

Agricultural and Rural Development in the 21st Century: Lessons from the past and policies for the future

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Session 4: Frontier of science for agriculture in the 21st century

My contribution to this dialogue will be to address some additional questions to the ones that have been posed by the organizers, but first to these original questions and the topic of the dialogue:

As the co-Chair of the International Assessment of Agricultural Science and Technology for Sustainable Development (IAASTD), I would like to mention that the IAASTD would cover in very great detail the topics of the next two days dialogue and it will certainly also benefit from the insight gained that we will gain. I am looking forward for some interesting new visions for an agricultural system that will on the one hand have learned the lessons from the past and help build more rational and above all sustainable options for the future.

Before we discuss specific technologies or tools, I propose that we discuss what kind of agricultural system we, as a society, want for the future. From there we can then look at the knowledge and science needs, as whatever policies and innovations we may need or want, need to be in line with specific and well document needs. The IAASTD process will give us five plausible futures for consideration, which shall serve as basis for policy choices and decisions. Technological advances should then be sought as the need arises from these choices and in response to such needs.

Who will be the provider of these technologies remains to be determined, I would suggest that agricultural science should remain in the public domain and accessible to the farmers on a need bases. There are areas where the public domain should have a major input and agriculture is one of it. If we look back, most of the major advances in agricultural sciences actually came from the public domain (i.e., land grant model in the US, national agricultural research institutes in Europe), maybe a lesson to be considered already.

On how can modern science complement farmers knowledge, I would suggest the areas that are beyond the realm of genetics, in particular information and communication technologies that would allow farmers to better plan their seasonal crop selection, keep adequate reserves on farm or at community level, price information and more broadly information that would serve better agronomy, conservation, processing and marketing.

On the genetic resource end the lessons from the past and the tremendous potential for improvement, the resilience of different species and varieties to a broad range of biotic and abiotic factors should be learned and internalized. It is clear to many already, that it is the farming community that will in the long run, be the best steward of the agricultural biodiversity, assisted by science and gene banks, not the other way around.

Yes, as stated in the background paper; “Modern science can also provide opportunities for enhancing input efficiencies and for developing more sustainable production systems. But the extent to which farmers in developing countries benefit from such technologies, which are often highly knowledge intensive is a matter of debate”. While this may be true, it should not be forgotten that farmers in developing countries have their richest resources in their knowledge base, not in access to technology. It makes sense to build on this rather than try to develop solely an agriculture that discards farmers’ knowledge and replaces it with technology. The ability of farmers, everywhere, to embrace efficiencies when presented with them, is substantial but often underestimated. This does not mean that farmers have an innate understanding of the agro-ecosystem, and there is a strong need to strengthen the basic education of the developing country farmers, to make them more responsive to sustainable agricultural practices and the use of new technologies in an informed way.

But the dialogue that concerns me most is the one that would link the farmers with the policy maker on the one hand, but also, and even more importantly with the consumers. These have, in the end, the final say on what they will buy when and at what prices and also they are the ones that will elect policy makers supportive of their view in terms of what food they want on their table at which monetary, health and environmental cost. This will obviously only take place when the consumers are educated and are allowed to have a say regarding their food preferences.

In the future, much more education of, and listening to, consumer will have to be done, by the farming and agri-research community, rather than leave

the field open to the agri-business only. There is no doubt that agri-business has a role to play in the food sector, but it should really be one that is responsive to the consumer's and farmer's wishes and needs, rather than an imposing one. The designation of agricultural products as commodities is part of the overall food and nutrition problem. Given the strong cultural and social aspects, food should be treated at a different level, and raising its overall value.

Agriculture is the primary occupation of a majority of people on earth, their survival and lively-hood. The industrialized countries have gone full circle, from an exploitative agricultural model to a more sustainable one (before the advent of agro-chemicals), to an unsustainable model that is kept up only with huge amounts of external energy and financial support, and now back again to a search for sustainability. This cannot be the model for the rest of the world, nor can it be the model for the future of agriculture in these industrialized countries. As recent development is showing, there is no hope for energy or the external agricultural inputs to drop. If there is a need to keep food prices from raising as often mentioned in this paper so that the poor can afford food, then we need to look for other solutions. Cheaper food is not the solution...nor for the consumers in the industrialized countries who, because it is cheap, are wasting some 1/4 of the production, nor for the people in the developing countries, for whom we need to create the jobs and income generating opportunities that will take them out of poverty, in the many different sectors of the economy and so allow them to become consumers that will be able to afford to buy their food.

