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*The World Economy:
Resilient for the Rich, Stubborn for the Starving*

The concept of a world food system is defined by D. Gale Johnson (1984) as 'a system in which food and other agricultural products that can be transported at reasonable costs produced anywhere in the world, is actually or potentially available to any person in the world *if that person has the means to purchase it*' (emphasis added).

In this sense one could not but conclude that the growing interdependence of the world (as measured by the percentage of agricultural production that is traded internationally) has led to a resilient well functioning world food system. It has been able to withstand shocks of severe bad weather as well as of sudden policy shifts by major actors on the world market. Supplies have resiliently responded to price signals and to incentives and the long-term trend of world food prices has been, if anything, downward in spite of large increases in demand due to increasing population of the world with a rising income.

Yet the system has functioned well only for those who have the means to purchase food. Most estimates show that a large number of people in the world remain hungry and do not get enough to eat. Though the proportion of world population getting inadequate food is estimated to go down, the improvements are too slow and still leave many or even more people suffering from hunger. A system that leaves people hungry is not functioning satisfactorily. As economic analysts it behoves us to ask why is the system malfunctioning? What are its characteristics and what can we do about it?

For the poor who do not have means to purchase food, the world economic (and political) system is malfunctioning and stubbornly so. No matter what happens, left to itself, the system seems to transfer the major burden of adjustment to the people too poor to buy or produce all the food they need. For these people the biological requirements are higher than their effective demand. In a system where effective demand has no lower bound, *hunger is just a part of the normal adjustment process* as it was in the former natural economies where population had to adjust to natural resources either by emigration or by dying.

In a world where everyone agrees that there should be no hunger (all nations who subscribe to the UN Charter agree to it) the persistence of hunger must be considered a sign of the malfunctioning system. The world economic system produces shortages and surpluses at the same time. While farmers are protesting against low prices in some countries (although leading to substantial surpluses), people starve in others.

In the world economy those which have more resources have also more power. And the domination by the powerful perpetuates itself. The dominating powers do not give up their positions and the dominated ones are by definition too weak to change them. Thus the burden is always shifted to the weak. (If it were not, then accepting more burden by the strong, equity could be achieved). So far as hunger is concerned, this leads to something like an *institutionalised disaster area*. If there is a drought in India, more people die in India. If there is a drought in the USA, the same number of people die in India. The system shifts the burden to the same areas and to the same income groups. (Just to clarify the idea the example is simplistic. In fact a drought in the USA will not change anything, except the buffer stocks and acreage set asides, thus keeping up the same artificial level of prices).

The effectiveness of the means to transfer the burden and the means to protect oneself against it is *disproportional*. A small change in a big country might still result in a big change in the small ones.

This description of the nature of the world economic system is to be demonstrated through simulation using our system of linked national models for food and agricultural policy analysis which cover the whole world economy. In particular we show that hunger is stubborn. It will not go away by merely increasing production; it will not go away by removing barriers to agricultural trade; it does not go away if the rich countries restrict their consumption or if they increase their production or even if they reduce their agricultural production, thus giving economic incentives to agricultural producers in developing countries.

The modelling system, which we call the Basic Linked System (BLS) consists of 20 national models and 15 regional models linked through trade, aid and capital flows. The national models are of general equilibrium type and their parameters are *empirically estimated*. The models are constructed such that not only physical flows but also financial flows balance both at national and international levels. The commodity flows balance at the level of each nation and at the international level. The financial flows balance at the level of each actor, the consumer, the government and the nation. The models distinguish nine agricultural commodities and one non-agricultural sector covers the rest of the economy. Thus the whole economy is included and there is no unaccounted supply (sources) or demand (sinks) in the system. It is run in a year-by-year simulation mode. The modelling system was developed at the International Institute for Applied Systems Analysis (IIASA) by its Food and Agriculture Program (FAP), with the help of a network of collaborating institutions. The objectives, approach and scope of FAP

are described in Parikh and Rabár (1981). The methodology and algorithms are given in Keyzer (1981). Fischer and Frohberg (1982) provide the technical description of many of the models of the system.

