

**CWANA Chapter 1 Graphics**

**Figure 1.1** CWANA region: a) countries; b) subregions. Source: ESRI's Arc View software supplemental map data, <http://www.esri.com/>.

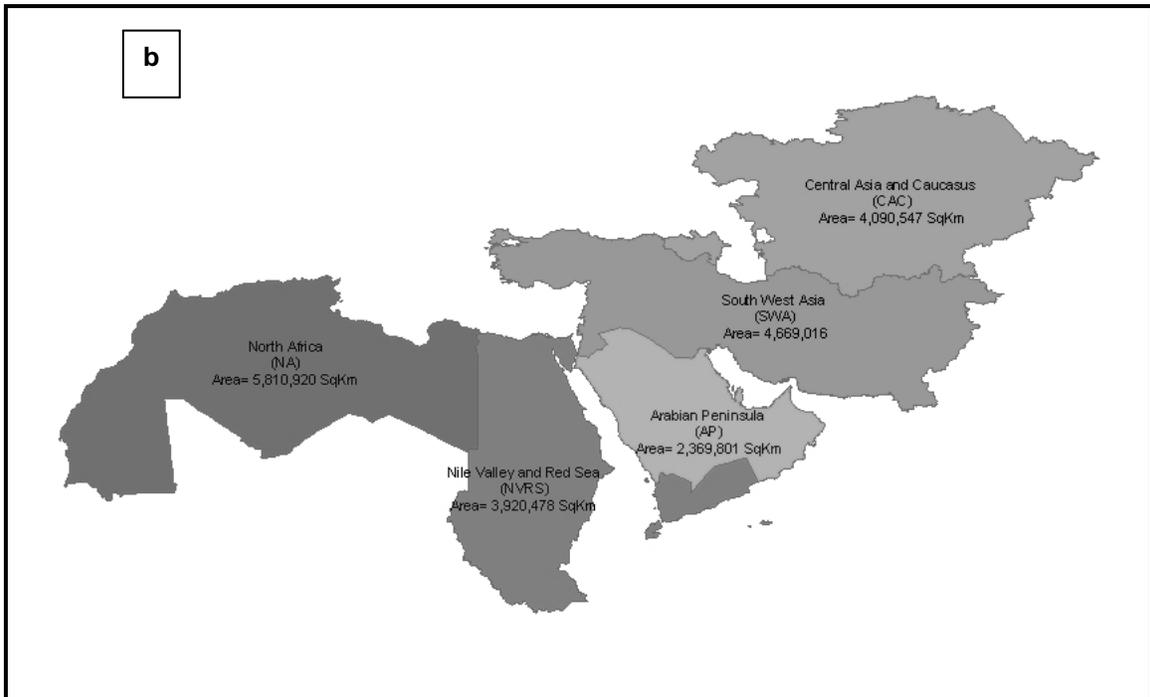
