

*“If you think in terms of a year, plant a seed,
if in terms of ten years, plant trees;
if in terms of 100 years, teach the people”
Confucius*

MORE FROM LESS

Armenian Biodiversity and Food Security

The history of modern agriculture begins after **World War II**. Industrialized countries switched back to a peacetime economy and developing countries gained independence from their colonial rulers and took more control over their agricultural practices.

Against the backdrop of a re-expanding population when international political and trade relations were being revised, many countries sought to increase **self-sufficiency** of food production to avoid the supply problems experienced by some of the richest countries in the world during the war. USA and EU, due to the right agricultural policies, strong government support and rich farming practices, not only have improved their standing regarding food shortage and food security, but also are the leading food export countries in the world. The goal for food security for Western countries really means everybody, regardless of income level, having sufficient access to food for a healthy diet and not having anxiety about where their next meal is coming from.

The same thing was expected to happen in Armenia after the food shortage the country faced during the war in early 1990s, but after almost 20 years, extensive agriculture production practices and dependence on import of agricultural raw material and inputs and food of strategic significance still continue in Armenia.

Having about 2 tons wheat production per ha and almost 2000 liters of milk per cow a year, almost the same level what we had 30 years ago and what many western countries had before World War II, Armenia is not able to overcome the food shortage, its dependence on international markets and transit roads in the near future. Today, industrialized countries produce 5 to 8 times more wheat and milk per ha and per cow compared to Armenia.

The main approach of the last millennium was the increase of efficiency in agricultural practices. In the beginning, the improvement of agricultural tools, the use of horses and oxen contributed to this, later on the application of agricultural machinery such as harvesters and tractors produced by John Deere International GmbH. Yet, the real development took place later on through improvement of productivity of the land itself.

Data analyses in the United States during 1948-2004 shows a decrease of some inputs and significant increase in others, moving from extensive to more intensive farming by reaching 168% increase in output. During that period, the labor use in the US agriculture has decreased by 76%, the land use by 27%, compared to 6% increase in energy use and about 368% increase in usage of chemicals.

Perhaps the most striking trend is the move from “food security” towards **“food self-sufficiency” which is the cornerstone of state agricultural policy in many countries.**

“Food security” means satisfaction of a local demand possibly mainly due to import, which was unfortunately dominant till the last decades, whereas “food self-sufficiency” means provision of enough food to everyone using a country’s own resources and self-sufficient food production.

In 1974, US Secretary of State Henry Kissinger announced during the first world food conference held in Rome that no child would go to bed hungry in the coming ten years, but 35 years later, in the week of another United Nations food summit in Rome, 1 billion people were hungry. Each year, more people die from hunger and malnutrition than from AIDS, tuberculosis and malaria altogether.

It seems “agriculture and food security” has become again a focal point on the international agenda. In 2009, the World Bank increased the financing of agricultural sector by 50%, up to \$6 billion. The Islamic Development Bank is establishing a department of agriculture for the first time in its history.

In 2010, the US President Barack Obama asked the Congress to increase America’s aid for agricultural development.

At their meeting in L’Aquila in July, the Group of Eight (G8) large economies promised to increase expenses for agricultural development by \$20 billion over the next three years.

After 30 years of neglect, the governments of most countries again make investments in the agricultural sector. Both the public and private sectors are taking more measures to help farmers than ever.

The President of the Republic of Armenia, Serge Sargsyan, announced agriculture as a high priority sector which is a precondition for making serious changes in the sector.

The government of Nagorno Karabagh (NKR) has established preconditions to shift to intensive agriculture changing the import and export balance. The NKR has started its own production of the most significant food, which will satisfy not only the local demand but also will be exported to the Armenian market. Serious preconditions have been established for livestock development and high quality food grains production. It remains only to have small and medium size business and big-scale farms get involved in these procedures.

In addition to the possible restart of military actions in the region, there are other, more global challenges. Between now and 2050, the world's population will rise by a third, reaching 9 billion, but demand for agricultural goods will rise 40% by 2030 and 70% by 2050 and demand for meat will double.

While the demand for food is rising, the suitable lands for food production are likely to decrease – mainly because of the urbanization, demand for bio-fuel and climate change.

Just the increase of productivity is not enough. Almost half of the produced food we lose at different stages of food value chain. Food losses in industrialized countries are as high as in developing countries, but in developing countries more than 40% of the food losses occur at post harvest and processing levels, while in industrialized countries, more than 40% of the food losses occur at retail and consumer levels (source FAO). Food waste at consumer level in industrialized countries (222 million ton) is almost as high as the total net food production in sub Saharan Africa (230 million ton).

Around the world, the food system is in crises. Prices have skyrocketed; they are now higher in real terms than at any time since 1984. The food crisis and price increase of 2008 have undermined the global food production system. Among the causes are: increase of energy prices, demand for bio-fuels, climate change, market speculation, as well as changes in dietary patterns in such countries as China and India due to increase in the income of the middle class, with hundreds of millions of new consumers who are ready to buy more meat, milk, cheese and other high protein products. In many US states, the low harvest of wheat in 2012, related to unfavorable weather conditions, will increase the food prices even more in international markets.

This has implications beyond just food production. The approach of agricultural policy differs in various places on the Earth. Unlike most countries, where agricultural practices were far from the ideology, the agriculture in early days of the State of Israel was generated by the very ideology and became a real testament to its embodiment of Zionism in the life and was very much connected with the settlement in remote areas.

