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The WOAgri economic model and why it is an improvement

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Lord Keynes had a rather critical vision of education - "the inculcation of the incomprehensible to the ignorant by the incompetent"! I hope to convince you that if this definition applies somewhere, it doesn't apply to ongoing applied research on agriculture, on which I report here !

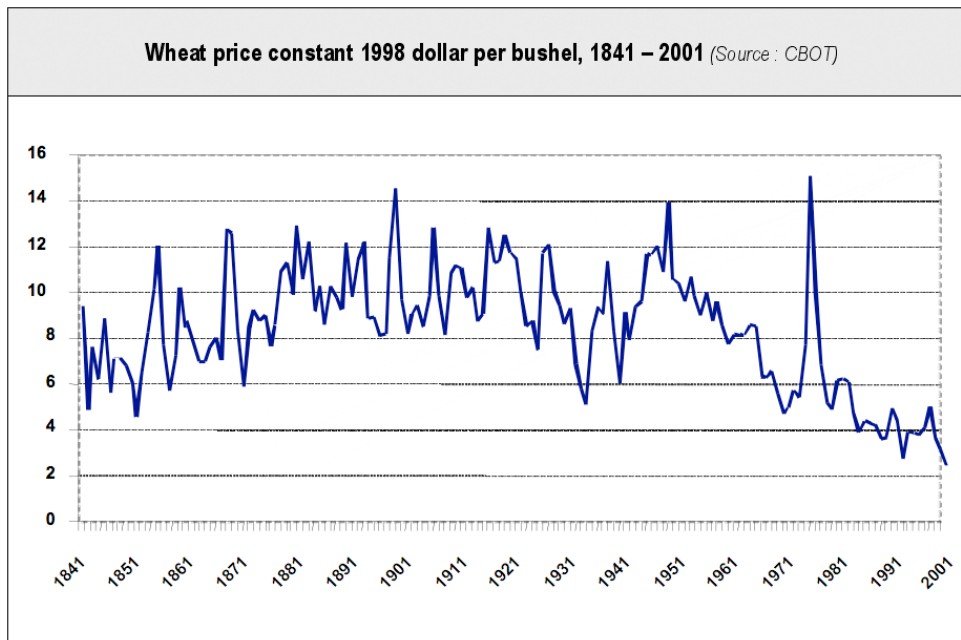
I acquired my background in three different countries: Morocco where I lived – on farmland as in the cities of Rabat and Casablanca - for almost twenty years and where I keep some strong ties; France, where I studied and live; and the US, - towards which I have a debt, both intellectual and human. My visiting graduate student time at Princeton, under Pr. Oskar Morgenstern's and Pr. Fritz Machlup's guidance; my post doc at Yale; and some frequent later connections with the academic world in this country left me with greatest souvenirs and put me in contact with some of my very best friends.

Our New Agricultural Rules (NAR) Model is being built by a team of researchers with diverse backgrounds (in particular economics and engineering) and experiences. But all have some experience of the jobs farmers do in quite a few countries around the world, including in less developed regions. We all are strongly motivated to try giving a better account and a better picture of agriculture in the world, than what is currently offered to international organizations of today like WTO, assuming that all international organizations do look at models of world economic exchanges.