To put up-front issues of hunger and poverty and derive from such a simplistic view of a very complex issue that more technology will solve the problems is ignoring reality and treating symptoms. There is no doubt that we do know already much better, we know that prevention is better than cure, and we also know that technology has its limits, downsides, costs and need to be used with care.

Here a few selected thoughts on what may bring us closer to the often-stated goals:

1. On the production side:

Sustainable production should be the number one objective, as in the end it will be the most efficient and assure the long term food production needed

globally, in an integrated system that will also assure enough air, water, energy and biodiversity. The problems here are multiple and by no means easy. But they are not impossible to achieve as demonstrated in many instances, such as in the ICIPE push-pull model (www.icipe.org). Note that in this example research and dissemination investments compare rather positively with what the agri-business influenced national and international research would and has been spending. Also, the farmers remain in charge of their inputs and can make whatever decision suit them best in terms of what seeds they may want to keep for the next crop, marketing etc. We have now had enough examples of the dead end of the industrial agricultural model, with animal diseases that cannot be managed reasonably, same for crop pests that also thrive in large monocrop systems. There are however also sufficient lessons to be learned from alternative agricultural models, eco agriculture and organic agriculture that are or can be even more productive (I mean here farm productivity vs crop yield) than the industrial model with few if any drawbacks at all.

If the future of agriculture is increased specialisation, it does not follow that this will only come from eliminating family farms and trending toward larger holdings. Specialisation often requires greater labour per unit of production. Smaller units of more careful production systems are also an excellent base for more sustainable production, and will permit ecosystem services, such as pollination provided by wild biodiversity, to flourish in agricultural landscapes.

Among the key production constraints that most farmers in the developing countries are facing we have access to land, soil fertility issues, access to water and access to information / knowledge. I would like to emphasise the issues of soil fertility, which is basic to sustainable agricultural production and where science could contribute a great deal, if it were given the priority it deserves.

2. On the market side:

It is my experience that most farmers would be able to increase productivity given that there is a market, a rewarding one that is, not the small roadside market, so that the investment in time and money can be recouped through assured sale of quality products. This in turn can, I believe, only be guaranteed through new investments in processing the products in situ, into high quality and new products that will generate a market on the one hand for the farmer's products and on the other end for

the processed foods. In a world that is producing in excess of needs, that sees depressed food prices (commodities), there is certainly merit in looking into some new options for the farmers to generate income, to take labour of the land and create new customers while at the same time developing the service sectors. Investing in equipment that is “food grade” and facilities that are ISO certified can overcome the issue of phytosanitary standards. Appropriate technology has too often been expensive and in the end “in-appropriate”. In my experience, I can say that there was so far only little if any interest in such a decentralized, rural based processing scheme, although research into the profitability and market needs had been done with a very positive outlook.

3. On the Environment side:

Africa, Asia and Latin America are on the receiving end of the global warming impact. There are solutions available already for the impact mitigation of major weather disruptions, caused by the El Niño Southern Oscillation (ENSO) and the North Atlantic Oscillation (NAO). With more research and an information diffusion system, farmers could be informed on mitigation measures such as drought tolerant varieties, early or later planting, pest and disease management procedures etc. and government can use the same information to plan ahead in terms of strategic food reserves.

Conclusion:

The technological advances that will be most useful to developing country farmers are the ones that address their specific needs. These needs are both at the production and marketing side of the farmer’s business and very different from the needs of the industrial agriculture in developed countries. The needs of the developing country farmers are however not so different from the needs of the farmers in the industrialized world that are concerned with sustainable and quality food production. This convergence is a great opportunity for research to address global issues in sustainable and socially acceptable farming for the benefit of all. The research and implementation costs could be shared among the global farming and consumer community for its long term benefit.

I would call for much more research and development investments in water utilization / irrigation adapted to small / medium farm conditions, soil fertility restoration and maintenance, ecosystem services such as pollination and the provision of natural pest control among others, organic

agriculture and food processing. I would also call for new trade policies in agriculture, that would give the developing country farmers a head start while also making sure that the family farms in the industrialized countries remain economically viable. An example of such policies would be to start payment to farmers worldwide for their key contribution to air, water, biodiversity and recreation space provision. With half the humanity living in urban areas, a small “city tax” to benefit the farming community would be a small price to pay for our common future.

Nothing here is very new, or beyond our present capacity. The only missing element is a lack of will to make the choices that will place sustainability ahead of short-term gains and exposing humanity at great risks of catastrophic crop failures, animal / human diseases and environmental degradation.