extreme poverty
33 estimates revealed that almost 690 million Asian were poor. Using a more “generous” poverty threshold
34 of US\$2 a day, 1.9 billion Asians were poor, with South Asia home to the most.

35
36 As measured by FAO, 16% of the Asia and Pacific region was undernourished, but this comprised 64% of
37 the world's undernourished population. Since 1995–1997, Asia and the Pacific have reduced overall the

1 number and prevalence of undernourished people. However, recently the number of undernourished
2 again increased. From 2001 to 2003, India had the most, 212 million, undernourished, followed by China,
3 150 million. The other Asia and Pacific countries together had 162 million undernourished (FAO, 2006c).
4 Girls and women in poor households were included in the “hunger vulnerable” group. Poor maternal
5 nutrition and health can be the hub of the vicious cycle that passes hunger from one generation to
6 another, with reduced capacity among children with low birth weights to be productive adults (FAO,
7 2005b). Nutritional deficiency among women and children in South Asia is a major crisis in the making.

8
9 On average, two out of every three malnourished children in the world live in South and Southeast Asian
10 countries (FAO, n.d.). Malnutrition and underweight prevalence in children under 5 years in developing
11 ESAP countries is about 31%, compared with 28% for all developing countries. In Bangladesh, India and
12 Nepal nearly 50% of children under 5 years are underweight. The estimated deaths per 1000 live births of
13 children younger than 5 years in 2002 was less than ten for Australia, Japan, Malaysia, New Zealand and
14 Singapore, and around 100 for India and Myanmar. Gains in nutrition have not been equitable in the
15 same country nor in the region, with many poor and landless not benefiting as much as the rest of the
16 population. In some cases, the use of chemicals and irrigation often associated with the Green Revolution
17 have had a negative effect on human health, through vector- and waterborne diseases, pollution of water
18 supplies and direct exposure to pesticides.

19
20 Sanitation, access to potable water and nutrition could be improved for about three-quarters of people in
21 urban areas and one-third of the people in rural Asia and some of the developing Pacific Island nations.
22 Most countries in Asia improved their sources of drinking water, but about 1 billion people still did not
23 have access to safe drinking water (WHO, 2004; WRI, 2005).

24
25 In recent times ESAP faced threats to human well-being from economic turmoil, epidemics, and ethnic
26 and political conflicts. Notable were the East Asian economic crisis of the late 1990s, severe acute
27 respiratory syndrome (SARS) in early 2000, increasing HIV incidence, and currently, the highly pathogenic
28 avian influenza. ESAP countries demonstrated resilience by coping or recovering from these crises to
29 achieve well-being targets, but the effects remain.

30
31 The East Asian economic crisis threatened sustainable growth that undermined economic, health, food
32 security and educational opportunities. In 1997/1998 millions of people fell below the poverty line and
33 created concerns over labor rights. Women in low-paid labor were most severely affected (Jones, 1998;
34 Heller, 1999). In 2003 a major threat came from the SARS outbreak. It affected the regional economy and
35 was contained within a year, illustrating the resiliency of the countries. Recently, HIV and avian influenza
36 have been significant threats to human well-being, with both health risks and economic consequences.

37

1 In 2006 about 8.6 million people lived with HIV in Asia, including 960,000 people who became newly
2 infected in 2005. In Oceania, about 7,100 people acquired HIV in 2006, bringing to 81,000 the number of
3 people living with the virus, three-quarters of whom lived in Papua New Guinea (UNAIDS and WHO,
4 2006). Women comprised 13% of adults with HIV in East Asia, the Pacific, and South and Southeast
5 Asia. In Cambodia, India, Japan, Papua New Guinea, Sri Lanka and Thailand, infection rates among
6 women aged 15 to 24 were higher than among their male counterparts.