WOULD LOWER WORLD PRICES OR REDUCED CONSUMPTION BY THE RICH HELP THE HUNGRY?

There is some evidence to show that world foodgrain prices are kept high by the government policies of some big exporters and that this prevents poor countries from importing more. Thus, not just prices but also hunger are kept at a given level. What would happen if we kept prices low and allowed the poor countries to import more than they do now?

As a first step we assumed that a hypothetical country enters the market with the firm intention of selling 35 million tons of wheat each year, at any price, to help poor importers.

A new additional input channel that does not follow the rules of the market is thus opened in the system. It continues supplying just the missing amount of grain that is needed to eradicate hunger.

A series of adjustments starts as soon as the first 35 million tons appear on the market. The international market response is instantaneous. The major wheat exporters reduce their exports by increasing their stocks and the importers increase their imports. Yet the quantity is too high to be completely absorbed at prevailing prices. The wheat price drops and it stays depressed.

The second-level adjustment on the part of the exporting countries, after reducing their exports, is reducing their production as well. This happens with different time lags, different speeds and different intensities. This is, though, the general response of all the exporters.

The second-level adjustment on the part of the importers, after increasing their imports and their home demand, is the reduction of their home supply. In other words, they substitute their home production with cheaper imports. Of course, they reallocate their production capacities to other products. Because of these substitutions the consumption of wheat increases only marginally and hungry people do not eat much more.

The real advantage seems to be in the beef market. In almost all countries there is an upward shift in feed consumption: either wheat is directly used as feed or producers substitute wheat with coarse grain production. Bovine production and export figures in the exporting countries and imports in the importing countries go up and for some years after the shock an upswing in the beef market is created, until prices and production begin to adjust.

After all these adjustments we may ask the question: where are the additional 35 million tons of wheat, put on the market by an imaginary country? The answer is that it was absorbed in the system. Very little of it reaches the hungry people of the countries represented. They increased their buffer stocks, they changed their export structures and they substituted their wheat production with feedgrain, bovine, dairy and

non-food production. Consequently, hunger was not eradicated; instead a new export and production structure was created that seemed more profitable from the point of view of the new relative prices. The present market mechanism did not solve the problem. A solution by the market could not have been rationally expected anyway, since we already knew that effective demand does not always reflect biological needs and that the market is distorted in many ways by conflicting agricultural policies.

This scenario can be interpreted in other ways too. If people in developed countries were to eat less wheat, it would also put more wheat on the world market and the effects would be similar; changes in the structure of production, trade and prices but a marginal impact on the hungry in the world.

WOULD NOT THE FREE MARKET TAKE CARE OF HUNGER?

In this heyday of 'supply side economics' one sometimes hears that if only governments would not intervene in the markets, price signals and profit motives would solve the problem of hunger. Though no simulation with any model (after all, models abstract from reality and can on that excuse be rejected) can shake religious beliefs, we test this through simulation that introduces free trade in agricultural commodities in the world. In our simulations which run from 1980 to 2000, we introduce free trade gradually over 1982 through 1986, and the relative prices in the world market and national markets are equalised from 1986 onwards. Important production or demand restraining measures are also removed in the market economies.

TABLE 1 *Economic and welfare effects of agricultural trade liberalisation at country group level, percentage change compared to reference scenario in year 2000.*

	World	Developed market economies	Developing countries
GDP (at 1970 world prices)	0.25	0.58	-0.30
GDP (at 1970 domestic prices)	-0.05	0.15	-0.32
Agricultural GDP (at 1970 domestic prices)	0.02	-1.45	1.22
Per caput consumption of			
calories	—	—	-0.03
proteins	—	—	0.33
Persons hungry*	—	—	0.22

*Calculated from cross-country regressions, see Hrabovszky, Parikh, Zeold (1985).