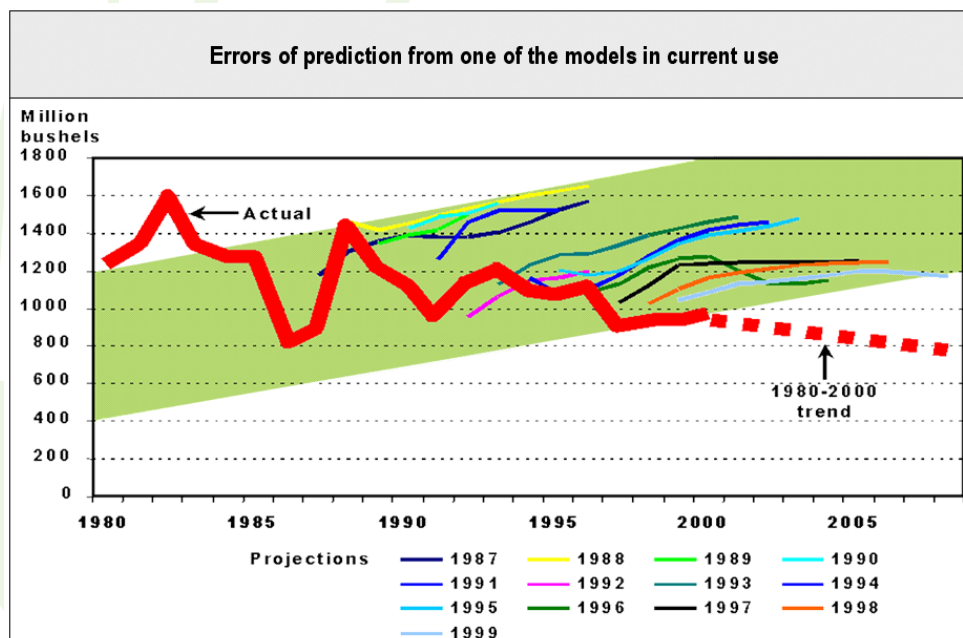
For the picture given by most often used models is quite strange. We all have been told for decades that agricultural prices would sometime stabilize around their market price. Yet, in the last thirty years, agricultural prices – unlike industrial prices - have been fluctuating more and more widely.

We have also been told that the reason why these prices have been fluctuating so wildly was only a temporary one. It is only because men have been unwise enough to refrain from getting rid of all tariffs, quotas and other type of barriers to free trade, including subsidies to farmers. But removing such barriers would open the road to stability. Yet, this type of barriers have been more and more removed in the last twenty-five years, and fluctuations of agricultural prices have gone the same puzzling way, in some cases frightening us.

Maybe the road opened is a very long road, but with such utterly long roads, won't we all be dead before anything happens?

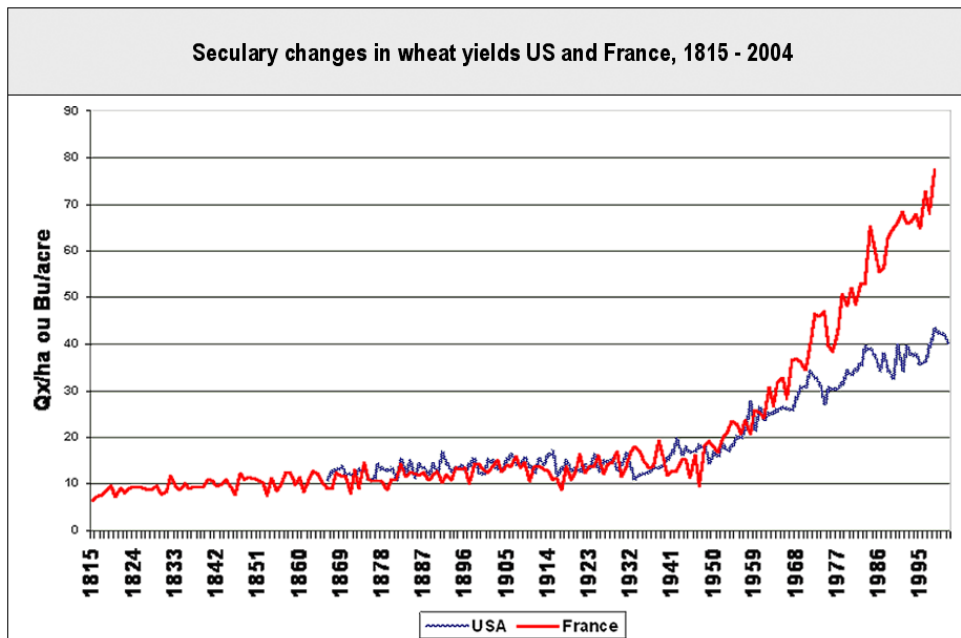


Source : CBOT, reproduit dans « La régulation des marchés agricoles. Un enjeu décisif pour le développement », p.68, dir. JM. Bousard, H. Delorme, L'Harmattan, 2007.



Source : Baumel, C.P, « How U.S. Grain export projections from large scale agricultural sector models compare with reality », IATP, 2001.