7
8 The human welfare effect of HIV and AIDS on economic output was likely to be felt hardest in the
9 household. The economic impact was predicted to be severe where millions lived under US\$1 a day. Two
10 major causes for financial and material burden were a drastic increase in healthcare expenditures and
11 severe reduction in income of patients and caregivers. In a rampant epidemic, local economic loss can
12 accumulate and drag down national economic growth. Epidemics significantly affect the labor supply
13 (ESCAP, 2003). The labor loss in agriculture from HIV and its economic burden on rural households
14 affect rural economic viability and capacity to innovate. Another threat to human well-being has been the
15 avian influenza epidemic, a human health crisis that could have adverse global economic effects.

16

17 ***Agricultural livelihoods and poverty***

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

26

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

31

32 ***Alternative systems to access food***

33 Most of the developing countries in the region have a large population dependent on agriculture; the
34 region also has many food-deficit, low-income countries. The region is home to many hungry people and
35 rural poor. Farming systems include off-farm work as a livelihood strategy. Hence, the government and
36 external agencies such as the UN and nongovernment organizations deployed programs to improve
37 access to food and increase rural employment. The remarkable achievement in poverty reduction in

1 China and India have come from public investment in rural areas. Public investments, particularly in
2 human capital, physical capital, and science and technology, have been used to stimulate economic
3 growth and reduce poverty. This investment in rural areas, where most of the poor reside, has been
4 important in reducing rural poverty (Thorat and Fan, 2007). FAO recommended a twin-track approach to
5 quickly reduce hunger and poverty. One track would create opportunities for the hungry to improve
6 livelihoods and the second would require direct and immediate action to enhance access to food (FAO,
7 2002). These programs could take different forms, such as direct food assistance, food for work, and rural
8 nonfarm employment. Rural public works programs generate nonfarm employment and reduce poverty.
9 These programs would be complementary because they would mitigate income fluctuation (IFAD, 2002b).

10
11 Both food and cash transfers have increased household resources. The multidimensional nature of
12 malnutrition and the nonlinear link between food consumption and nutrition make it difficult to attribute a
13 nutritional outcome to either food or cash. A combination of food and cash transfers should be considered
14 more widely, especially if done under a national social protection program (Gentilini, 2007). Policies to
15 improve science and technology in rural areas, investment in rural areas to increase labor productivity,
16 improved access to nonfarm work and direct food assistance all help decrease rural poverty and improve
17 access to food. However, effective implementation and monitoring will require good collaboration among
18 the stakeholders involved.

19

20 **1.5 Trade**

21 **1.5.1 Agricultural GDP in ESAP**

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

31

32 **[Insert Table 1.3]**

33

34 The agricultural share in GDP and in total trade has declined over the last decades in many ESAP
35 countries, but it remains a significant source of employment, income and economic activity. The share of
36 agriculture in the GDP ranges from 14 to 57%, from Kiribati to Myanmar; agriculture and agricultural
37 products represent a large share of regional exports. Products include natural rubber, palm oil, rice, fruits

1 and vegetables, mainly exported to the United States, Europe and Japan. Imports are primarily cereals
2 and dairy products, mainly from the United States and Europe. Many countries in this region trade a large
3 share of their GDP, mostly in primary or processed primary products. Tariffs and market access are
4 important to East Asian exporters, but in the region, agricultural protection remains considerably higher
5 than industrial protection.

6
7 The economy of East Asia and the Pacific has grown rapidly and poverty has fallen. The GDP of this
8 region grew 8.5% in 2004. The number of East Asians living on less than US \$2 a day declined by about
9 250 million between 1999 and 2004. Countries in the region were on track to meet the Millennium
10 Development Goal for poverty reduction, although there was wide variation in progress across and within
11 countries. China exerted strong economic influence through trade and cross-border production networks.
12 China's growth helped strengthen economic integration within East Asia and increased the region's
13 integration into the global economy. Many countries were considering how to maximize the opportunity
14 China presented, while managing the challenges. High prices for natural resources, especially oil, likely
15 will slow growth in the years ahead. Several other risks also threaten to reduce the rate of growth.

16
17 Most of the population in South Asia depend on agriculture and related activities for their livelihood.
18 Despite more than five decades of policy commitment to industrialization, agriculture still is important for
19 most of the countries. All countries in South Asia are low and middle income (Table 1-3). The share of
20 agriculture in total GDP ranges from 18 to 40%, from Sri Lanka to Nepal.

