

II. Poverty, Productivity, and Trade

In this chapter, we discuss three key issues that are intricately linked and that affect water, food security and agricultural policy in the MNA region. The three key issues are: poverty and social dimensions of agriculture, agricultural productivity, and agricultural trade.

2.1 Poverty and Social Dimensions of Agriculture

After the deep recession faced by the region in the 1980s, wide ranging economic reforms have been implemented in the 1990s aimed at tightening demand, liberalizing trade and improving the regulatory framework in which the process of development was being implemented. Those reforms gave a significant boost to growth with an average annual GDP growth around 3 percent (World Bank, 2000) and have started putting the foundations of a market-based economy where the private sector is called to play a more prominent role.

Despite these signs of economic recovery, the region still suffers from the burden of an inefficient public sector, high levels of unemployment, substantial poverty, slow steps in global and regional integration and a mounting pressure on its natural resource base as a result of population growth, urbanization and demand changes. All these challenges are related in one way or another to the performance of agriculture, a sector still significantly contributing to growth and employment. While some of these challenges have directly or indirectly hindered the development of the sector, others are the result of its inability to achieve substantial jumps in productivity. In the context of the MNA region, it is nevertheless difficult to dissociate the causes from the consequences of the limited agricultural potential reached thus far.

The limited progress achieved in the agricultural sector has important implications with respect to the fight against poverty, considered as an important dimension of the development agenda in the region. Research efforts are particularly needed on this front because of the mixed messages given about the region from the various assessments made on poverty patterns. Poverty in MNA though limited relative to other developing regions has been increasing, except for Tunisia and Morocco, since the early 1980s in absolute terms (van Eeghen, 1995) but the percentage of poor people has gone in different directions depending on the period considered⁵. A closer examination at the trends for recent years show that poverty is more pronounced in the rural areas where 70 percent of the poor people while only 43 percent of the population is supported by the rural areas (Table 3). However, we also observe that in some countries urban poverty is increasing. This can also be considered a consequence of increasing rural poverty because poor families in rural areas often send members into cities to supplement their rural incomes. However, without the necessary skills, most migrants end up in menial jobs in urban cities, joining the ranks of the poor in urban cities. Thus, rural poverty has far-reaching

⁵ Examples of conflicting assessments include findings for an increasing trend in the second half of the 1980s as in Hamdan (1996) and referenced in Doraid (2000) and findings for a decreasing trend between 1985 and 1994 as in van Eeghen and Soman (1995).

consequences well outside the rural space. Taking other indicators of poverty besides the standard income and expenditure based measures, the MNA region does not fare well when it comes to the concept of “poverty of opportunity”, an indicator measuring access to basic services (van Eeghen and Soman, 1998). All these various elements seem to indicate that earning opportunities in rural areas are disappearing and that key human development factors have been impeding the development of agriculture and rural areas in the region.

Though there exists extensive theoretical and empirical evidence on the positive impact of growth on poverty reduction, the link between growth and improved equity in income distribution is rather ambiguous. While income distribution at the national level is relatively equal in MNA countries as compared to other developing countries⁶ (van Eeghen and Soman, 1998; Rodriguez, 1998), the increasing gap between rural and urban raises important concerns with respect to income distribution as it relates to geographical location (urban v. rural) and agro-ecological characteristics (high potential v. low potential agriculture). Looking at the experience with government programs for poverty reduction and their effectiveness (van Eeghen and Soman, 1998; Kossaifi, 1998) the region tends to allocate huge sums to social programs (2.5 percent of GDP on average) that have proven overall to be inefficient in lifting all the poor people out of poverty because of the high degree of leakage and their inadequate and difficult targeting scheme. Food and consumer subsidies have proved to be a major drain on governments (1-2 percent of GDP) and have benefited the urban areas more than the rural areas while public works programs have had lower financial endowments but with a higher impact on the poor and the rural areas (e.g. Tunisia and Morocco). With the existing poverty patterns, increases in income inequalities have generated some social tensions that could prove to be detrimental to efforts to spur growth. As current poverty reduction programs are being challenged on efficiency and inequality reduction grounds and alternatives sought, the challenge for policy makers is to identify policies that could promote growth without worsening income distribution.

