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West Asia and North Africa: A Regional Vision



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About ICARDA

Established in 1977, the International Center for Agricultural Research in the Dry Areas (ICARDA) is governed by an independent Board of Trustees. Based at Aleppo, Syria, it is one of 16 centers supported by the Consultative Group on International Agricultural Research (CGIAR), which is an international group of representatives of donor agencies, eminent agricultural scientists, and institutional administrators from developed and developing countries who guide and support its work.

The CGIAR seeks to enhance and sustain food production and, at the same time, improve socioeconomic conditions of people, through strengthening national research systems in developing countries.

ICARDA's mission is to improve the welfare of people through agricultural research and training in the dry areas in the poorer regions of the developing world, by increasing the production, productivity and nutritional quality of food to higher sustainable levels, while preserving or improving the resource base. ICARDA meets this challenge through research, training, and dissemination of information in a mature partnership with the national agricultural research and development systems.

The Center has a world responsibility for the improvement of barley, lentil, and faba bean, and a regional responsibility in West Asia and North Africa for the improvement of wheat, chickpea, forage and pasture—with emphasis on rangeland improvement and small ruminant management and nutrition—and of the farming systems associated with these crops.

Much of ICARDA's research is carried out on a 948-hectare farm at its headquarters at Tel Hadya, about 35 km southwest of Aleppo. ICARDA also manages other sites where it tests material under a variety of agroecological conditions in Syria and Lebanon. However, the full scope of ICARDA's activities can be appreciated only when account is taken of the cooperative research carried out with many countries in West Asia and North Africa.

The results of research are transferred through ICARDA's cooperation with national and regional research institutions, with universities and ministries of agriculture, and through the technical assistance and training that the Center provides. A range of training programs is offered extending from residential courses for groups to advanced research opportunities for individuals. These efforts are supported by seminars, publications, and specialized information services.

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by
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1. Introduction

The West Asia/North Africa (WANA) region is an enormous and diverse area, with Morocco in the west, Pakistan and Afghanistan in the east, Turkey in the north, and Ethiopia and Sudan in the south (Fig. 1).

WANA is characterized by high population growth, expected to more than double by 2020; low and erratic rainfall; limited areas of arable land; and severely limited water resources for development of irrigation. There are very few possibilities for expansion of farming areas or irrigation. Methods for more efficient and sustainable use of these limited resources must be found.

In recent years we have heard disturbing evidence supporting the need for agricultural development and indicating the dangers of complacency. My aim is to convince the reader of the importance of this; and to discuss what must be done to face the challenge of WANA's escalating food gap, rural poverty and natural resource management problems.