I suggest that the clue to our amazements can best be found in American History. Under times of bad crises, all countries get rid of a great deal of their respective cultural prejudices or ideologies, the U.S. being in that respect no real exception. In the early Thirties – a bad crisis if the word is to mean anything - , Roosevelt economists came to consider that agriculture called for specific discretionary policies, even if these policies differed from a strictly orthodox set of rules like the ones we want to govern industrial and service companies. The effects on farmers' production, if not unquestionable, were substantial.



Source : « La régulation des marchés agricoles. Un enjeu décisif pour le développement », p.69, dir. JM. Boussard, H. Delorme, L'Harmattan, 2007.

After World War II, the issues had entirely changed. The problems from which people were suffering regarded by then exchange controls, inconvertibility of many currencies (including all major European currencies), trade barriers of all sorts which had been necessary to the war economies, lack of private initiative inherited from different pre-war organization in some countries, etc. In one word, abusive regulations were bringing poverty or low incomes and, at the same time, a profound need of economic development. Students in economics in western countries suddenly came to discover that there was a "third world".

The focus of critical issues had thus completely changed. No wonder that the focus of solutions had entirely changed as well. Under such circumstances, how could one ever question that free markets were basically the pattern to aim at, except when some failure case appears, which economists carefully classify?

To be sure, problems of income distribution, problems of externalities linked to economic activity, more generally environmental issues, not to mention global issues that make us anxious today, have progressively and substantially corrected the picture² and some more selective course of actions have been taken now and then. But the general conviction remains.

As for the specificity of agriculture, however, we entirely lost it along the way. I think our main models in use for international negotiations are products of that movement of thought.

This presentation is organized in the following way: We first look (1) at the way some real world aspects are being presently taken care of by current models in use, in order to see what specific model is being needed to fill the gap. We then (2) illustrate what substantial innovations we have been aiming at, in our "New Agricultural Rules" (NAR) model and we describe the present state of the model and its practical importance as a negotiation tool. In a third and last part, we shall see (3) how we envision that our model be used and improved in the future.

1/

When we examined, two years ago, the major models which negotiators in agricultural matters could effectively use as supports, we were not surprised to see that these models all refer more or less to the efficiency criterion, i.e. to the maximization of some kind of indicator of society's welfare, a state of the economy which they intend to reach through market equilibrium. Let us only remark that this is paramount to assuming not only perfect markets and pure competition, but also assuming income distribution to be "the right one". Beyond that very frequent hint, we were frankly and deeply surprised by the following features:

1.1 - No single model we know of takes the degree of self-sufficiency of the different countries into account. This was only 'natural' in minds of the Enlightenment, when Dr Quesnay, Adam Smith and Turgot² were explaining that international trade, although meaning literally 'trade between nations' was in effect a trade between individuals. But times changed: thirty years later, at the time of the 'Continental Blockade' by Napoleon, not many economists would make such a statement anymore. And times have again changed. Our future is likely to be plagued by threats on transportations, local wars or civil wars, disruption of local productions etc. In turbulent times it becomes then costly, in terms of expected efficiency and expected welfare for one country, to be too far from a reasonable level of self-sufficiency. Western experience with oil should have made this point clear. It may not be so easy to meaningfully measure a degree of self-sufficiency, but we hardly can ignore it nowadays. Food and agriculture are a strategic sector, not unlike oil. Politicians tend to ignore it when negotiating at WTO, but they have to fall back on this reality in current affairs. Similarly, exchange rates should be accounted for, at least as exogenous variables.