Some economic and welfare effects of free trade are shown in Table 1. The figures given are for the year 2000 and indicate percentage changes of the free trade run compared with the reference run. As can be seen from this table, there are only minor changes in GDP, agricultural GDP

and consumption per caput at world level. Though GDP calculated at 1970 world prices shows a modest improvement, GDP calculated at domestic 1970 prices shows a slight fall. When one investigates the developed market economies and the developing countries separately, a different picture emerges. While the former group of countries increase their GDP the latter shows a decline. Under the hunger aspect the nutritional status of the population in developing countries even worsens under agricultural trade liberalization and the number of persons in hunger goes up.

TABLE 2 *Changes (in per cent) in food index, GDP per caput, calories and equivalent income for developing countries identified in the BLS: free trade run compared to reference scenario, year 2000.*

	Food Price Index		GDP per caput		Calorie intake		Equivalent income*	
	1990	2000	1990	2000	1990	2000	1990	2000
Argentina	31	22	0.3	-0.2	-2.2	-1.5	1.0	3.8
Brazil	14	16	-0.4	-0.7	-1.8	-2.0	-1.3	-1.9
Egypt	-3	-4	-0.6	-2.5	0.4	-0.4	0.8	-1.2
India	11 ⁽¹⁾	7 ⁽¹⁾	0.2	-0.0	-0.1	-0.4	-0.3	0.6
Indonesia	11	8	0.4	1.1	-1.0	1.8	-5.1	-3.6
Kenya	19	14	1.7	3.2	2.6	2.9	—	—
Mexico	-1	-4	-1.6	-4.2	0.0	0.2	-2.0	-4.7
Nigeria	-5	-9	-0.4	-0.6	1.1	1.2	0.5	0.2
Pakistan	-2	-3	1.2	2.2	-0.2	1.1	1.9	2.1
Thailand	11	8	0.1	0.1	-0.2	-0.3	—	—
Turkey	-6	-3	0.6	1.2	0.0	0.2	2.5	2.1

*Income required to get the same utility at base year prices as provided by current consumption.

⁽¹⁾Agricultural price index is used as a proxy for the food price index.

Table 2 gives more detailed information on consumption for those developing countries which are identified in the BLS. Food prices rise in Argentina, Brazil, India, Indonesia, Kenya and Thailand as a result of the removal of trade barriers. This happens because these countries have negative protection on the major food commodities and world market prices do not fall in the free trade run so that the price rise due to these negative protections cannot be offset. The income gain (measured as GDP per caput) is too modest – if there is one at all – to counterbalance the loss in purchasing power due to the price increase. Hence in 1990 except for Kenya, these countries consume less calories. By 2000 Indonesia shows a small increase in calorie intake.

The other countries shown in Table 2 – Egypt, Mexico, Nigeria, Pakistan and Turkey – have lower food prices in the free trade run compared to the reference run, and increases in calorie intake when they take place are modest (highest is 1.2% in Nigeria). In terms of changes in equivalent income, the picture is in general similar to calorie intake

changes. Brazil, Indonesia and Mexico suffer a fall in equivalent income whereas Argentina, Pakistan and Turkey show clear gains. Others show modest or changing gains. But the main point in this run is that the number of hungry in the world shows little change and if anything, increases.

WOULD A 'GREENS' REVOLUTION IN THE OECD COUNTRIES PROMOTE A GREEN REVOLUTION IN THE LESS DEVELOPED WORLD?

To test the hypothesis that less developed countries (LDCs) would benefit and that hunger would be reduced if the OECD countries were to reduce their agricultural production, one could envisage that the environmental concern represented by the 'Green' parties in Europe could culminate in attempts to reduce use of chemical fertilizers and restrict the extent of land cultivation. A tax on fertilizer prices may be introduced to provide for the cost of cleaning up the resulting environmental pollution. To simulate such a scenario we stipulated the following. A tax of 50 per cent was levied on fertilizer prices in the OECD countries. Moreover, total cultivable area was reduced by 25 per cent in these countries.