21
22 The share of agricultural products in total exports has declined significantly over the past two decades.
23 However, in net foreign exchange earnings, agriculture is much more important than it appears in gross
24 export earnings. The decline in agriculture's share in total exports in these countries cannot be explained
25 solely by the rapid growth in exports of manufactured products. There is considerable evidence that the
26 region lost market share in several agricultural products in which they had comparative advantage,
27 because some countries hold a significant antiexport bias in their incentive structures. South Asian
28 agricultural exports have a significant share of world trade in only five products: spices, rice, tea, oilseeds
29 and jute. In all other major internationally traded agricultural goods, South Asia has less than 4% of the
30 market share.

31 32 **1.5.2 Trade flows: main players, commodities and partners**

33 ESAP countries' trade dynamics are vibrant and marked by complex and growing bilateral and multilateral
34 trade agreements. The Asian trade has gone global, with ESAP countries emerging as exporters and
35 importers. Cross-border agriculture trade has increased. In these countries agriculture trade is also
36 important in domestic economies and is driven by the increasing purchasing power of a growing middle
37 class. But aggregate data on agricultural domestic market effects are difficult to obtain and analyze, since

1 some trade happens informally and in rural and urban links. Hence, this subchapter focuses on
2 international trade in ESAP.

3
4 In import and export trade value, Japan, China, Australia, Thailand and South Korea are the top five
5 countries in ESAP, followed by Malaysia, Indonesia, India, New Zealand and Singapore. Japan with
6 US\$71 billion and China with US\$66 billion were also the leading traders in the world in 2004.
7 As for exports, China ranks fifth and Australia sixth in the world. They are the biggest exporting countries
8 in ESAP, followed by Thailand, Malaysia, Indonesia, New Zealand and India.

9
10 Japan is the biggest importer in the region, also the second biggest importer in the world, just behind the
11 United States. China is the biggest exporter and also one of the biggest importers in the region, ranking
12 fourth in the world. Other big agricultural importers are South Korea, India and Malaysia.

13
14 If the ASEAN countries are regarded as a group, the large traders in the region are China, Japan,
15 ASEAN, Australia, New Zealand, South Korea and India. The Pacific countries, even though copra and
16 cocoa beans are important, occupy only a marginal place in total trade value.

17
18 In products traded, Australia and New Zealand export mainly livestock products, especially mutton and
19 lamb, beef, milk products and wool. Indonesia and Malaysia export palm oil and rubber. Thailand,
20 Vietnam, Cambodia and India export a large amount of rice and fisheries products. The main world rice
21 exporters come from ESAP, especially from ASEAN countries. China exports mainly vegetables, fruits
22 and maize. India, Sri Lanka and China are the major world exporters of teas. The Pacific countries export
23 copra, cocoa beans and, to a lesser extent, raw sugar.

24
25 Japan, China and South Korea are the three biggest importers; Japan and South Korea import most of
26 their agricultural products, mainly cereals and meat products. Japan is low in food self-sufficiency,
27 importing about 60% of its supply. China and India import mainly land-intensive products, such as
28 soybeans, wheat, cotton and edible oils. Since Singapore has almost no agriculture, it relies almost
29 entirely on food imports.

30
31 Apart from internal trade among countries in the region, USA, Brazil and Europe were the main providers
32 of agricultural products to ESAP. The USA, Europe and Russia were the main destinations for ESAP
33 agricultural exports. However, trade within the region is important. For example, 66% of China's exports
34 go to Asia, Japan and Korea alone accounting for more than 40% of China's total export. ASEAN is also
35 an important trade bloc, with strong trade relations among members.

36

1 Australia and New Zealand had close trade relationships with Pacific countries; they were the major
2 exporters to these countries and the main importers from them. Australia has long been the major source
3 of imports for many of the Pacific Island economies and its importance has increased significantly, except
4 in Tonga and Vanuatu. For agricultural products as a whole, New Zealand had a relatively small import
5 share, except in Fiji, Samoa and Tonga, and that share declined in recent years.

6

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