⁶ Using Gini coefficient estimations for the mid nineties, income inequality in the MENA region was found to average 38.03 percent. In comparison, MENA fares better than Sub-Saharan Africa (46.95 percent) and Latin American and the Caribbean (49.3 percent) but has more income inequality than the industrial countries (28.94 percent). Its performance is similar to other developing regions such as East Asia and the Pacific with 38.09 percent or South Asia with 31.88 percent (Rodriguez, 1998). Within the region and, Algeria (38.70 percent in 1988), Morocco (39.57 percent in 1991) and Tunisia (40.23 percent in 1990) have lower inequality levels than Jordan (43.3 percent in 1992) based on World Bank data (van Eeghen and Soman, 1998).

Table 3. Population below National Poverty Line (%)

	Survey Year	Rural	Urban	National	Survey Year	Rural	Urban	National
Algeria	1988	16.6	7.3	12.2	1995	30.3	14.7	22.6
Egypt	1981	24.2	22.5	26.0	1995-96	23.3	22.5	22.9
Jordan	1987	23.7	16.6	18.7	1997	18.2	10.0	11.7
Morocco	1990-91	18.0	7.6	13.1	1998-99	27.2	12.0	19.0
Tunisia	1990	13.1	3.5	7.4	1995	13.9	3.6	7.6
Yemen	1992	19.2	18.6	19.1	1998	26.9	21.8	25.4

Note: Rural poverty (urban) rate is percent of rural (urban) population living below the national rural (urban) poverty line, National poverty rate is percent of population living below poverty line deemed appropriate for the country by its authorities.

Source: World Bank, 2002a

Since agriculture is the main industry in rural areas, agricultural development is key to successful rural development. Conversely, mismanaged agricultural policies will have a direct impact on the lives of rural people, in particular the rural poor who are most vulnerable to shocks and/or disasters. In the MNA region, where arid and semi-arid areas account for 85 percent of the land area and contain 60 percent of the population, the vicious cycle between rural poverty, unsustainable agricultural practices and environmental degradation is especially reinforcing.

Since agriculture is the predominant industry for the rural population, low agriculture productivity is a major hindrance to rural development. In this context, three main policy areas have been identified as major obstacles to agricultural development and thus contributing to rural poverty: pricing, land tenure, and drought management.

Pricing Policy

Overall mismanagement of various policies dealing with both input and output prices in agriculture contribute to rural poverty in a substantial way. When prices do not reflect the actual scarcity and are artificially set, over-consumption and under-supply tend to occur. Heavy subsidy for producers of “strategic crops” such as wheat, sugar, oilseeds, beef and dairy products as well as on irrigation water are common pricing policies in the MNA region. Producer subsidies for these “strategic crops” are often justified by a policy of promoting self-sufficiency. By encouraging the production of crops in which countries have little comparative advantage, public support which could otherwise have been channeled towards crops with clearer comparative advantage are being used inefficiently. Furthermore, targeting mechanisms are generally weak and therefore, subsidies tend to benefit middle and high income producers rather than poor ones who have limited access to markets or state purchases.

Producer subsidies often take the form of guaranteed minimum prices, obligatory delivery and collection prices given by state monopolies or floor prices with a premium over reference prices based on production costs or international prices. The producer subsidy of bread wheat in Algeria and Saudi Arabia are well-known to be especially high, at almost double the world price. Such producer subsidy policies not only distort investment decisions but impose a large burden on government expenditure. For

example, in Algeria, one-third to one-half of the public expenditure in the budget of the Ministry of Agriculture and Fishery are allocated to financing the price support program for wheat. Table 4 shows the share of agriculture expenditures in total government functional expenditure. Agricultural expenditure ranges from 7.4 percent to 27.4 percent of total government expenditure in select MNA countries.

Table 4. Share of agriculture in total functional expenditures share (%)

	Agriculture expenditures (%)	Total functional expenditures (%)	Share of agriculture in total functional expenditures (%)
Egypt	5.27	31	17.00
Iran	2	27	7.41
Jordan	3.79	34	11.15
Morocco	4.15	33	12.58
Tunisia	8.23	30	27.43
Yemen	7.82	42	18.62

Source: IMF, 1999

Indirect subsidy on irrigation water is another commonly prevalent policy despite the fact that the MNA region is the most water scarce region in the world. Cost of water for irrigation is set at below cost recovery levels in the MNA countries. In some extreme cases such as Algeria, current tariffs are equivalent only to 1 to 7 percent of the marginal cost of water depending on source and loss assumptions (World Bank, 2002a). On-farm water use efficiencies in the MNA region are low⁷ and this is partly due to low/negligible irrigation tariffs that discourage its efficient use as an economic input in competitive and profitable agricultural production and ultimately threatens the sustainability of this scarce resource. Region-wide, only 30 percent of the water used in flood irrigation ever reach crops. As a consequence of such inefficient use of water, reserves are quickly being depleted. For example a typical farmer near Sana'a, Yemen has deepened their well by 50 meters over the last 12 years while the amount of water they can extract has dropped nearly two-thirds (World Bank, 2002a).