TABLE 3 *Impact on LDCs of lower agricultural production in OECD countries. Percentage change over reference run. Selected indicators for year 2000.*

Country	GDP		GDP	Calorie intake kcal/person/day	Utility indicators
	Domestic world (1970) prices		Agriculture (1970) prices		
Argentina	0.2	1.4	11.2	-0.6	3.7
Brazil	-0.3	-0.6	2.6	-1.7	-1.8
Egypt	-4.6	-4.7	10.5	-0.9	-9.4
India	0.1	0.1	0.1	-1.4	—
Indonesia	0.7	1.3	0.6	-0.4	6.9
Mexico	-3.9	-3.6	7.9	-1.4	-6.7
Nigeria	2.3	4.0	13.5	2.7	-16.4
Pakistan	0.2	2.2	9.2	-2.6	3.2
Turkey	1.0	0.7	11.8	-0.4	0.3

These changes were introduced over a five-year period from 1981 to 1985. Our expectations were that this measure would reduce production in these countries and result in higher world market prices. This in turn would lead to higher prices in LDCs which would stimulate increased production in these countries and after some time, and not too long a time, these countries would be better off.

The scenario results showed that (compared to the reference run) the world prices do go up and so do agricultural prices and production in the LDCs for which we have elaborate national models in the system. Their

agricultural GDPs also increase and so do the total GDPs in most of them. Yet the higher domestic prices that promoted increased agricultural production also led to lower intake of calories in most LDCs. Moreover, in terms of utility all LDCs but Argentina showed a decline. The utility measure is based on the underlying utility functions behind the expenditure systems which characterize consumer behaviour. These results, summarised in Table 3, indicate that even when agricultural production increases substantially as it does in Mexico, Nigeria, Pakistan and Turkey, the average calorie intake and utility indicators fall.

Thus the passive bystanders, the poor LDC consumers (especially in urban areas) are hurt by the actions of people in faraway countries and adjust in the only way they can by reducing their food consumption.

SUMMARY

What these scenarios have shown is emphasised by many others that we have generated. That hunger persists stubbornly and does not respond to easy solutions. The world economic system adjusts and adapts in favour of those who have. Similarly, national economic systems also adjust and adapt in favour of the rich groups within the nation.

Active redistribution policies that alter the structure of the system in favour of the poor within nations and between nations are needed if hunger is to be reduced effectively, substantially and in reasonable time. The reconciliation between overproduction on the one hand and hunger on the other would otherwise take a long time to come.

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DISCUSSION OPENING – MICHELE DE BENEDICTIS

Jan de Veer and Fisher, Frohberg, Parikh and Rabár (whom, for brevity, I will call the IIASA group) should be complimented for delivering two stimulating papers.

The first point I would like to stress is the complementarity existing between the two papers: one could read them as the first two acts of a

play. In the first act de Veer tells us quite convincingly that it is unlikely to expect, in the immediate and also in the intermediate future, any substantial change in the agricultural policies of the developed countries. In the second act the IIASA group produces some surprising and we could say shocking research results: even if dramatic changes – and, as we have been told in the first act today, unthinkable changes – were introduced in the policies of the developed countries the perspective of persistence of chronic and substantial malnutrition for many in Third World will remain unaffected. Among other things, the myth of free trade – at least, so far as the elimination of hunger is concerned – comes out shattered.

A third act remains to be written, which should answer this fundamental question: *is there then any way out of the deadly over-production/nutrition trap?* We cannot blame the authors for not attempting to give the answer to this question which, perhaps, more appropriately should collectively come out of the entire conference.

I will say more about this question in a moment; but first I would like to call your attention to a few selected points listed or hinted at in de Veer's paper which, in my opinion, deserve consideration for discussion.

The *first* group of points concerns the *supply behaviour in developed agricultures*. De Veer underlines, and I tend to share his views:

- (a) The low aggregate price elasticity in comparison with the powerful impact of other supply shifters;
- (b) That the level of yields are not very sensitive any more to price;
- (c) That an accelerated structural development may result in a more rapid diffusion of yield increasing technology;
- (d) That we are quite ignorant about the type and the size of adjustment that will take place after a radical lowering of farm product prices.