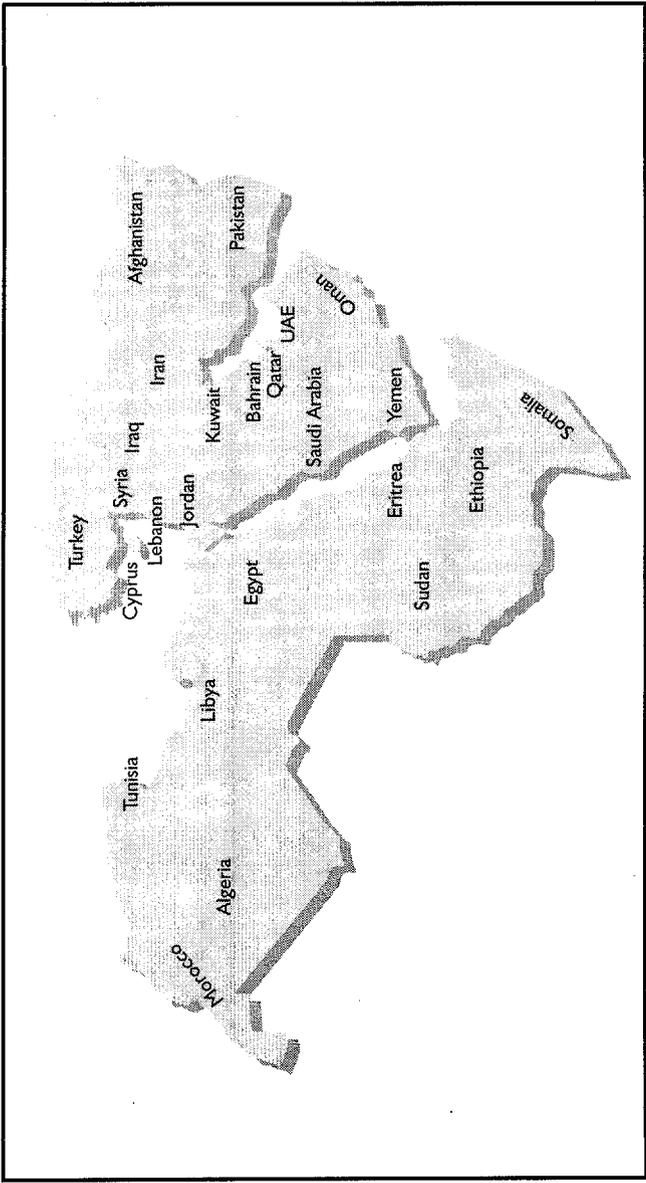


Fig. 1. The West Asia and North Africa (WANA) region.

2. Poverty, Agricultural Employment and Migration

Poverty in many WANA countries is masked by averaging the poor with the rich. Consider Libya, Oman, Saudi Arabia, Kuwait and United Arab Emirates—examples of the major oil exporters with small populations. We find large disparities between these and the remaining WANA countries. These oil-exporters with only 7 percent of the region's population represent the region's highest per capita GNP, averaging just over US\$9417 (Table 1) which, even so, is only a quarter of the per capita GNP of industrialized countries (Nordblom and Shomo, 1995).

The remaining 93% of WANA's population has a far lower per capita income. The western stereotype of the "rich Arab" represents only a tiny minority of the people in WANA.

The four most economically disadvantaged states of South WANA (Eritrea, Ethiopia, Somalia and Sudan) have per capita GNP of only US\$88—that is less than 1.2% of the oil-exporters with small populations. The oil-exporters with large populations (Algeria, Iran, and Iraq) have a per capita GNP of US\$1929. The remaining countries of WANA, which account for 75% of the population—421 million people—have a per capita GNP of less than US\$2.0 per day. In fact, 42% of the total population—239 million people—has a per capita GNP of less than US\$1.0 per day and is thus in the grip of severe poverty.

There is more absolute poverty and incidence of poverty in rural than urban areas in WANA. Even though infrastruc-

**Table 1. GNP and Population of Seven Groups
of WANA Countries**

	1992 Average	Population	
	per capita GNP (US\$)	1994	2020
Oil-exporters with small populations (Libya, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates)	9417	29	58
Oil-exporters with large populations (Algeria, Iran, Iraq)	1929	113	222
Fast population growth (Syria, Jordan)	1000	20	41
Transitional population growth I (Lebanon, Morocco, Tunisia, Turkey)	1520	99	150
Transitional population growth II (Egypt)	586	62	89
East WANA (Afghanistan, Pakistan, Yemen)	379	146	313
South WANA* (Ethiopia, Eritrea, Somalia, Sudan)	88	93	198
Total population		562	1071

Sources: GNP data are from World Bank database for 1993 except* from UN Statistical Yearbook 1995 for GDP rather than GNP values; population data from FAOSTAT.PC. 1995; population projections from UN 1993.

ture in the rural sector has improved in the last 20 years, there has not been a proportional increase in employment or poverty alleviation.

Egypt, Jordan, Lebanon, Pakistan, Syria and Yemen are the major suppliers of work force to the oil-exporters with small populations; the Gulf countries employ 3.5 million non-

national workers. Turkey and North Africa provide work force for Europe, accounting for the majority of the 5.3 million people from WANA living in Europe (Rodriguez, 1995).