Economic theory argues that only when the price paid for a commodity reasonably reflects the true price can market forces work for efficient distribution. In other words, subsidized water leads to waste in agricultural practices, little incentive for research and development of conservation techniques and practice, and too much water allocated to agriculture as opposed to industry where contribution to GNP per unit of water is often much higher. The primary alternative to quantity-based allocation of water is incentive-based allocation, either through volumetric water prices or through markets in transferable water rights. Empirical evidence shows that farmers are price-responsive in their use of irrigation water. The four main types of responses to higher water prices are use of less water on a given crop, adoption of water-conserving irrigation technology,

⁷ While inefficiencies seem to imply the potential for huge savings from existing irrigated agriculture, the potential savings in many river basins are not as dramatic, nor as easy to achieve because much of the water "lost" from irrigation systems is reused elsewhere (Seckler, 1996). For example, estimates of overall water use efficiencies for individual irrigation systems in the Nile Basin are as low as 30 percent, the overall efficiency of the entire basin is of the order of 80 percent.

shifting of water applications to more water-efficient crops, and change in crop mix to higher-value crops. However, this has to be balanced against the fact that for most countries in the world, water price elasticities in agriculture are very low, and the MNA region is no exception (See Table 5)

Table 5. Comparative Water Price Elasticities

Region/Country	Domestic	Industrial	Agriculture
Latin America	-0.40 to -0.50	-0.70 to -0.80	-0.07 to -0.12
SSA	-0.45 to -0.55	-0.60 to -0.8	-0.10 to -0.15
West Asia/North Africa ⁸	-0.44 to -0.57	-0.75 to -0.85	-0.10 to -0.20
South Asia	-0.35 to -0.40	-0.65 to -0.75	-0.08 to -0.11
Southeast Asia	-0.35 to -0.45	-0.65 to -0.80	-0.09 to -0.12
Japan	-0.22	-0.45	-0.04
United States	-0.30 to -0.50	-0.45 to -0.72	-0.08 to -0.14

Source: Rosegrant et al, 2002. Ranges indicate different river basins or subregions. SSA – sub-saharan Africa

Despite the declining per capita water supplies in the region, water charges in irrigation are typically well below even the inadequate levels of the municipal sector and, in contrast to the municipal sector, many governments are unwilling to accept even the principle of irrigation cost recovery. Irrigation and other subsidies are often rationalized as a means of offsetting low farm prices controlled to keep down urban food prices. In Jordan, irrigation tariffs were last raised in 1995 from 6 fils/m³ (US\$0.01/m³) to 15 fils.m³ (US\$.02/m³) as part of the Agriculture Sector Adjustment Loan conditions which covers only 62 percent of O&M costs. A rational tariff policy to at least recover the Jordan Valley Authority's (JVA) O&M costs is an urgent priority if government fiscal burdens are to be reduced. (World Bank, 2001). Egyptian agriculture, unlike other countries in the region, is entirely dependent on irrigated land. The government now provides irrigation water free except for cost recovery of on-farm investment projects. Annual irrigation subsidies are estimated at US\$5.0 billion in Egypt (Bhatia and Falkenmark, 1995).

The fact that a significant portion of the labor force is involved in agriculture in the region is an important consideration for any policy intervention. It is important that the policies be designed to reduce water consumption to sustainable levels while at the same time ensuring adequate jobs and increasing economic returns. Economic incentives should be designed to support these objectives. An approach to meeting these objectives might result in an overall reduction in irrigated area, but a conversion to higher-value, more labor intensive crops and agro-processing. However, poor wheat farmers with small plots will have major difficulties in successfully navigating this transition. Diversification should be complemented by other support services - market information systems and market access are critical to promote diversified cropping. Development of agricultural markets can drive investment and productivity in irrigated agriculture. At the

⁸ Includes Turkey and Cyprus.