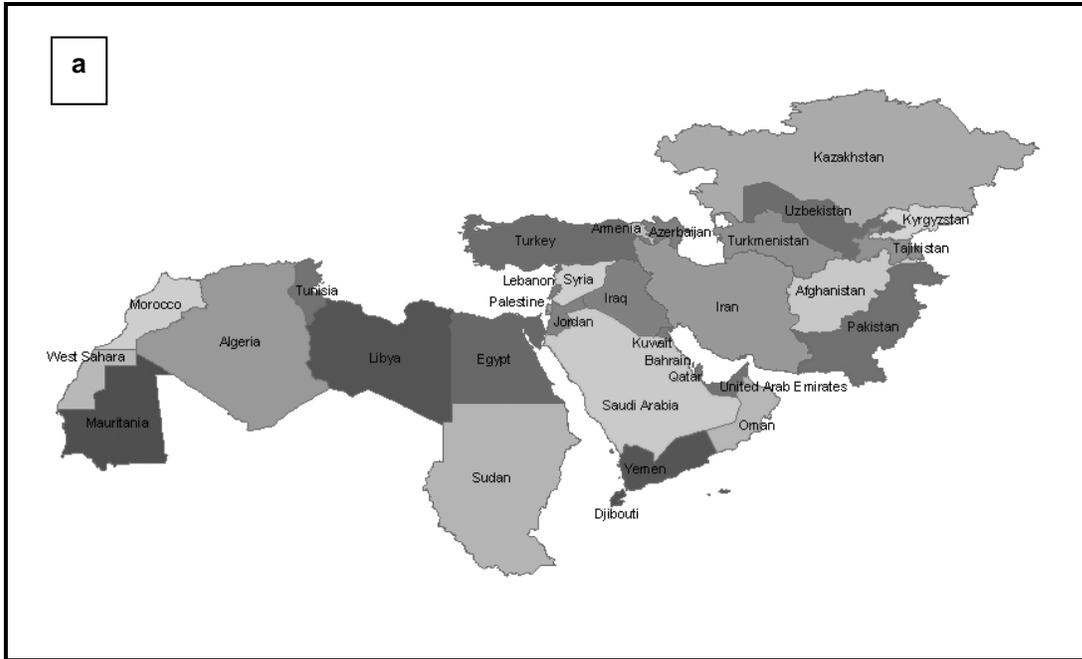
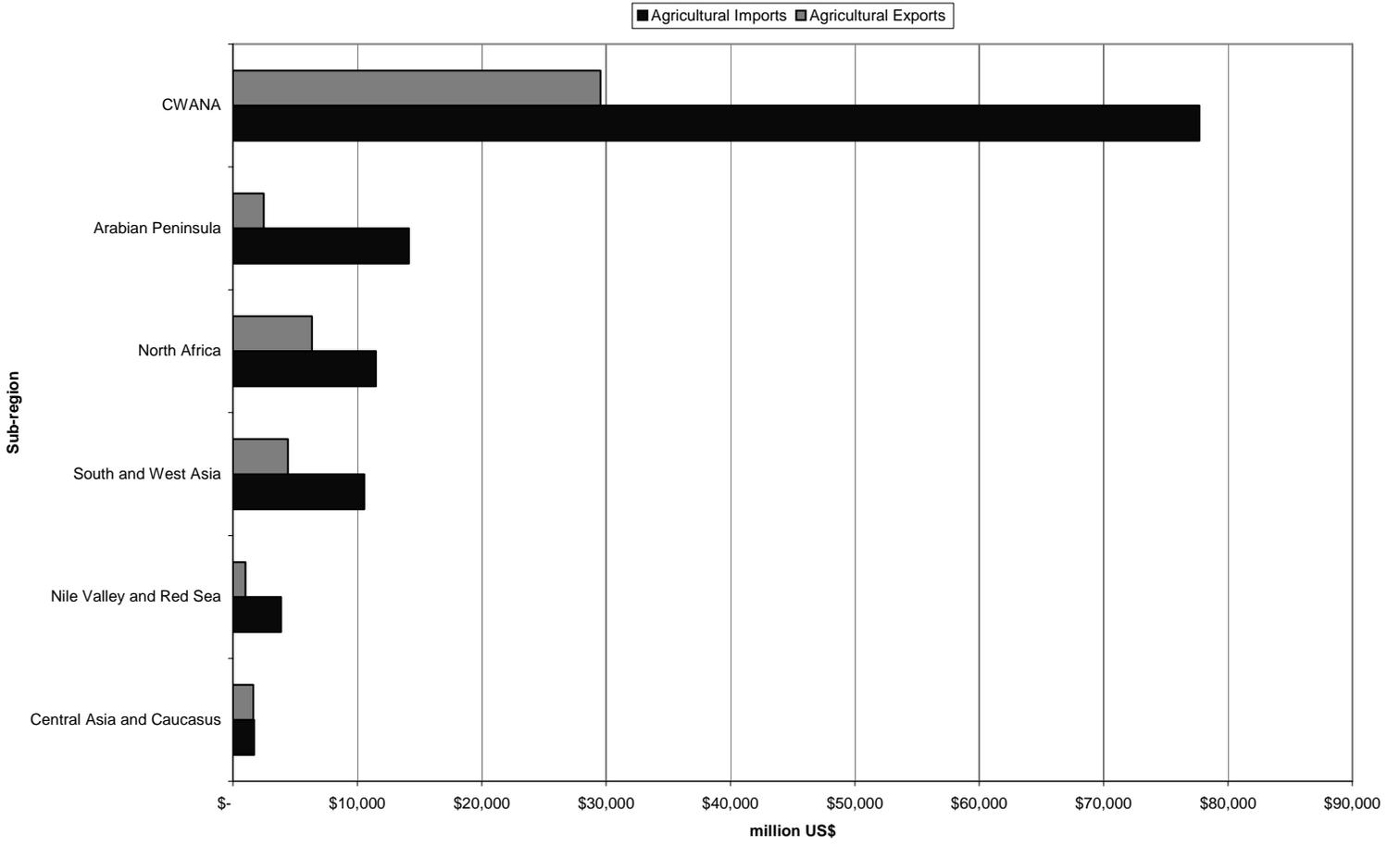
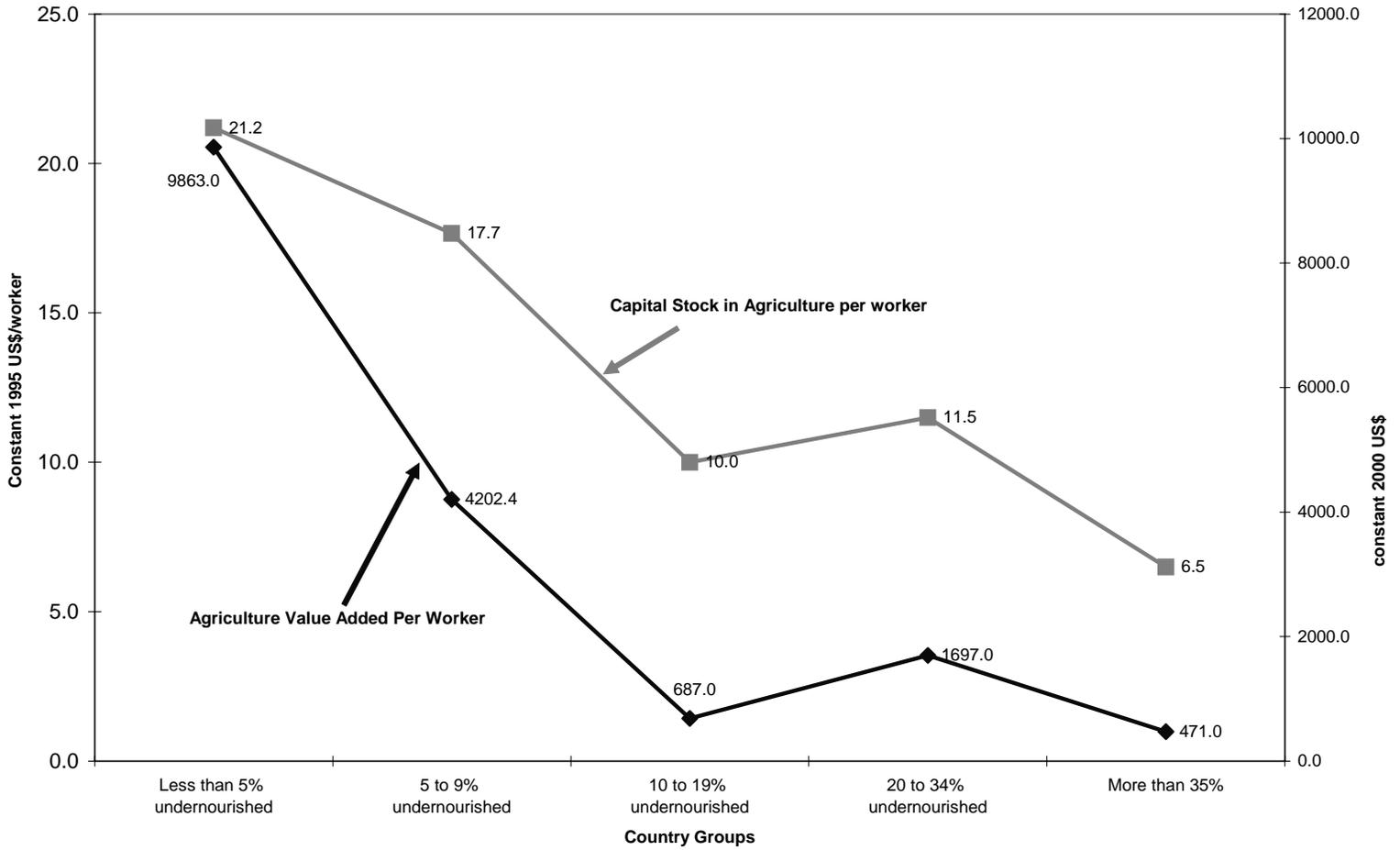


