

**CIMMYT's Economic Environment to 2000 and Beyond:
A Revised Forecast**

By

Your Evergreen Economists

These notes are in response to a request to review the economic environment outlined in our Strategic Plan of 1988 in light of more recent information. We note at the outset the increasing importance of the "green movement" in our world environment; it now even permeates to the level of CIMMYT's committees!

These notes review the economic environment with respect to (1) demand for wheat and maize, (2) supply of wheat and maize, (3) world prices, (4) changes in incidence of poverty, and (5) possible implications for CIMMYT.

1. Demand for Maize and Wheat

We had projected developing country demand for maize and wheat to grow at 3.5% and 3.0% respectively, based on a population growth rate of 2.0% and income growth rate of 2.6% per capita. Due in large part to modest success in debt alleviation and widespread policy reforms over the last 2-3 years (e.g. Mexico, Brazil), the World Bank now forecasts a per capita income growth rate of 3.2% per year for the period 1990-2000 (Table 1). This would increase the demand for cereals modestly over our projections, especially for feed maize in Asia where economic growth will be concentrated.

The policy reforms of the 1980s have also substantially reduced the exchange rate distortions and food subsidies in sub-Saharan Africa and Latin America that encouraged rapid growth of wheat imports over the past two decades (Byerlee,

1987). Recent evidence suggests that per capita wheat consumption has fallen in Sub-Saharan Africa and stagnated in Latin America, as consumer prices have risen (Byerlee and Sain, 1990; Fischer and Byerlee, 1990). Hence our projections for wheat demand in these two regions, especially Sub-Saharan Africa, was overestimated.

At the same time, we may have under-estimated the demand for maize and wheat in Asia. High income growth will drive the demand for maize in Asia which may increase at a rate of 7% annually. At the same time, a recent comprehensive projection of food demand in India forecasts a demand growth rate for wheat of 3% per year (given our income forecast) (Radhakrishna and Ravi, 1990). However, if real wheat prices to consumers continue their downward trend over the past two decades of over 2% per year, demand for wheat in India will increase at 4% per year, well above our earlier projections. Such a trend is desirable since declining cereal prices have been an important factor in reducing poverty in India. Finally it should be noted that if this demand growth rate is realized, India will need to produce 76 Mt of wheat by the year 2000 (versus current weather-adjusted production of about 50 Mt).

Putting this new information together, gives maize and wheat demand projections of Tables 2 and 3, which replace Tables 3.1 and 3.2 of the Strategic Plan. The largest aggregate effect is in the demand for maize in developing countries which is forecast to increase at 4.2% annually versus 3.5% in the Strategic Plan.

2. The Supply of Wheat and Maize

In the Strategic Plan we used modified FAO and IWC supply projections. We have no reason to adjust these projections significantly, but we do make a number of new observations.

- 1) Historically, the USA has adjusted area planted to cereals through land set-aside programs that constituted a form of world food reserve that cushioned rising world prices. While the USA continues this program, now an additional motivation for setting aside land is to conserve the environment. (It is now called the Resource Conservation Program). Because of this environmental emphasis, it may be much more difficult to return land to production than in the past. At the global level area increases now make a negligible contribution to cereal production, and in two large producers, China and India, total cereal area is declining. Together this suggests that our forecasts of area expansion may have been optimistic, although Brazil and Argentina have substantial potential to bring new land under production in the 1990s.
- 2) The "Green movement" in Europe has led to restrictions on agricultural chemical use in Europe. It is quite likely that these restrictions will become tighter over the next decade, resulting in slower and perhaps declining cereal production in the EEC.
- 3) Even before the recent Middle East crisis, the World Bank was predicting a 3% per year increase in real energy prices to the year 2000 (Amuzegar,

1990). This will translate into modest real price increases for N fertilizer and other chemicals and slow the rate of growth in fertilizer use.

- 4) There is now stronger evidence of sustainability problems in major irrigated systems of the Third World, especially South Asia (see Byerlee, 1990), which may affect future yield growth. Furthermore the Green movement may lead to a backlash against agricultural chemical use in the Third World - or at least donor support for programs involving chemicals. There is a real chance, for example, that donors actions will slow the growth of fertilizer use in Africa (much of the fertilizer there is provided by aid programs).