household level, market development can help drive irrigation modernization and improve water productivity. It can promote investment, generate growth through diversification and productivity gains, increase and diversify incomes, provide employment, and reduce the cost of food and increase its availability. Market development can promote more efficient and less water-intensive crop management practices and higher-value cropping patterns—fruit, vegetables, flowers. The Government of Jordan (GOJ) has promoted a policy environment that is designed to promote exports and attract direct foreign investment. Continuing the reforms made in the agricultural sector, GOJ is now seeking to prepare the basis for the modernization of Jordanian agriculture from its current high water consumption but relatively low value-added terms to GDP to one that maximizes this scarce factor through promotion of horticultural exports. Even though horticultural production grew by 29 percent in 2000, about 25 percent of the total produce was wasted because of lack of adequate exporting outlets. GOJ is now increasingly cognizant of the need to improve quality and standards to break into the lucrative EU market. These call for substantial improvements in produce quality in terms of better standards of production, post-harvest handling, packaging and preserving the integrity of the cold chain. GOJ also recognizes the need to improve market information and logistics to monitor demands. Through a World Bank-financed project⁹, GOJ is now looking to address the key challenge of linking small and medium-scale farmers with the reliable large-scale farmer-exporters by way of incentives, timely marketing information and support services and systems.

Governments should also encourage investments in rural infrastructure (especially roads), communication systems and storage. An assured and stable market, and readily available inputs and credit, are essential to sustain agricultural diversification. Another key public investment is in research, development, and extension or technology transfer, which need to be carried out in partnership with professional and commercial bodies. Extension programs with relevant up-to-date information on irrigation techniques, agronomic practices and economics are enormously beneficial to farmers. A third area is in the proactive development of farmer-market links, a difficult area for governments because this is essentially a market-driven private activity, but one where business-oriented NGOs have some comparative advantage (World Bank, 2004; 2006). Public private partnership (PPP) approaches (example Egypt and Morocco) that involve the private sector, produce economies of scale and with high labor requirements could very well achieve these objectives. These recent developments in private public partnerships in Egypt and Morocco that involve the production and processing of fruits and vegetables for export to the EU have demonstrated the scope for innovating, although private sector investment in large scale irrigation for smallholders is likely to remain limited. Another recent initiative by IFC's Advisory Services concerns the new PPP being developed for the Government of Brazil, through its agency CODEVASF, that intends to transfer the PONTAL project land to the private sector for development into intensive irrigated agriculture. The land at PONTAL is not currently irrigated. CODEVASF also intends to transfer the operation and maintenance of the existing partially built irrigation infrastructure to a qualified private sector operator. The operator will commit to complete additional irrigation

⁹ Horticultural Exports Promotion and Technology Transfer Project, Report Number 24428-JO, Project Appraisal Document, June 25, 2002, World Bank, Washington, D.C.

infrastructure as required to develop over time PONTAL's approximately 7,897 hectares. The project is located in the Municipality of Petrolina (state of Pernambuco), a region with a proven track record of success in fruit production and agribusiness exports, near other irrigated projects developed by CODEVASF. This is different from the Morocco Guerdane or the Egypt West Delta Irrigation PPP projects where the terms of the concessions relate to the construction and management of the irrigation infrastructure only.

The dominant constraint on any cost recovery scheme is socio-political resistance rooted in equity concerns. However, studies in Egypt have shown that even a fee covering just O&M costs would be equivalent to 1-2 percent of gross farm revenue, 3 percent of net farm revenue (including return to family labor) and 3-4 percent of total costs. Similar figures for a fee covering both O&M and capital costs are 3 percent of gross revenues, 5-6 percent of net revenues or 6-7 percent of total costs (World Bank, 1992). While such cost increases are not insignificant, they are well within the farmer's capacity to pay especially considering that real net farm incomes have risen by about 40 percent since 1984. In Morocco, irrigated areas comprise about one million hectares which account for 13 percent of cultivated area and account for 45 percent of value added and 75 percent of exports. However, the policy of supporting prices for the big import-substitution crops (cereals and sugar) has a powerful impact on resource allocation, production and competitiveness of the irrigated areas that constitute the country's most dynamic creator of agricultural value added. Thus, nearly 40 percent of irrigated lands are currently occupied by cereals for which there is no proven comparative advantage. The orientation of agricultural policy also favors the continued cultivation of sugar-producing crops in regions that do not appear to have any comparative advantage for those crops. The absence of a true profit constraint weighing on the public sugar refineries creates a bias, through the price paid to producers, in favor of these crops at the expense of other alternatives such as market gardening, fodder crops, and legumes. The current incentive structure leads to intensive water utilization for the production of import substitution crops, even though their production is far from economically profitable. The financial returns on these crops, artificially maintained by high border protections and guaranteed prices and markets, prevents the reallocation of this scarce resource towards more labor-intensive export crops (e.g., horticultural crops) and those with higher-value added for which Morocco does have a proven comparative advantage. They represent a comparative advantage for the country, allow for more efficient use of water and are more labor-intensive. (Aloui, 2002; World Bank, 2001b).