But these are only small proportions of WANA's population. Economic disparities will continue to fuel migration from rural to urban areas and from poor to rich countries.

WANA's agriculture employs large parts of the population; nearly 50%, for example, in Turkey and Morocco. And women contribute about half the agricultural labor, well above their share of the total labor force.

3. Food Consumption and Production

Most calories and protein in human diets in WANA comes from plant sources—mainly cereals, with some pulses. In sharp contrast, people of industrialized countries take their protein predominantly from animal sources (Fig. 2). Diets have improved in most of WANA over the last two decades, but still lag well behind in quantity and quality of protein. Dairy and poultry production are rising in WANA, but are still far behind those of industrialized countries. Deficiencies of micronutrients in diets of women and children can have permanent negative effects on the quality of life.

FAO data on production of all grains were used to calculate five-year averages for the two periods centered on 1970 and 1990. The case of Egypt, plotted in per capita terms, is illustrated in Fig 3. Consumption of all grains including pulses, and of pulses alone, are shown for the same periods (Fig. 3). These include grain for livestock feed but most is for direct human consumption.

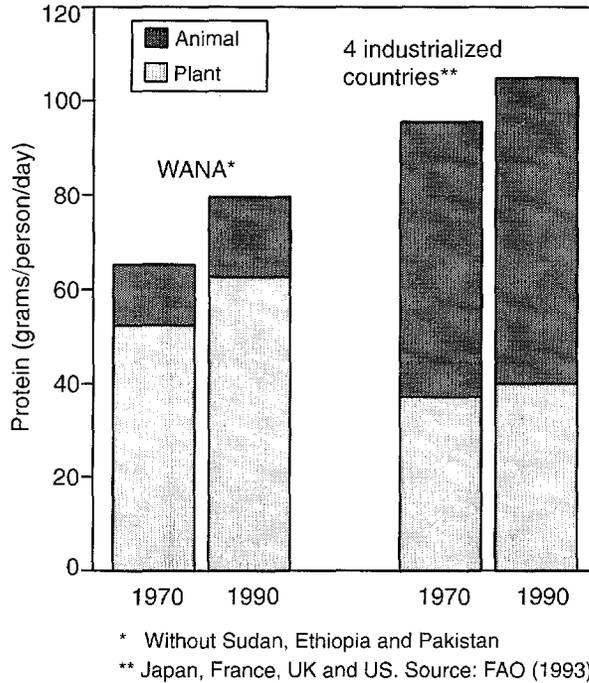


Fig. 2. Sources of protein in human diets.

In Egypt, agriculture is almost totally dependent on irrigation, but this is not the case for the majority of WANA countries—which rely mainly on rainfed agriculture (El-Beltagy, 1993). Grain production has just kept pace with population growth in Egypt, benefitting from research results and policies aimed at putting these to good use. Per capita consumption of all grains has increased, while pulse consumption has held constant. Income growth and concessionary pricing have enabled the importation of grains for food and feed to fill the gap.

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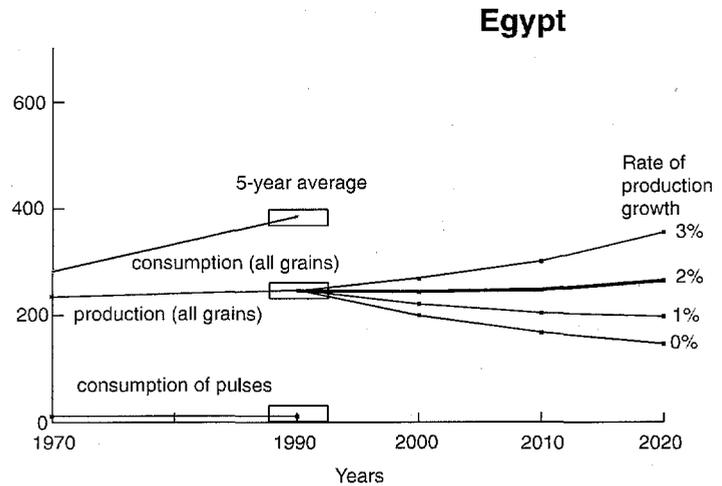


Fig. 3. Per capita production and consumption of all grains including pulses (kg/person).