Together these observations suggest that production growth in the 1990s might be slower than we had projected, and exporters may have less flexibility to respond to production shortfalls.

3. World Prices

The above observations on supply and demand for cereals suggest that world grain markets could be tighter than expected. However there two major uncertainties cloud our crystal ball.

1. Much depends on production strategies and import policies of China and especially the USSR. Both countries are undergoing major policy reforms which could have important implications for world grain markets (either in terms of sharply reduced or increased imports).

2. The outcome of the current GATT negotiations is uncertain. If grain trade distortions are eliminated, world grain prices could increase (by 0-35% depending on the economist you talk to).

Overall the World Bank is now projecting a modest increase in real prices of cereals in the 1990s, with most of the increase occurring after 1995. Other knowledgeable (and usually optimistic) observers such as Falcon make similar projections (Falcon, 1990).

4. Changes in Poverty Incidence

The Strategic Plan did a rather poor job of analyzing the distribution of the worlds' poor and its implications for CIMMYT. The World Bank has recently published a comprehensive overview of Third World poverty (World Bank, 1990). Tables 4 to 6 summarize the distribution of poverty and expected changes to the year 2000. Major points from these tables are:

- (1) In 1985, 75% of the poor were located in Asia, most of them in South Asia.
- (2) Most of world's poor were located in rural areas (Table 6). The major exception is Latin America, where about half of the poor are in urban areas. Nearly all the rural poor are small farmers, except in South Asia where as many as a half are agricultural laborers.
- (3) Looking toward the year 2000, the largest increase in the number of poor people will be in Sub-Saharan Africa, while poverty incidence will

decline dramatically in East Asia (China). By 2000, the world's poor will be overwhelmingly located in South Asia (44%) and Sub-Saharan Africa (32%).

- (4) In the two regions where the poor will be concentrated (South Asia and Sub-Saharan Africa), at least half live in favored areas. For poor producers who depend on CIMMYT's crops (maize and wheat), an even higher proportion will be in favored areas.

5. Possible Implications for CIMMYT

- (1) The indications of a more difficult situation for world food supplies, suggests a need to rededicate efforts to those areas in poor countries that have the greatest potential to contribute to increased food production and reduce food prices to the poor (examples are South Asia's irrigated tract and E & S Africa's highland and subtropical maize areas).
- (2) Our objective of targeting research resources on the poor and the changing distribution of poverty strongly suggest that Sub-Saharan Africa will be increasingly important for the Maize Program, and South Asia for the Wheat Program, and that these will be the flagships of CIMMYT's effort. At the same time the data suggest a sharply declining priority to maize in Southeast and East Asia and wheat in Latin America.
- (3) These regional priorities will of course dictate priorities in upstream research at Headquarters, including our increasing effort in biotechnology, toward problems of maize in Africa and wheat in Asia.

References

- Amuzegar, J. "Oil and a Changing OPEC." Finance & Development, pp. 43-45, September 1990.
- Byerlee, D. "The Political Economy of Third World Food Imports: The Case of Wheat." Economic Development and Cultural Change, 35(1):307-28, 1987.
- Byerlee, D. "Technical Change, Productivity, and Sustainability in Irrigated Wheat Systems of Asia: Emerging Issues." Paper presented at the Symposium, "Post Green Revolution Asian Agriculture: Prospects for Sustaining Productivity Growth," at the Annual Meetings of the American Agricultural Economics Association, 4-8 August, 1990.
- Byerlee, D., and G. Sain. "Relative Food Prices Under Structural Adjustment: Preliminary Findings from Latin America." Food Policy, forthcoming.
- Falcon, W. "Future Links Between U.S. Agriculture and the World Food Economy." J. Prod. Agric. 3(3):269-273, 1990.
- Fischer, R.A. and D. Byerlee. "Trends of Wheat Production in the Warmer Areas: Major Issues and Economic Considerations." Paper presented at the Conference "Wheat for the Non-Traditional Warm Areas", Iguazu Falls, Brazil, July 29-August 3, 1990.

Mellor, J.W. "Agricultural Development Opportunities for the 1990s --The Role of Research." Address at International Centers Week of the CGIAR, Washington, D.C. Nov. 4, 1988.