These costly producer support policies affect the lives of the poor in three major ways: 1) by encouraging strategic crop production over production of crops with comparative advantage which could increase the incomes of households engaged in agriculture, 2) increased water use contributing to accelerated environmental degradation which leads to lower long-term productivity and 3) agricultural subsidies taking away public support from other social services such as education, health and social protection. Irrigation prices do not play a role in allocation of water in Morocco but informal water markets have emerged in some areas that value water more accurately. (See Box 1)

Box 1. Water Markets in Morocco

Although Morocco had a long tradition of water-rights markets to deal with allocation issues, the implementation of the public ownership provision and the prohibition of water rights independent of land made all formal water markets obsolete. They closed, but informal water markets emerged whenever the need to adjust allocations locally was perceived. These informal markets are located in regions where traditional irrigation and water rights were prevalent.

In the Nfis perimeter, a large-scale irrigation perimeter with low pressure distribution at the farm gate, the official rate for irrigation is lower than the farmers' perceived value. The Regional Agricultural Development Offices (ORMVA) allocates quotas based on irrigated land area. The farmers buy and sell quotas and informally tell the network managers about their transactions. Distribution is then revised accordingly.

In the Haut Ziz perimeter, the same arrangement is used, although the network is based on gravity distribution. Two kinds of transactions occur: the pumping stations sell their water and use the network for transport; the owners of rights to dam water also sell and buy rights. The network management accommodates the transport and the use of water rights, although these are not officially recognized.

These arrangements are designed to overcome the constraints on allocation flexibility in the official settings. They are seen as a major instrument for overcoming rigidities in the water allocation process at the macro level.

Source: Pricing Irrigation Water, Tsur et al, 2004

However, for water markets to play a more effective role in improving allocation of scarce water resources, it is imperative to have a system of formal and structured **water rights**. International experience has shown that the following principles are emerging that are being applied to water use rights systems across the world (World Bank, 2003):

- Recognition of the underlying public ownership of water resources
- A right to reasonable water use for basic human needs (without license)
- All other uses of water subject to grant of a license or appropriate instrument
- Rights issued for a limited duration
- Transparency (e.g., public registers of rights)
- Customary rights changing to specified rights (with or without a license)
- Provision for transferability of water use rights
- Customary rights within irrigation schemes managed by farmers' organizations
- Public participation in licensing processes

The experience of Mexico is illustrative of the problems faced in the implementation of a practical water rights system. It is relevant to many of the MNA countries since it is also a strongly groundwater-dependent country. To introduce water use rights, the Mexican Government introduced a public water registry. In the National Water Commission, a special office was established to register water use rights (concessions/titles). In theory, the record includes both quantity and quality. However, the model proved to be too cumbersome for both water users and regulators to manage. Originally, the nation-wide registration was supposed to take only a year, but it has taken nearly a decade to complete 90 percent of the registration as of 2003. The meticulous procedures to prevent corruption eventually became the cause of non-transparent judgment by the bureaucracy, which in

turn has fostered corruption. Furthermore, market mechanisms only work if the government has tight control over water measurement and abstraction, and good monitoring – the reality was that the government had neither. Australia is another country whose agro-ecology is similar to the arid MNA region. Here, water resources are vested in the states (not nation). All states and territories are in the process of strengthening property rights and removing restrictions on water trading consistent with the national competition policy and national agreements on water resources. Water use rights are only one part of the overall scope of water resource management, and must be developed and implemented inside the framework adopted by each country for this water resource management. Design of a water use rights system should reflect the four pillars of good governance – accountability, transparency, predictability and participation by external entities.