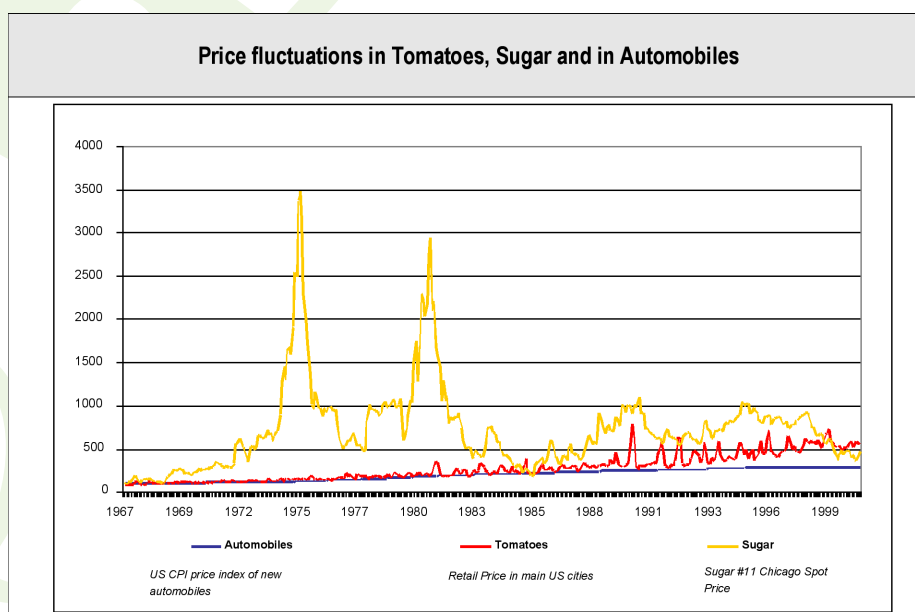
1.2 - Almost no available model takes into account the peculiar uncertain situation agricultural producers face. Indeed, agriculture is a specific sector because it has at the same time three features:

a) Final demands are relatively price inelastic for many products, substitution between (largely aggregated) groups of products is limited.

b) Prices, as has already been noted, are wildly fluctuating.

c) Once the decision to grow some quantities of products has been made, little adjustment of such quantities can intervene (one speaks here of operations, not of investments, where this lack of adjustability is less a characteristic of agricultural activity) up to harvesting time (while car producers can finely tune their productive operations, proceed through temporary lay-off, etc.). It should also be noted that, like in complex systems, there are some positive interpersonal correlations between price expectations and thus between output decisions.

These three characteristics make out of agriculture a specific sector. Taken together, these characteristics "produce" most of the fluctuations of prices and of market risk. The important point is that this is a case of "endogenous" risk, a type of uncertainty which does not call for the same policies as standard "exogenous" risk, changes or fluctuations of natural conditions being the standard example in agriculture of the latter.



Source : <http://economagic.com> <<http://economagic.com/>>

It should be clear from these remarks that the way farmers treat risk or uncertainty is a sensitive parameter of agricultural activity and markets, while most models just and simply ignore it. How could we then design appropriate policies if we lack an instrument to correctly assess the impacts of such policies on price movements?

1.3 - Almost no model is well built to meaningfully capture the effects of standard policies of international trade on the welfare of different social groups in Society. The most blatant example is that one single "representative consumer" is being modeled for each country, so that we cannot know, assuming that some country gets better off (or worse off) on the average, who benefits and who loses... Other examples are that most models do not take into account preferential agreements of trade between LDC's and the industrial world: how then can we know whether the differential impact of some policy with respect to another can be improving welfare in the relevant countries ?

1.4 – Most models ignore the impacts on innovation, welfare and distribution of income of the more or less stringent protection of intellectual property. Yet, these effects are massively important in terms of the level of innovative activity, in terms of who gets the royalties and what the effects on competition and on prices to consumers are... Such protection goes back to international agreements and to bilateral agreements, which have wildly different impacts on the variable evoked just a moment ago. In the practical world, these types of agreements are a decisive piece for long term growth and income distribution. But most models ignore them.