The *second* group of points concerns the *policy behaviour in developed agricultures*.

First of all, I feel that de Veer is quite right in stating that there is going to be *no major revision* of the agricultural policies, and of the price policies in particular, on the part of the developed countries, only collateral adjustments to alleviate the budgetary constraint. He points out several reasons that support his belief (the presence of other objectives assigned to agriculture – regional development, environmental control, the power of the traditional pressure groups, among others).

There is, however, another factor which pushes toward the continuation of the present situation, which, in my view, has not received sufficient attention in de Veer's analysis. Or, more appropriately, my position is more pessimistic than that which can be read between the lines in de Veer's paper. I refer to the role that is going to be assigned in the future to agricultural exports by the developed countries. It is my impression that the maintenance of a substantial flow of agricultural exports will continue to receive the highest priority in the policies of this group of countries. In no minor part this is also due to the appearance on

the policy making scene of a new group of characters with no direct interest in farming – the agribusiness export firms.

The impacts of aggressive export policies will be substantial both in the First and the Third World. Looking only at the developed nations, one should point out that the internationalisation of agriculture pursued through these means has increased instability, thus generating greater needs of government intervention and deepening the vicious circle of overprotection and overproduction in which developed agricultures seem to be trapped.

The *third* group of points concerns some tendencies in the international division of labour which will influence agricultural development both in the First and the Third World. In addition to the points mentioned by de Veer I would like to stress the following significant trends, largely imputable to the behaviour of developed economies:

- (1) The growing *internationalisation of capital*, taking the form of (a) foreign investments in plantations or the contracting of agribusiness with foreign products; (b) investment by food processors and distributors in retail and marketing in the Third World, (c) the opening of new markets for agricultural exports.
- (2) Increasing *capacity for agribusiness to gain control over farming*: specifically in the:
 - generation of technology;
 - control of the production process;
 - dramatic expansion of specific crops.

In the Third World these tendencies, together with other structural forces, tend to generate situations characterised by:

- diversion of agricultural production away from basic needs towards what is profitable on either the domestic or international markets;
- surplus labour in agriculture with lack of absorptive capacity in the rest of the economy.

All this raises a permanent conflict between agricultural and rural development and tends to create situations – to use the expression of Prof de Janvry – of a ‘cornered peasantry’ that experiences the worst form of poverty.

Finally, a few conclusive comments around the central question that should dominate the third act of the play mentioned before: is there any way to curb and dominate the stubbornness of hunger?

The final suggestion of the IIASA group is to point out the need for active redistributive policies that alter the structure of the system in favour of the poor. I would expect that they have in mind ‘feasible’ policies, i.e. applied through some form of reformism, not calling for revolutionary changes in the economic and social structure of the system.

At this point a methodological question seems to be in order. Do we possess the appropriate conceptual and empirical knowledge to identify the kind of policies that, though compatible with the structure and the

functioning of the system, would allow, at least in perspective, a way out of the 'poverty and deprivation' trap? I don't want to sound too pessimistic but I have the impression that we still have some way to go before we succeed in putting together an articulated conceptual framework capable of identifying regular patterns in the relations between the economic and social structure of specific societies, the forms, functions and limits of public action, the adoption of specific food and agricultural policies, the economic and social impacts of these policies both within agriculture and the entire economy. I wonder whether what I would call 'our excessive faithfulness' to the neoclassical equilibrium analysis of markets is not partly responsible for hindering the search for alternative or complementary theoretical frameworks. But I do not want to conclude these comments on a pessimistic note: I am convinced that significant progress has been accomplished in recent years toward the specification of more satisfactory theoretical frameworks and the possibility of incorporating them in quantitative models. The papers given so far to the conference confirm this general impression. However, more courageous doses of 'methodological reformism' and phantasy are needed if we want to write the third act of the play as well as the first two.