Land Tenure Policy

Land tenure issues have been identified as a major impediment to agricultural growth in the MNA region. The first issue concerns land fragmentation. In many countries, successive land reform and land distribution have taken place resulting in land fragmentation. For example, Table 6 shows that in Egypt more than 90 percent of land holders own land smaller than 1 hectare. Similarly, in each of the five countries surveyed (Algeria, Egypt, Jordan, Saudi Arabia, Tunisia), more than half of all land holders own land that is smaller than 5 hectares. Land fragmentation is an impediment to agricultural growth because small land holdings make mechanization and investments in new technologies infeasible. Some countries such as Iran have policies to encourage the establishment of farmer cooperatives to achieve economies of scale in production and marketing. In November 2000, there were 752 Rural Production Cooperatives, or RPCs, all over the country, and this number is planned to rise to 1700 by the end of 2005. In addition to awareness campaigns, GOI provides financial incentives for the establishment of cooperatives. To encourage land consolidation, Government finances the necessary studies, including land consolidation design, as well as land leveling, road construction, and the irrigation network. However, the success of cooperatives has so far been limited to certain areas due to socioeconomic and technical constraints. (World Bank, 2001d)

Table 6. Agricultural Land Size

		Less than 1 ha		Less than 5 ha	
		Holders (%)	Area (%)	Holders (%)	Area (%)
Algeria	1985	--	--	74.05	29.11
	1993	--	--	61.61	14.18
Egypt	1982	95.40	52.90	97.92	63.63
	1985	95.40	53.92	97.80	64.41
	1987	95.29	53.03	97.79	63.43
	1990	95.80	56.35	98.08	66.05
	1994	95.97	57.09	98.22	66.73
Jordan	1975	24.30	1.07	63.47	13.63
	1983	30.39	1.66	71.81	18.57
Saudi Arabia	1979	36.32	2.64	74.98	14.34
	1982	--	--	72.34	7.48
Tunisia	1986	--	--	45.73	7.48
	1990	11.81	0.41	49.73	8.46
	1995	17.32	0.61	53.28	9.05

Note: “—” is n.a.. Data for Algeria is for private owned farms only (does not include socialist agricultural fields (DAS)). For Egypt, the category “less than 1 ha” should be replaced with “less than 2.1 ha”, “less than 5 ha” with “less than 4.2 ha”.

Source: Arab Organization for Agricultural Development, 1996

The second land issue concerns the skewed land distribution in some countries. For example, in Tunisia, 53 percent of landowners occupied only 9.1 percent of total cultivated land in 1995. de Janvry and Sadoulet (1993) find, in the context of Latin America, in cases where land and income are unequally distributed, only a handful of large landowners benefit from the income effects of agricultural growth and that there is pressure on small landholders to be “pushed” out of agriculture to non-farm sectors. Adams (1999) finds similar results for the case of rural Egypt. Thus, although land tenure policies, especially land distribution issues are politically sensitive and thus difficult to implement, evidence seems to show that they greatly affect the objective of achieving rural development.

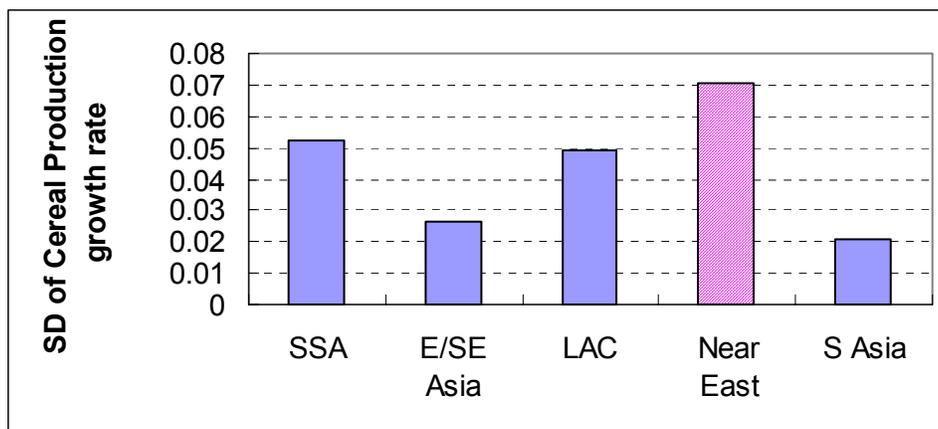
Finally, in some countries, lack of land titles and registration limit farmers’ access to formal credit as well as leads to unsustainable exploitation of the land. For example, in Algeria, farmlands formerly owned by the state were distributed to individuals and collective farms in 1987 to form individual private farms and collective private farms. However, the preoccupation of the central authorities to maintain viable farm sizes and prevent fragmentation and parcellization has been slowing the process of establishing official ownership rights (“actes administratifs”) for these lands. Traditionally private sector farms (“melks”) have also faced the same problem of lack of official deeds due to the fact that only 600 out of a total 1,541 communes had cadastres (World Bank, 1994).