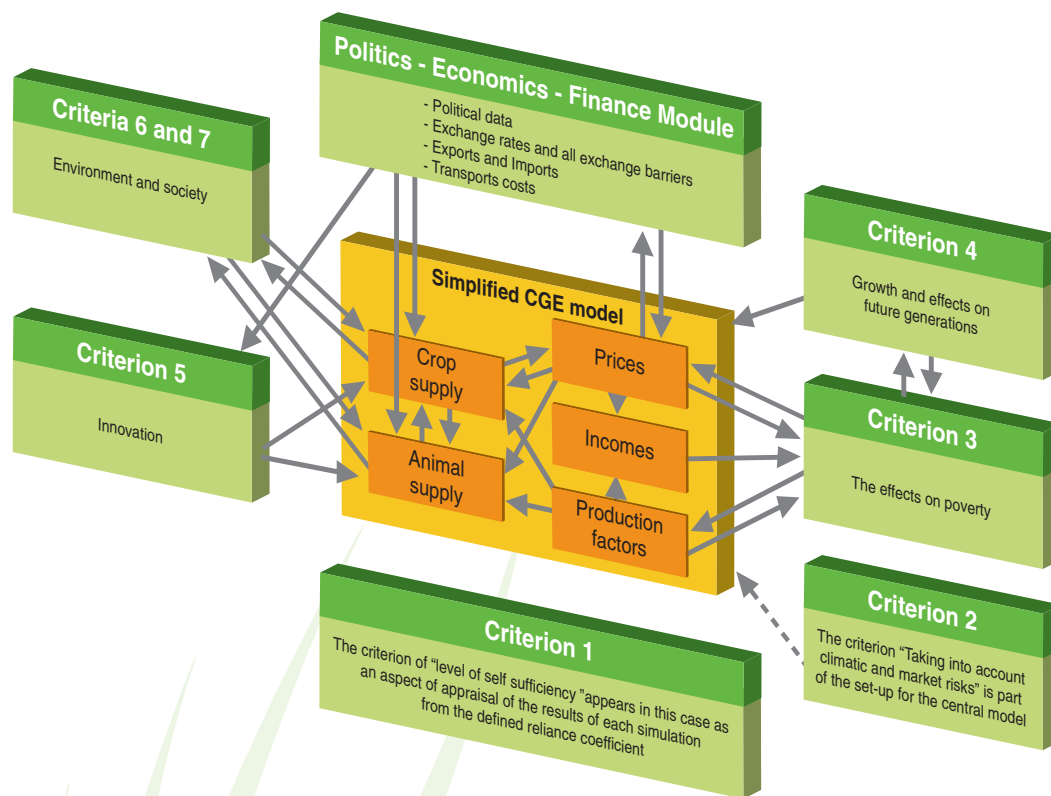
1.5 - One could also question how these models take into account natural resources depletion and the diverse impacts on the environment of agricultural (and other economic activities). Moreover, they do not allow for specific changes in parameters resulting from environmental issues and policies, like, for instance, the possible taxation that could be envisioned by countries abiding by environmental norms when other countries don't. Clearly this would be a way for abiding countries to acquire differential competitive advantages over the others. WTO has ruled out such sort of "compensatory green taxation schemes" for the time being, but it is far from unlikely that the idea will emerge again in the future.

1.6 - and **1.7** - Similar remarks could be made on long term human capital with respect to sustainable development and intertemporal issues, including the specifics of climatic change, etc.

Not all models do suffer from all such insufficiencies. For most of the seven points above, one can find some model which does not suffer from the corresponding insufficiency, or, to change vocabulary from now on, which satisfies the corresponding criteria. But none, of course, satisfies the seven criteria together and most models in use do not satisfy most of these criteria. The conclusion is that one needs, to shed some more light on the issues at stake, to have a new tool.

2/

A Computable General Equilibrium (CGE) model is a simplified representation of the world through a set of equations, some describing the behavior of some agents, others having an accounting meaning, etc. In such a model, the adjective "general" means that demanded (and supplied) quantities depend from many prices at the same time. Obviously, if one were to construct such a model and try to directly incorporate in it all 7 features mentioned in part 1 above, it would be a very heavy construct. More specifically, it would be difficult to run properly this model and to understand what happens when we reach some specific result. Interpretation would become difficult. So, we have decided to use a modular architecture, ordering around a central module some smaller modules, each featuring some of the issues raised above in a more or less simplified way.



Source : MOMA, 2005, d'après B. Munier, N. Drouhin, M. Trommetter

The central module (containing 7 macro-sectors) is reaching the end of the construction stage this coming month. It contains the following sectors:

1) The non-agricultural sub-module has five macro-sectors:

- Food processing (IAG), other industries (AI), individual services (SM)
- EG will feature the energy (EG) sector (Electricity, gas, etc.)
- PEC will feature fishing
- Public good services and Infrastructures (SNM or NTR)
- Residual sector (other products)

2) The risk/agriculture sub-module is also reaching the same stage by now. It aggregates the agricultural sectors in two macro-sectors, namely:

- AGRO will aggregate Cereals, (including rice) and large crops (sugar, oleaginous)
- AGR will aggregate cattle type of breeding, sheep type of breeding and other types of breeding.