Radhakrishna, R., and C. Ravi. Food Demand Projections for India. Center for Economic and Social Studies, Nizamia Observ. Campus, Begumpet, Hyderabad, India, 1990.

World Bank. World Development Report, 1990.

Table 1. Economic growth prospects for the 1990s.

Region	Rate of growth of per capita income		
	Trend 1965-80	Recent experience 1980-89	Forecast 1989-2000
Industrial countries	2.8	2.5	2.6
Sub-Saharan Africa	2.0	-2.2	0.5
SE and East Asia	4.8	6.7	5.1
South Asia	1.2	3.2	3.2
WANA	3.9	0.8	2.1
Latin America	3.4	-0.6	2.3
All Developing countries	3.4	2.3	3.2

Source: World Bank, World Development Report, 1990.

Table 2. Demand projections for maize by region (1985-2000).

	1985		2000		Annual growth rate	Annual growth rate	Annual growth rate
	Food maize (million tons)	Feed maize (million tons)	Food maize (million tons)	Feed maize (million tons)	Food maize (%)	Feed maize (%)	Total maize (%)
Developing countries:							
Sub-Saharan Africa	14.9	1.5	23.9	2.6	3.2	3.6	3.2
Middle East/N. Africa	7.6	4.3	10.4	8.7	2.1	4.9	3.2
Asia	43.8	53.1	48.1	146.0	0.6	7.0	4.7
Latin America	9.1	29.1	12.2	50.4	2.0	3.7	3.4
Total LDCs	75.4	88.0	94.6	207.7	1.5	5.9	4.2
Developed countries	14.0	231.0	14.0	315.5	0.0	2.1	2.0
Total World	89.4	319.0	108.6	523.2	1.3	3.4	3.0

Source: Update of Longmire (1988).

Table 3. Demand projections for wheat by region (1985-2000).

	1985		2000		Annual growth rate	Annual growth rate	Annual growth rate
	Food wheat (million tons)	Feed wheat (million tons)	Food wheat (million tons)	Feed wheat (million tons)	Food wheat (%)	Feed wheat (%)	Total wheat (%)
Developing countries:							
Sub-Saharan Africa	6.6	0.1	11.2	0.1	3.5	3.1	3.5
Middle East/N. Africa	58.1	3.4	89.6	6.8	2.9	4.8	3.0
Asia	156.3	5.5	246.7	14.2	3.0	6.5	3.2
Latin America	25.4	2.4	38.1	4.5	2.8	4.2	2.9
Total LDCs	246.4	11.4	385.6	35.7	3.0	5.6	3.2
Developed countries	154.0	89.0	168.3	122.3	0.6	2.2	1.2
Total World	400.4	100.4	553.9	147.9	2.2	2.6	2.3

Source: Update of Longmire (1988).

Table 4. Distribution of poverty in the Third World, 1985

	Number (M)		Total Percent of population	
	Extremely poor ^a	Poor ^b	Extremely poor	Poor
Sub-Saharan Africa	120	180	30	47
East Asia	80	210	8	20
SE Asia	40	70	10	20
South Asia	300	520	29	51
WANA	40	60	21	38
Latin America	50	70	12	19
All LDCs	633	1116	18	33

a Less than \$275 per capita.

b Less than \$370 per capita (includes extremely poor).

Source: World Bank, World Development Report, 1990.

Table 5. Changes in projected distribution of Third World poverty 1985-2000

	Number of poor ^a (millions)		Percent of world's poor	
	1985	2000	1985	2000
Sub-Saharan Africa	180	265	16	32
East Asia	210	35	19	4
SE Asia	70	35	6	4
South Asia	525	365	47	44
WANA	60	60	5	7
Latin America	75	60	7	7
Third World	1125	825	100	100

a Less than \$370 per capita.

Source: World Bank, World Development Report, 1990.

Table 6. Distribution of the poor by urban, favored rural, and marginal rural areas

	Favored areas	Rural Marginal areas	Urban	Total
		(Percent)		
Sub-Saharan Africa	45	45	10	100
East Asia	34	66	0	100
SE Asia	19	65	16	100
South Asia	40	40	20	100
WANA	na	na	na	100
Latin America	15	44	40	100
All	36	45	19	100

Source: Mellor (1988).