GENERAL DISCUSSION – RAPPORTEUR: CATHY L. JABARA

To start off the discussion of Dr de Veer's paper, his statement that countries isolated themselves and postponed necessary adjustments by letting their exchange rates float was questioned. In the view of the questioner, the opposite is true, that is, countries fix their exchange rates to avoid this adjustment.

Another speaker agreed with Dr de Veer that agricultural policies were effective in increasing agricultural production, but wanted to make two additional points. First, if price incentives are biased towards a specific crop, they may cause a surplus of that crop, but may not cause a surplus of agricultural production as a whole. At the same time, there could be a shortage of other crops. This point was made from the experience of Japanese agricultural price policy. Second, when agricultural surpluses emerge, it may not be possible to solve this problem by exporting because of the financial constraint of the government to subsidise the product on the world market or because of poor product quality.

In reply to the first comment, Dr de Veer stated that a devaluation or revaluation of the exchange rates, while a means to adjust the prices of import and export commodities, was not a direct mechanism which forced countries to adjust their policies so as to solve internal disequilibria. In his argument, agricultural commodities were special, regulated products due to their importance in the cost of living and influence on real wages. Countries used the effects of devaluation as time to take care of their internal problems. Dr de Veer cited the case of the Federal Republic of Germany which had difficulty in lowering agricultural prices after a revaluation of its currency.

With regard to the second paper a number of questions revolved around what was in the 'black box' of the IIASA model and how the scenarios in the paper were carried out. Specifically, it was asked whether the IIASA model results given in the paper were sensitive to the supply and demand elasticities, whether transport costs from exporting to importing countries were taken into account when the increase in wheat supply appeared in the market, and if the model examined changes in demand for intermediate products (inputs). Another question asked whether the model included the impact of changes in relative prices on the total economy or on the agricultural sector.

With regard to the overall results of the paper, the need to examine the economic and social mechanisms which produce the result that the poor do not benefit from increased food supplies was stressed. It was also pointed out that the poor might have the means to absorb production variability through the extended family. However, the extended family system is in the process of breaking up in many developing countries, a process which makes the poor even more vulnerable.

A final comment was that the scenarios in the paper involved regional or global changes while many of the problems in agriculture were national ones. In this regard, it was asked whether or not the IIASA model had been used as a policy tool in co-operation with a national group to examine national food problems.

In reply, Dr Parikh, who presented the paper, first stated that the paper did not include specific redistributive policies, and that national governments were left free to redistribute food through existing systems. He stated that specific redistributive policies could be designed through fair price shops, or food for work programmes, but knowledge of existing systems for redistributing food were currently limited.

With regard to the model results, Dr Parikh stated that the overall thrust of the results presented in the paper were robust with respect to the model's parameters and that transport costs from exporting to importing countries were taken into account. He also stated that the IIASA model was a general equilibrium model with consistent physical and monetary flows. Thus data presented in Tables 1 and 2 were consistent.

With regard to the more general comments on the paper, Dr Parikh stated that the model had been used for analysis of national agricultural problems for several countries, including Bangladesh where the model was used in developing that country's five-year development plan. National policy changes were also included in the global scenarios. For instance, a decrease in OECD countries' production was achieved through a decrease in land and fertilizer use in those countries.

Finally, Dr Parikh observed that the inability of the developing countries to benefit from the types of scenarios examined in his paper was due largely to a lack of financial resources and of specific policies designed to redistribute purchasing power or food to the poor in these countries. Thus there was a need for additional financial aid to these countries combined with specific redistributive policies in order for the

poor to benefit from global actions that increase food supplies. Dr Parikh also observed that the free trade run did not eliminate hunger, but it did eliminate surpluses. Therefore, the costs in terms of foregone income were much less than expected.

Participants in the discussion included Takeo Misawa, Günther Schmitt, Leroy Quance, Carlos Arnande, Ewa Rabinowicz, Lyndon Moore and Gordon Macaulay.