There are five factors of production (Skilled labor, unskilled labor, capital, land and natural resources). Stocks or inventories play an important role in such a model, and we take them into consideration also in our framework.

Final demand will be split into four different categories of households:

	Urban	Rural
Poor	UP	RP
Rich	UR	RR

These splitting of households will allow us to really say whether or not such or such policy will benefit urban poors or rural poors, or, to the contrary, be adverse to one or both of these categories. Rural households raise a specific problem: should they be adversely affected, land would escape their hands (presumably be bought at low prices by some richer farmer or farming company) and they can be presumed agglomerating around some large cities, in slums from which people grow to almost anything from a career of gangsters to drug trafficking, when not worse.

This last effect can be presumed to be the most conspicuous effect of the grand opening of trade, rather than making poors richer. Without anything more – for the time being - than presumption, intuition and observation (which is no sufficient proof, I admit), I would tend to agree that the grand opening of trade and the 100% free markets strategy, while it may make some LDCs richer on the average, makes in other LDCs poors get poorer and come from the rural areas to the slums around the big cities of the Third World.

I think this is the correct way to interpret facts, while it is often heard that liberalization creates an average increase in welfare of X billion dollars among poor countries (X being continuously revised to smaller amounts, by the way). If I am correct, you may legitimately ask the question whether this current presentation – even if we assume temporarily that we can admit the conclusion – is not hiding more appalling effects than the positive ones it announces.

Sketch of most likely sequence following dismantling of all barriers to trade <small>(Source: Nicolas Drouhin, Bertrand Munier and Michel Trommetter, 2005, p. 8, §3)</small>		
Advanced Countries	World markets	Less Developed Countries
1 Tariffs, subsidies dismantled		
2 Prices decrease in AC		
3 Farmers leave land in AC	4 World Supply decreases	
	5 World Demand in excess	
	6 Higher prices	7 LDCs modern agriculture has some response capacity
		8 Prices of intensively used factors increase : land, capital, skilled labor
		9 Prices of unskilled factor decrease : Unskilled labor
		10 Poor workers leave their land
		11 Unemployed people in slums of large cities

Source : MOMA, 2005, d'après B. Munier, N. Drouhin, M. Trommetter

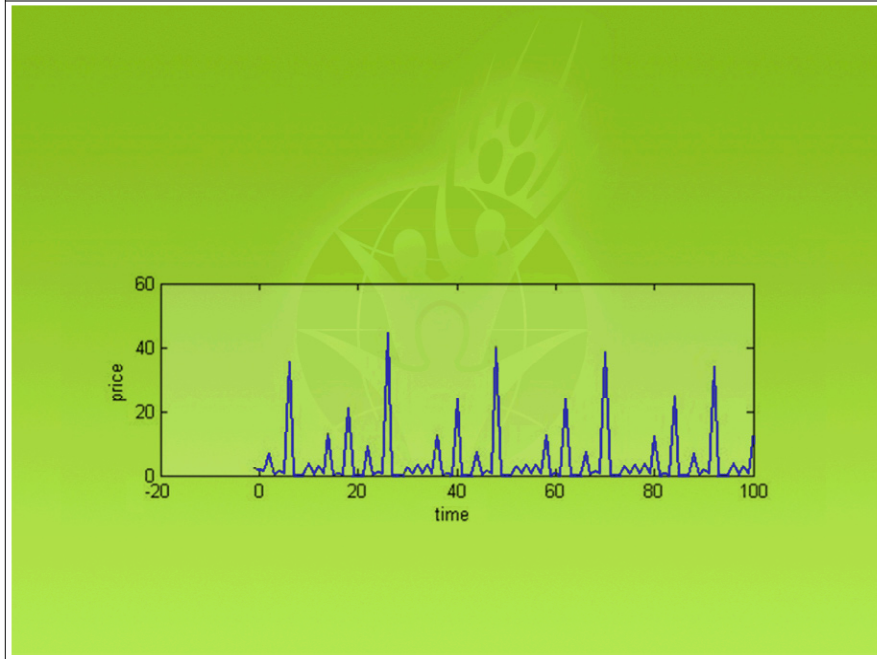
The modular character of NAR makes it a variable geometry model. We can run (for short periods) agricultural sectors alone as a hemi-general equilibrium model. We can then look for more details in this agricultural/risk module than can be the case when the model will be used in full generality. We can dispense with some of the dynamic effects, for example the innovation and intellectual property module can be discarded or taken with fixed values, etc. For longer term periods, it is obviously preferable to use, partly in sequence, partly in simultaneous treatment, the full-fledged model.