The role of pulses in human diet is greater than their small quantities suggest, due to their high protein and energy content and their use in diets of the poorest people as substitutes for animal products. Faba beans, lentils and chickpeas enhance the value of cereal-dominated diets as they provide complementary essential amino acids and minerals. Pulses are “the poor man’s meat.”

Our projections of Egyptian grain production in 2020 are based on the five-year average around 1990. Four assumed rates of production growth, and the UN’s population projections, allow us to imagine upper and lower limits for per capita production in 2020. Sustaining a 3% yearly production growth rate to the year 2020 would be enormously

challenging. A zero growth rate, on the other hand, is possible but positive rates of production increase must be expected. A respectable 2% growth is achievable, but will require concerted technological and policy advances.

In addition to grains (and pulses), Egypt produces and consumes fruits, vegetables, edible oils, meat, dairy products and eggs. Consumption of all foods has risen on a per capita basis. Assuming no change in per capita consumption of all foods from that in 1990, domestic production must grow at well over 2% annually to close Egypt's food import gap by 2020 (Fig. 4). Considering that there may be per capita increase in food consumption will make this an even bigger challenge.

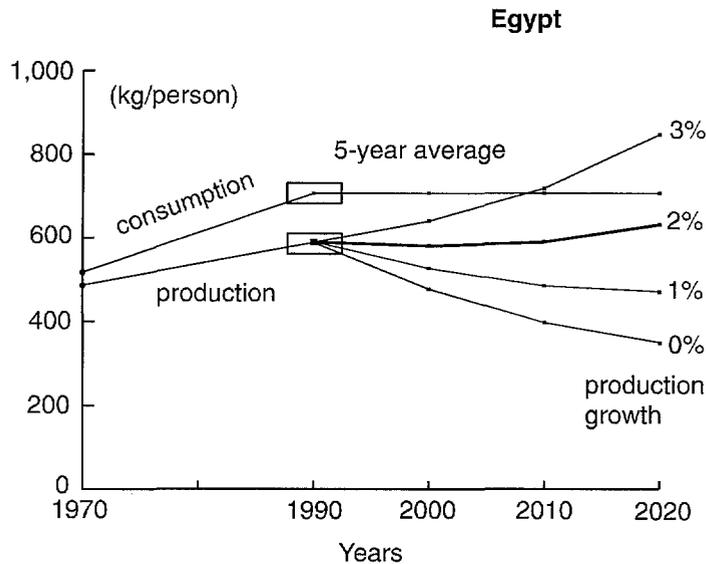


Fig. 4. Per capita production and consumption of all food.

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Egypt's approach has been to seek the best economic balance of crops by allowing their prices to match the world market (World Bank, 1993). Research has been enhanced by active partnerships with the IARCs; in particular with IRRI on rice, with ICARDA on food legumes, cropping system resource management, and regional cooperation (Nile Valley Regional Program), with ISNAR and IFPRI on research organization and agricultural policy, CIMMYT/ICARDA on wheat, and CIMMYT on maize. There have been important positive impacts on productivity in these areas (El-Beltagy, 1992, 1994; York *et al.* 1994).

Other countries of the region are far worse off than Egypt. Pakistan, Afghanistan, Sudan and Ethiopia, for example, import little grain though their population growth has outpaced production growth. Their per capita consumptions were lower in 1990 than in 1970. The 1990 per capita consumption of all grains was about half of that in Egypt. In such countries increases in per capita consumption over the 1990 levels are much needed. Per capita consumption, however, is a function not of want or need but of effective demand, and is directly related to income.