Figure 1.2 Agricultural exports and imports in the CWANA region (2002–2004). Source: FAO, 2006c



**Figure 1.3** Capital stock in agriculture per worker and value added per worker in groups of the 33 CWANA countries.  
 Source: FAO, 2006c.



Box 1.1 **Climate change: The Nile Delta and Darfur**

*The Nile Delta* is one of the oldest intensely cultivated areas on earth. It covers an area of about 25,000 km<sup>2</sup>. Almost 40 million inhabitants live in the delta. Deserts surround the low-lying fertile floodplains. The area is suitable for intensive agriculture. Most of a 50-km-wide land strip along the coast is less than 2 m above sea level and is protected from flooding only by a coastal sand belt 1 to 10 km wide, formed by discharge of the Rosetta and Damietta branches of the Nile. Erosion of the protective sand belt is a serious problem and has accelerated since the construction of the Aswan Dam.

Rising sea levels caused by expected global warming would destroy weak parts of the sand belt, essential to protect lagoons and the low-lying reclaimed lands. The impact would be serious. One-third of Egypt's fish catches are made in the lagoons. Sea level rise would change the water quality and affect most freshwater fish. Valuable agricultural land would be inundated. Vital, low-lying installations in Alexandria and Port Said would be threatened. Recreational tourism beach facilities would be endangered and essential groundwater would be salinized. Dikes and protective measures would probably prevent the worst flooding up to a 50-cm sea-level rise. However, it would cause serious groundwater salinization and the impact of increasing wave action would be serious (UNEP, 2002a).

*Darfur*: Ecological degradation in the Sudano-Sahelian ecozone, and especially in Darfur, mainly caused by climate change, has been so severe that the traditional means for preventing and managing interethnic disputes have been rendered virtually unworkable. Indeed, many of the current disputes are not being fought along traditional political borders, but along ecological borders (in this case the borders of the semiarid plains roamed by 'Arab' pastoralist nomads and those of the wet oases settled by 'African' fur farmers) that divide richer and poorer ecozones. To continue to treat the conflict in Darfur, and many other parts of Africa, as purely ethnic, tribal, political or religious, and to ignore the growing impact of ecological degradation and depletion of the resource base, will ultimately lead to a distorted understanding of the real situation, and consequently limit the possibility for genuine conflict resolution.

In Darfur, as in most other parts of the continent, the balance of soil, climate, water and flora upon which human and animal life depend has been upset. In addition to persistent drought (six over the last hundred years, three occurring in the last 20 years), unsustainable methods of land use, such as large-scale mechanized rainfed farming and overgrazing in marginal lands, are destroying the ecosystem. As a result of ecological deterioration and armed conflicts, millions of people have been forced to abandon their homelands and have become displaced—so many in fact that Sudan has the world's highest proportion of internally and externally displaced people, one in every five (El-Nour, 1992).

Climate change can dramatically affect livelihoods and ecosystems. In these regions, lying between isohyets 100-600 mm, even the slightest decline in mean annual rainfall could bring people and livestock to the brink of disaster. Along with the general decline in rainfall, vegetation stripped from large areas has allowed sand dunes to move, which in turn has killed almost all remaining plant life. There has been an increase in incidents of conflict corresponding with decrease in rainfall (Suliman, 2000). Social phenomena in the region must be analyzed within context of climatic and ecological transformations (Bachler and Spillmann, 1992; Suliman, 2000).