Drought Management

Due to its arid climate, most parts of the MNA region experience frequent droughts. In recent years, Morocco suffered from drought during 1980-85 and in 1990-95, Tunisia in 1982-82 and then again in 1993-95, and several countries during the three year period of 1998-2000 (FAO, 2002b). FAO identified Iran, Iraq, Jordan, Morocco and Syria as being most affected by drought during this period. Droughts cause a major reduction in agricultural output mainly in rainfed areas but also in irrigated areas where inflow into reservoir will be reduced. Dramatic changes in climatic and hydrologic features in recent years have affected the economies of the region and specifically those of the dry areas where rainfed agriculture is the dominant activity and the only source of income for a majority of the rural population.

Droughts of higher frequency and longer duration have had a serious impact on development in several countries of the region, with severe repercussions for economic growth, food security and poverty alleviation. Droughts affect the lives of the rural poor through decreased agricultural production, death of livestock and endangered environment as seen in loss of soil fertility, loss of species and the threat of extinction. In the 1994/95 crop season, a drought season in Morocco, agricultural output of 1995 was 45 percent lower than the previous year, a non-drought year and rural landless or small landholders lost 100 million work days in agricultural employment. During the 1981-82 drought, 25 percent of cattle and 39 percent of sheep were sold or died and it took 5 years for the livestock population to reach previous levels (World Bank 1995b). In addition, water use for irrigation was reduced by 35 percent, and in some areas (Souss), by 90 percent. Livestock rearing, which is typically engaged in non-arable arid land is also heavily hit by reduction in vegetation on rangeland and shortage of drinking water. However, the largest impact is on rainfed agriculture land. Cereals, which occupy 58 percent of agricultural land in the region, are produced entirely by rainfed agriculture or a combination of rainfed and some irrigation. Figure 3 shows the standard deviation of cereal production growth rate as a proxy for volatility of cereal production in different developing regions. The Near East has the highest standard deviation of approximately 7 percent for the 1990-2000 period. Severe and periodic droughts are believed to be the main cause of production volatility.

Figure 3. Volatility of Cereal Production Output (1990-2000, SD = Standard Deviation)



Note: SSA = Sub-Saharan Africa, E/SE Asia = East/South East Asia, LAC = Latin American and the Caribbean, Near East = Near East Asia and Near East Africa, S Asia = South Asia
Source: Calculated from FAO, 2002

Poor people in rural areas live on the most marginal land with little assets to hedge their risks. Furthermore, droughts are difficult to forecast, even at the beginning of the crop season. Therefore, there is a clear link between droughts and the financial well-being of poor farmers. With respect to risk management, droughts increase the level of indebtedness of rainfed farmers who borrow for agricultural production purposes, in turn, putting agricultural financial institutions at risk after repeated drought occurrences. In Morocco, since 1999, the public agricultural bank, CNCA (Caisse Nationale de Cr dit Agricole), which finances more than 80 percent of all loans to the agricultural sector, has made the purchase of a drought insurance a mandatory condition for obtaining an agricultural loan in drought prone areas (World Bank, 2001). Further studies have recently been conducted on developing a more specialized and objective insurance tool, a rainfall-based index insurance, in Morocco which aims to minimize the risk of moral hazard and adverse selection and promote a streamlined pay-out process (Skees et al., 2001).

Because of a higher degree of vulnerability to drought in the MNA region, countries have been forced to review their approach to drought management. Most of the drought-coping strategies implemented by governments of the region have focused on mitigation measures and emergency plans. With greater population growth rates and higher demand on declining water resources, governments need to address the issue as a structural phenomenon, inextricably linked with the socio-economic production system and within the context of scarce, declining and degraded water resources. The careful management of water resources will become increasingly important in mitigating the impact of drought on the economies of the region in the future. Box 2 discusses some of the steps that need to be put in place for a National Mitigation Strategy, and a Drought Relief Planning System.