In contrast, Turkey's per capita production of grain is nearly double that of Egypt. With abundant rainfall, good soils, and policies promoting private investment in agriculture, Turkey is the only substantial net exporter of grain in WANA. Like any other commercial exporting country, however, Turkey is under no obligation to feed other countries of WANA having poorer agricultural resources. But most analysts include Turkey in the WANA aggregate; this has the effect of overstating the region's productive capacity.

If per capita consumption of all grains remains constant at 1990 levels to the year 2020, and the UN population projections come true, we should expect a total aggregate grain consumption of about 217 million tons in 15 WANA countries by that time. Here, one is talking of absolute amounts, totalling only 15 countries of WANA-proper; and this is without the burgeoning populations of Sudan, Ethiopia and Pakistan (Nordblom and Shomo, 1995).

The grain gap in 1990 was of the order of 27 million tons. If the rate of production growth can be sustained at 2% per year to 2020, the 15-country grain gap will increase to 70 million tons (Fig. 5a) (Nordblom and Shomo, 1995).

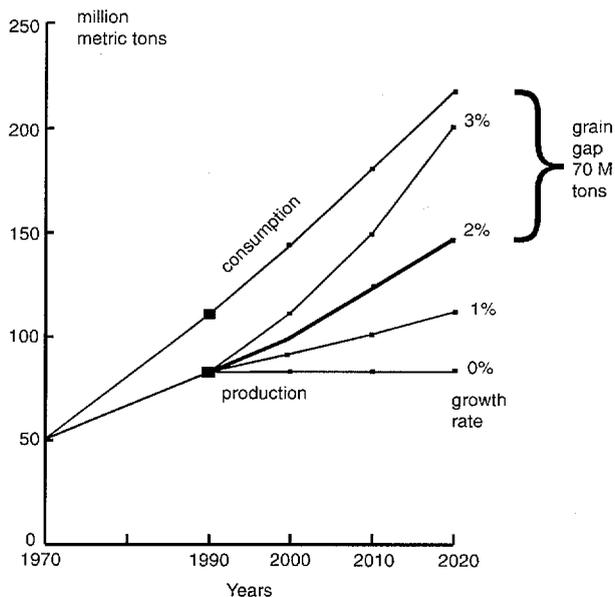


Fig. 5(a). Production and consumption of all grains in 15 WANA countries.

Now, if we exclude Turkey, and talk only of a 14-country WANA aggregate, the 1990 grain gap was about 33 million tons. This deficit will easily reach 86 million tons by the year 2020 (Fig. 5b) (Nordblom and Shomo, 1995).

Again, this is a conservative estimate which assumes no growth in per capita income or consumption.

Assuming grain will cost only \$100 per ton, 86 million tons of grain per year will cost \$8.6 billion, no less than 30 times the size of the current annual budget of the CGIAR system. To visualize the quantity of 86 million tons of grain

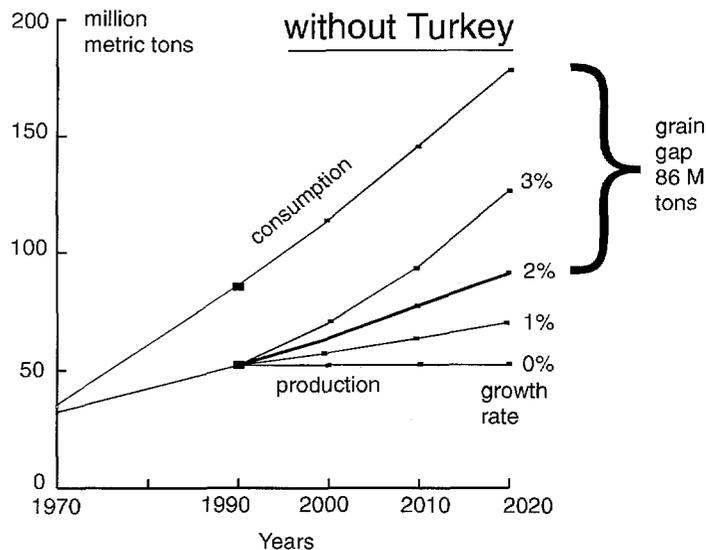


Fig. 5(b). Production and consumption of all grains in 14 WANA countries.