Israel had 3 big goals for agriculture development in the past 60 years, and all have been successfully accomplished. The first goal was the settlement of migrants in remote and border areas. Second goal was to increase the level of self-sufficiency and provide food security. Finally, the third goal has been the development of export-oriented agriculture which also has become a reality in a very short period of time. Today, Israel is exporting \$1.5 billion food and agriculture input supplies to EU and CIS countries, USA, Turkey and other countries.

Israel was able to increase milk production per cow up to 10,000 liters within 30 years. According to the World Dairy Report 2010, published by International Farm Comparison Network (IFCN), there are about 120,000 cows in Israel producing 1.2 million tons of milk a year. Armenia has almost 3 times more milking cows than Israel but we produce half the milk. According to the same source, 600,000 liters of milk are produced in Armenia.

Agriculture development in Israel is quite unique, having less agricultural land and less irrigation water than Armenia. Israel is almost fully self-sufficient, producing about 90% of the main food crops and feeding more than 8 million people.

We need to have a vision as to how to develop private agriculture and what it should serve for. The role of the government, ways and levels of support must be clear. Should we grow everything or just those products which have comparative advantage in the market? After land privatization, those who developed the agricultural policy of those times thought that the market will regulate everything; the government has nothing to do with this. As we see, the market regulated mostly through import contributing to the prosperity of our next door and remote neighboring farms, where strong state systems exist for agricultural support. The same people, who were for segmentation of agriculture through distribution of assets to all rural households in early 1990s, today are talking about collective production, uniting small plots for efficiency and are preaching the significance of cooperative development without realizing that this is not possible from upper levels, it should start from the lower level- at farmers' wish.

The efficient production, though, is not always connected with large and collective farms. Almost 50% of food is produced by small-scale farmers and only 30% by the large ones. Efficient agricultural production very much depends on the level of applying new technologies, national traditions, the climate conditions of the region and the proper use of the country's biodiversity. For example, unlike the approach accepted in many countries of having a maximum profit through big-scale farms, in Austria and many other developed countries, the support to small-scale farms continues which ensures the sustainability of rural areas, employment, keeps national and rural traditions, development and diversity. Austria still has about 180,000 farms and 65% of the farms have 3-5 cows with average annual production of 6300 liters of milk per cow, but with higher content of protein and fat than in Israel.

According to the Swiss Constitution, agriculture is required to play an active role in attracting settlement in remote and economically disadvantaged areas. If the farmer in Switzerland uses remote pastures, he receives a financial support of 300 Euros per cow. This is only one way of support.

Located in the middle of Europe, why are Austria, Switzerland and some other EU countries so concerned about developing agriculture and preserving the rural areas? EU budget for agriculture development and subsidization has been around 50 billion Euros for many years aimed at keeping its own market, for supporting the remote villages and ensuring the ongoing growth of agriculture.

Armenia depends on extended global food supply chains and we are vulnerable to the unstable political situation in the region and to outbreaks of animal or plant diseases in neighboring countries. We've got to think about the vulnerabilities that are a result of extended global food supply chains. Any supply and demand changes in the world market will shift the supply curve and price index in Armenia.

Armenia should find its place and way in the world market by selling seasonal and off season products of high demand through diversifying the supply markets.

This is a serious challenge, which requires not only new scientific developments, but also supposes a greater awareness of modern approaches, exchange of experience in rural areas as well as transfer of new information and technologies.

By what means, what quality or generally what information do we give to farmers? How many TV programs are there on agriculture, village or rural needs?

The time to make broader investments in agriculture and food production is *now*. Research and development, technology transfer and knowledge-based projects are so critical for alleviating the poverty and hunger experienced by many people.

We've got a choice. We either start to change things now to overcome some of the great inequalities of food production and develop the disadvantaged, remote areas, or for food supply we continue to rely on the world in this way trying to exclude the hunger factor and migration of rural population.

We must realize as well that the development of agriculture is impossible without the increase of population and incomes. Within 50 years, the population in Israel has grown from 500,000 to 8 million, and the national income per person has become 45,000 USD.

New young graduates with western education and experience should be more involved in creating vision and strategies. Otherwise it will be difficult to overcome barriers in a very short period of time. Furthermore, the vision and the strategies should not stay on a paper. They should be implemented and given the necessary resources. We need new youth with a new mentality.

Long-awaited reforms must be made without being afraid of failures. If 30% of those reforms succeed, then we can consider the result satisfactory. Since the privatization in 1991, no radical changes have been made, yet it seemed to be the start of agricultural changes. These changes started and ended with privatization. Many laws accepted during the past years about seed breeding, livestock, veterinary and organic farming, etc., have not increased the milk yield of our cows or wheat production per hectare. As to the organic farming, it still remains on amateur level.

If we cultivate more lands, we will need more resources, and we will continue having more inefficiency in production. The right solution is to increase the productivity on a hectare or per head of livestock basis. ***To produce more from the less.***

In the 21st century, our strength is not only related to military forces, but also how strong our rural communities are, how rich the rural population is, what we grow, what's the productivity and where do we consume? Our neighboring countries realize this too, and we have no right to sit and wait to see how beneficial the sale of their food is in our markets.

Growth of Armenia should start from rural communities. In the villages people still remember what motherland is. They still keep and carry on national traditions, values, they respect adults.... They are not aware about profit yet, whereas, in the cities, alas, the motherland is where profit is.

Gagik Sardaryan

CARD Director

PHD in Agricultural Sciences