**Box 1.2** Disappearing Aral Sea waters

The Aral Sea in Central Asia has been deprived of water sufficient to maintain its water levels since the 1960s. The fresh water that used to sustain the sea has been used by neighboring countries to produce export crops. Large amounts of water from the two main rivers feeding the Aral Sea were diverted into the desert to irrigate about 2.5 million hectares. It used to receive about 50 km<sup>3</sup> of fresh water per year in the 1960s; by the early 1980s it received none. By the 1990s, the surface area of the Aral Sea had shrunk by half and its volume had gone down by 75 percent. Its salinity had increased fourfold, preventing the survival of most of the sea's fish and wildlife. The negative environmental results include fisheries loss, water and soil contamination, and dangerous levels of polluted airborne sediments. Commercially useful fish catches of about 40,000 tonnes annually have ceased. Soil salinity has affected about 40% of the irrigated land. The regional water table has fallen. Many oases near the shore have been destroyed. Winds have picked up and scattered salt- and pesticide-laced particles, devastating surrounding regions. By 1990, more than 95% of the marshes and wetlands had given way to sand deserts. Communities face severe health problems. Drinking water is polluted, chronic bronchitis and kidney and liver diseases have increased by 3000 percent. The infant mortality rate is one of the world's highest (Sources: UNEP, 1992, 1997, 2002b).

**Table 1.1** Characterization of major aridity zones in CWANA. Source: UNEP, 1997.

Zone type	Land area (%)	Location	Characteristics	Type of agriculture
Hyper arid	67.0	75% located in North Africa, Nile Valley and Red Sea subregions 25% in Arabian Peninsula and West and Central Asia	Low annual rainfall (0–100 mm) unequally distributed in time and space True desert Plain of loose red sand Scarce vegetation	Meager agricultural activities, except some irrigation on alluvial soils
Arid	7.5	West and Central Asia, Caucasus, Nile Valley and Red Sea	Total annual precipitation 100–300 mm Interannual variability rainfall range: 50–100% Short grass and sparse thorn scrub Wildlife—gazelles and reptiles Strong winds and summer thunderstorms causing sand storms	Nomadic grazing Opportunistic rain cropping and pearl millet in depressions and foothills Low carrying capacity Large irrigation schemes
Semiarid	17.3	North Africa Central Asia	Total annual precipitation 400–800 mm	Rainfed agriculture: cropland and permanent pastures Interannual variability in rainfall causes yield variation Cattle associated with rainfed agriculture Some supplementary irrigation schemes
Sub-humid	7.6	North Africa South Sudan Caucasus, Central Asia	Large variety of vegetation types Rainfall more than 800 mm a year Temperate climate to tropical climate	Productive rainfed farming Some plantation agriculture

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**Table 1.2** Total population, rural population, GDP PPP, human poverty index and human development index. Source: World Bank, 2006

Country	Total population in 1000 (2005)	Rural population (%)	GDP PPP in C1\$ (2003)	Human poverty index (2002) <sup>a</sup>	Human development index (2004) <sup>b</sup>
Afghanistan	25,971	76	na	na	na
Algeria	32,877	40	6,248	21.9	0.728
Armenia	3,043	36	3,607	na	0.768
Azerbaijan	8,527	50	3,606	na	0.736
Bahrain	755	10	na	na	0.859
Djibouti	721	15	2,144	34.3	0.494
Egypt	76,117	58	3,950	30.9	0.702
Iran	70,675	32	7,145	16.4	0.746
Iraq	26,555	33	na	na	na
Jordan	5,750	21	4,319	7.2	0.760
Kazakhstan	15,365	44	6,556	na	0.774
Kuwait	2,671	4	na	na	0.871
Kyrgyzstan	5,278	66	1,714	na	0.705
Lebanon	3,777	12	na	9.5	0.774
Libya	5,631	11	na	na	0.798
Mauritania	3,068	36	1,896	48.3	0.486
Morocco	32,209	40	4,012	34.5	0.640
Oman	3,020	21	na	31.5	0.810
Pakistan	161,151	65	1,971	41.9	0.539
Palestine (West Bank, Gaza Strip)	3,901	35	na	na	0.736
Qatar	627	8	na	na	0.844
Saudi Arabia	25,795	12	na	15.8	0.777
Somalia	10,742	64	na	na	na
Sudan	35,040	59	2,046	31.6	0.516
Syria	18,651	50	3,575	13.7	0.716
Tajikistan	6,356	76	1,119	na	0.652
Tunisia	10,042	36	7,083	19.2	0.760
Turkey	73,301	33	6,749	12.0	0.757
Turkmenistan	5,014	54	5,884	na	0.724
United Arab Emirates	3,107	15	na	na	0.839
Uzbekistan	26,410	63	1,737	na	0.696
Yemen	21,481	74	889	40.0	0.492
Total	723,628				