Box 2. Elements of Successful Drought Mitigation Planning

One of the biggest challenges in successful drought planning is getting all the right groups of people to communicate effectively with one another. Three main particular groups need to be involved:

scientists, managers, and decision makers (**political authorities**); **climatologists and others**, who monitor how much water is available now and in the foreseeable future; (Monitoring Committee); **natural resource managers** and others who determine how lack of water is affecting various interests, such as agriculture, recreation, municipal supplies, etc. (Impact Assessment Committee); and high-level **decision makers**, often elected and appointed officials, who have the authority to information they receive about water availability and drought's effects. (Drought Task Force)

The U.S. National Science Foundation developed a 10 step-planning process in 1990 which is considered international best practice especially in arid/semi-arid environments. Getting these three groups functioning is the core of a successful drought plan, which is step 5 in a general 10-step process that can be tailored to the needs of an individual region, state or country:

- Appoint a drought task force
- Define the purpose and objectives of the drought plan
- Seek stakeholders participation and resolve conflict
- Identify drought risk and potential risk reduction actions
- Develop a drought plan that includes monitoring, impact assessment, and decision making
- Identify research and institutional needs
- Integrate science and policy perspectives
- Publicize the drought plan
- Teach people about drought and water supply
- Keep the drought plan up to date, and evaluate it after droughts

The drought planning process was outlined in USA in 1990. Since 1990, it has been revised and updated to reflect more state-level experience with drought planning. Additional changes have come as a result of a greater emphasis now being placed on mitigation and preparedness, recent workshops on drought planning held around the country, and a methodology developed to conduct drought risk analyses. The result of these efforts is a model for drought planning that is focused at the state level but can be easily tailored for states, cities, or other communities.

Source: Simas, J pers. comm..

Conclusions

While by some measures, poverty in the MNA region does not stand out among other developing regions, 85.4 million people or 29.9 percent of the population live on less than \$2 a day (1998). 70 percent of these poor people live in rural areas; they are either landless or small landholders, mostly growing cereals on rainfed land and/or rearing livestock. Furthermore, farmers in the MNA region live and work in the most water scarce region, where in some countries the available water is less than half of the water demand. However, at the same time, due to low water prices which do not even capture the full private costs, agriculture, which uses 87 percent of all available water resources, is an extremely inefficient and wasteful user of water. Recent PPP approaches in Guerdane (Morocco) and W.Delta (Egypt) offer an alternate way to support rural employment and improve farmer incomes. Internalizing the private as well as the social costs of water by the largest user is a challenge that countries will have to face for agricultural development to be successful and sustainable, especially in the context of

increased competition with more trade liberalization. Specifically, reforms in land tenure policy and drought management are identified as key issues in agricultural development especially with respect to the poor. Finally, although reform policies will produce positive results in the long run, social safety nets and protection policies that directly target the poor are necessary in the short run as they are likely to be made worse off in the short run.

2.2 Agricultural and Water Productivity

“We need a Blue Revolution in agriculture that focuses on increasing productivity per unit of water – more crop per drop”.

Kofi Annan

Secretary-General of the United Nations

Report to the Millennium Conference, October 2000

In the MNA region, where water is extremely scarce, producers face a severe water constraint despite the fact that agriculture consumes on average 87 percent of the region’s entire water withdrawal. Furthermore, due to low capital investment and insufficient agricultural support services such as research on high yielding varieties and extension work, agricultural productivity in MNA is low. Table 7 shows that MNA’s cereal yield is lower than all other developing country region except for Sub-Sahara Africa. Yield rates have been increasing in the last decade but the average cereal yield in the region (1973 kg/ha) is below the developing world average of 2312 kg/hectare. For the most important cereal in the region, wheat, trends in area harvested and yields shown in Figures 3 and 4 confirm that productivity gains are highly unlikely, with the possible exception of Egypt. Reasons for low cereal yields in general include the aridity of the climate and high variability of precipitation, risk-aversion to adoption of new cultivars and fertilizer application, and continuing resource degradation. In addition, the region generally possesses very low stocks of human capital in comparison with other countries at similar income levels: for example, while the region has a similar land-to-labor ratio as Latin America, labor productivity was significantly higher in Latin America (Oram et al, 1998; Karshenas, 1999).

Table 7. Cereal Yield (kg per hectare)

	East Asia/pacific	Latin America/Caribbean	South Asia	Sub-Sahara Africa	MNA
1990	2314.30	1997.57	1828.83	991.55	1220.00
1995	2584.16	2462.80	1966.69	1072.38	1625.00
2000	2942.07	2462.93	2354.23	1130.35	1349.87

Source: World Bank, 2002b