It is my view that this kind of architecture, allowing for some limited, partial (or, rather, hemi-general) equilibrium models, with or without some complementary modules, or for a full-generality model, is at its best to simulate consequences of given policies. It will be a handy tool for negotiators. It will be an alternative to existing models, being able to replicate with more meaningful features, the development of agriculture within the world economy. The number of sectors has been chosen to be 10 + a governmental non tradable goods sector. The number of countries will be variable, starting of course with the simplest split, i.e., three zones in the world.

Our team has performed some partial simulations of prices, in partial equilibrium for the time being, which give a picture of agricultural price behavior fairly close to real cases. We plan to work on this basis to finish the two-sector agricultural/risk model next month.

Finally, we hope to have a first (minimal) version of the model by the end of 2007 / beginning of 2008, with some first more general simulations in the weeks following that period.

A price simulation from the NAR team



Source : MOMA, 2007, d'après JM. Boussard et B. Munier.

Linking the last peripheral modules to the central modules should happen in the spring of next year. We hope to gather in the late spring of 2008 an international conference on such issues, in which this model could be presented in the state reached by then.

Then will start a phase of distinguishing more zones in the world and of improving the model and its use. This is, clearly, a long term effort, which will never come to a final end, like Sisyphus's work, though, we hope, the mountain will progressively move.

3/

The NAR model will be used by governments, public agencies, international institutions, NGOs, research centers, etc. who will request it. Its intellectual property will be protected, but licenses to use it will be granted on a non-profit basis to potential users.

The model will help to envision what effect on output, on demand, on inventories, on poverty, on environmental conditions, on potential disruption of supply, on innovation, policies on tariffs, subsidies of different types, infrastructure sharing, import quotas, but also on price limits or adjustable pegs, on preferential agreements, etc. may have.

Policies have to be determined by negotiation and coordinated, to be sure. But negotiation has to be based on some sufficiently credible predictions about facts. It should neither be based on simple personal convictions, nor on idealized misleading representations of the world. This is why international negotiations on agriculture need a more appropriate model. This is the justification of our efforts.

The model, once "finished" (= in a reasonably working shape, leading to simulations sufficiently akin to observable facts) will be open to suggestions from anyone anywhere. We envision also to have it as an open source object, but then under a minimal supervision of an international scientific committee.

We also hope that a network of international experts interested in modification and sophistication of the model will form, so that discussions contributing to useful knowledge for negotiators and to knowledge in general can take place in a fruitful way.

Concluding remarks

As the two preceding speakers have indicated, the aim of our effort is to create conditions for farmers to make some acceptable living in the world of tomorrow, in such a way as to maintain a capacity to feed Mankind at an acceptable level and within the constraint of a reasonably low probability of insufficient supply in every country. We hope that this will help maintain environmental conditions within acceptable bounds.

Free market competition should entirely play its role, within rules which can apply, in each given region of the world, to every incoming entrepreneur as well as to every incumbent. These rules have to be determined without any prejudice of any kind. The NAR model should help determining these new rules, as it will throw a more realistic light on where our world can go and how we can organize things in tomorrow's agriculture.

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1 It is only fair to add that, in some European countries, the free market recipe took more time to perfuse throughout Society than one could have thought. Several historians have insisted, in this respect, on the blocking role of ideologies, mostly inherited from socialist experiences of the Thirties. In postwar times of scarcity, low income, poverty, a great deal of forgetfulness did turn some pre-war experiences into golden periods. Jean-Paul Sartre – how admirable his work may be, by any means - did not hesitate to claim, in the late Fifties that the standard of living in Soviet Russia would soon be higher than the American one! ... Still in the Eighties, not every country had gone through that cultural aggiornamento.

2 In a celebrated letter to Miss Julie de Lespinasse