PPP – purchasing power parity; C1\$ – constant USD; na = not available

<sup>a</sup> scale of 1–100; <sup>b</sup> scale of 0 to 1

**Table 1.3** Agricultural GDP as share of the total GDP and major imports. Source: FAO, 2005

Country	Agricultural GDP as share of total GDP (%)	Major imports
Afghanistan	–	–
Algeria	10	Wheat, dry cow's milk, maize
Armenia	26.2	Wheat
Azerbaijan	–	–
Bahrain	0.7	Chicken
Djibouti	3.7	Wheat
Egypt	16.8	Wheat, maize, cake of soy beans
Iran	12.1	Wheat, oil of soybeans, rice milled
Jordan	2.2	Wheat, maize
Kuweit	–	–
Kyrgyzstan	38.6	Wheat
Lebanon	11.0	Cattle
Libya	–	Flour of wheat, paste of tomato, wheat
Mauritania	20.8	Sugar, oil of soybeans
Morocco	16.1	Wheat
Oman	3.2	Dry whole cow milk, rice milled
Pakistan	23	Oil palm
Palestine	–	–
Qatar	–	–
Saudi Arabia	5.1	Barley, sheep, rice
Somalia	–	–
Sudan	39.2	Wheat
Syria	22.6	Sugar, maize
Tajikistan	24.3	Beef and veal, sugar, wheat
Tunisia	10.3	Wheat, maize, barley
Turkey	13.1	Cotton, skins, tobacco leaves
Turkmenistan	28.8	Sugar
United Arab Emirates	3.6	Rice milled
Yemen	15.2	Wheat, sugar, oil palm

**Table 1.4** Percentage of cultivated area that is irrigated, type of land and water management for major production systems in North Africa and the Middle East. Source: FAO and the World Bank, 2001.

Production system	Cultivated area irrigated (%)	Type of land and water management
Irrigated farming system		
Large-scale irrigated subsystem	100.0	Large-scale irrigation Intensive year-round cropping: cropping intensity 120–160% Large-scale centralized management of water access and distribution Water access and distribution managed centrally but land attributed to many tenants (0.5–5 ha) organized in water-user associations Large-scale fully irrigated individual schemes
Small-scale irrigated subsystem	Low percentage	Traditional irrigation practices Small units (0,02–1 ha)
Highland mixed farming system	23.0	Supplementary irrigation in summer for vegetables or high-value fruits (source of water)
Rainfed mixed farming system	4.3	Supplementary irrigation in summer for vegetables or flowers
Dryland mixed farming systems	18.0	Small irrigated areas grown in vegetables
Pastoral farming system	1.0	Small-scale irrigation (1–2 ha)
Sparse (arid) farming system	0.1	Irrigation schemes set up in oases
Coastal artisanal fishing system	–	–
Urban-based farming systems	High percentage	Family gardens

**Table 1.5** Croplands per capita and CWANA land use -- 1994. Source: WRI et al., 1998.

Subregion	Croplands per capita (ha)	Cropland (million ha)	Permanent pasture (million ha)	Forests and woodlands (million ha)
North Africa	0.330	25	108	18
Caucasus	0.264	6	48	6
West Asia	0.260	12	13	0.8
Central Asia	0.244	75	91	37
Nile Valley	0.156	19	169	60