Fig. 6. Length of train to carry 86 million tons of grain.

imports for WANA in 2020, imagine a railroad train 12,000 kilometers long! (this assumes 3 x 3 x 15 meter rail cars and 0.8 bulk-density of grain) (Fig. 6).

The challenges facing these “grain-importing WANA countries” are formidable indeed:

- how to sustain production growth?
- how to achieve income growth sufficient to fill the remaining grain gap with imports?
- and how to do both while sustaining the natural-resource base?

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4. Natural-Resource Stewardship

Heading the list of resources that are no longer abundant in the region is water. Despite the scarcity of water in WANA, many countries have poor water-use efficiency. Open-access to aquifers by private wells is common. Water prices in agriculture often do not reflect the real costs of investment in irrigation structures, let alone the cost to future generations of exhausting groundwater supplies. Water harvesting and supplementary irrigation are alternatives for increasing and stabilizing yields of crops grown in rainfed areas.

Land itself must be protected from degradation. Inheritance traditions and land tenure laws have caused land fragmentation, hindering productivity and resource stewardship.

Rangelands in WANA, covering about 30% of the land and providing a third of the diet of some 300 million small ruminants, are typically open to unrestricted grazing and are severely degraded. Traditional grazing management, which integrates crop by-products and rangelands, is under serious stress. Hand in hand with this is loss of soil—from wind erosion, water runoff, and other causes—and, where it has not been lost, the draining of nutrients through inappropriate management.

A key resource which should not be overlooked is biodiversity. Desirable plant species have been lost or diminished over large areas of WANA. This is where some of the world's most important cereals (wheat and barley) and legumes (lentil, chickpea and forage legumes) originated, and where the wild relatives of these plants are found.

Continued degradation of the natural-resource base in this region is of grave consequence for all humanity.

5. Global Economic Integration and Food Security

Wise use of natural, human and capital resources in each country will allow agriculture to make sustainable contributions to food security. This will mean dropping the uneconomic goal of food self-sufficiency in favor of economic self-sufficiency. Given the fluctuating nature of productivity in the rainfed farming system, optimizing the storage and importation of grain stocks will receive greater attention in the future.

WANA countries that are increasingly dependent upon food imports will find their food bills rising as developed countries reduce production and export subsidies under GATT.

Greater integration with world markets will become more urgent. Investments in human capital, natural resource management, research and technological development are essential.

The following are a few important issues on which agricultural research in WANA can contribute to global food security and prosperity.

- Where pastoralists and farmers are insecure tenants, they cannot be expected to take long-term responsibility for the natural resources they use. This issue is central to policy research.
- Methods for determining the best agronomic practices (economically and environmentally) and for encouraging

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their adoption are essential for sustaining productivity and for improved water-use efficiency.

- Research on livestock management and nutrition should increase, given the current emphasis on national veterinary and animal breeding investments and the importance of livestock in the region.
- Conservation and enhancement of plant and animal genetic resources are essential to the future of not only WANA's but also the whole planet's food-production system.
- Informal seed sectors should be enhanced by strategic research on methods, followed up with well-informed extension.

It is no coincidence that ICARDA's mandate is focused on these areas of need for strategic research aimed at yielding knowledge (including genetic information) and human capital for the sustained benefit of mankind. Partnerships with and among the national agricultural research systems (NARS) of WANA are a key to success, and essential for bringing resources and critical masses of research skill to bear on the issues. This will require concerted efforts of NARS with international research centers like ICARDA.

The challenges to agriculture and natural resources of WANA are tremendous, and we must face them now, because we believe that agricultural development will not only fill food consumption gaps in future in the region but will also encourage overall development and job creation, so important to reducing poverty, and conserving and enhancing natural resources vital for the future of people in WANA and the whole world.

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