

Agriculture

A Sustainable Development Network Briefing Paper

Agriculture – the cultivation of crops and rearing of animals – began around 10,000 years ago, when humans first settled the fertile plains of Mesopotamia.

- It replaced the far riskier hunter-gatherer lifestyle and increased per capita availability of nutrition.
- Over time, better agricultural techniques were developed, enabling higher yields.
- Surplus food was traded, enabling specialisation and reducing risks further.
- Some people ceased producing food and became artisans or traders: commerce was born.
- The most explosive growth in agricultural productivity has occurred during the past four hundred years.

What caused the growth of agricultural productivity during the past 400 years?

- Clearer delineation and protection of property rights in land. Property rights provide people with incentives to invest in improvements to their land. They also turn land into capital, enabling owners to acquire loans at lower cost and thereby permitting more capital-intensive agricultural inputs, such as higher-yielding seed, fertilisers and pesticides, and diversifying into other trades.¹
- Stronger protection of inventions, through trade secrets, patents, copyright and other forms of intellectual property. Such rights provide incentives to inventors and also enable the owners to acquire lower cost loans with which to develop the invention into a marketable product.
- Better enforcement of contracts, which has improved security over transactions and thereby increased the incentive to trade.
- Reduced intervention in trade. Except for the period between the two world wars (when trade between nations was severely curtailed) the tendency over the past two hundred years has generally been towards freeing up trade between people in different nations.

These four factors have to a large degree been mutually reinforcing, with better technologies enabling increased trade, which enabled increased specialisation, leading to the use of improved, higher-intensity technologies. New technologies for ploughing, sowing, irrigating, and harvesting (including, recently, the introduction of diesel-powered tractors and harvesters); new crop varieties; and synthetic chemical fertilisers and pesticides. In addition, improved technologies for transporting and storing food have reduced waste and increased the diversity of people's diets. The result of more productive agriculture has been a dramatic increase in per capita nutrition across the world.

Barriers to Agricultural Sustainability

Agricultural productivity has been rising almost ubiquitously for the past two centuries, but it remains less sustainable than it might be due to several factors:

Perverse subsidies and price supports slow economic growth and harm the environment

- Subsidies lead to over-production and undermine the world market price of goods, thereby reducing the profitability of farming in poor countries.
- The United States recently approved \$180 billion worth of subsidies to farmers over the next ten years.
- The European Union gives out at least US \$40 billion in subsidies and price supports every year², "inflict[ing] enormous damage on developing countries, depressing and destabilising markets worldwide, and, by permitting exports at prices far below the costs of production, destroying smallholder livelihoods throughout the developing world. How can farmers with an income of a few hundred dollars a year compete with farmers who get an average annual subsidy of \$14,000?"³
- Governments of poor countries attempt to rectify this situation by subsidising their own agricultural output.
- Subsidies in both wealthy and poor countries divert resources away from more productive activities, slowing down economic growth.
- By encouraging overuse of inputs such as water, fertiliser, pesticide, subsidies damage the environment. In India, for instance, government subsidies to agriculture result in environmental harm, not to mention the enormous economic toll that such subsidies have on the non-farm sector. Subsidized irrigation leads to careless overuse of water. Soil is damaged through overapplication of subsidized fertilizers. According to the World Bank, "budgeted fertilizer subsidies in India rose from roughly \$900 million in 1982 to nearly \$2.5 billion in 1992."⁴

External factors

Inefficient transport, internal and external tariffs also reduce agricultural productivity. For example, trucks carrying perishable agricultural products often wait for hours, even days to pay tariffs between states in India. Products often spoil before they reach the consumer, a problem made worse by the absence of refrigerated trucks – which is in turn a

¹ Douglass North (1972) *The Rise of the Western World*, Cambridge: Cambridge University Press; Hernando de Soto (2001) *The Mystery of Capital*, New York: Basic Books.

² <http://www.ers.usda.gov/briefing/EuropeanUnion/PolicyCommon.htm>

³ Oxfam, <http://www.oxfam.org.uk/policy/papers/22europe/22europe.html>

⁴ <http://www-esd.worldbank.org/html/esd/env/envmat/vol2f96/meaval.htm>

result of very high tariffs on imported trucks (a situation which benefits the local manufacturers, who of course lobby to maintain the restrictions). These factors reduce the availability of food in countries where food is already scarce.

Inadequate land tenure arrangements

Inadequate land tenure rules in poor countries make it difficult to establish or enforce ownership over land, leading to environmental harm and decreased productivity:

- When farmers do not have clear title to their land, they have fewer incentives to maintain a long-term view about managing their land - so soils are depleted of their nutrients, whilst pesticides and fertilizers are overapplied.
- Poor land tenure rules prevent farmers from using their land as capital and prevent the consolidation of land holdings.

As a result, hundreds of millions of rural farmers are unable to escape from subsistence, barely able to feed themselves and quite unable to take advantage of the wonders of modern agriculture and the market economy that it has enabled.

Towards More Sustainable Agriculture

First and foremost, land tenure rules should be made more effective and less discriminatory.

- Legislation that prevents certain classes of people from owning their land individually must be removed.
- Legislation preventing the accumulation of land must be removed.
- The courts of law must respect the rights of individuals to arbitrate disputes over land privately. Modern technology can help by providing cheap and efficient means of delineating land boundaries – for example GPS combined with simple personal digital organisers could offer a very simple and effective system for identifying who owns what. A private register of land holdings could be constructed with relative ease and the minimum of bureaucracy.

Agricultural technologies offer developing world farmers the chance to escape poverty by producing more food at a lower cost, using less human labour and less land.

- Mechanization and use of fossil energy rather than human or animal energy would improve land productivity -- thus, less land would be required to grow more food.
- Pesticides and fertilizers would reduce the proportion of crops that fall victim to insects and disease.
- Packaging, refrigeration, and processing technologies ensure that foods do not spoil before reaching consumers.
- Genetic enhancements to seeds could make traditional plant varieties more robust, so that crops can be grown on marginal lands and with fewer inputs.
- Likewise, such genetic enhancements could increase the nutritional content of crops, which would reduce the disease burden in poor countries.⁵ Vitamin A deficiency, for instance, leads to blindness in 250,000 to 500,000 children every year, and half of those die within 12 months of losing their sight.⁶ Golden Rice could help to alleviate this nutritional deficiency.

Eliminating agricultural subsidies and price supports everywhere.

Governments should eliminate all subsidies to agriculture, including subsidies to water and 'emergency'/'disaster' relief. The benefits would be enormous, including:

- Hundreds of millions of farmers in poor countries would see the value of their products rise, helping them to escape from poverty.
- All consumers would pay less for agricultural products, including fresh fruit and vegetables, which contain micronutrients which help protect against disease. As a result, the poor especially would be better fed and less susceptible to disease.
- Resources would be used more productively and there would no longer be perverse incentives to use fertiliser and pesticide on lands that are not economically productive.

Free trade and eliminate tariffs. Nations should allow free trade in goods between individuals, groups and companies without distortions that benefit local producers over foreign ones.

The Sustainable Development Network (SDN) is a global network of organizations, whose mission is to encourage policies which allow individuals to pursue their goals without bureaucratic intervention. The SDN focuses on the institutional framework within which people act, to ensure that policies encourage individuals to make the best use of resources and to protect the environment, while improving both their own wellbeing and the wellbeing of others.

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⁵ http://www.globalforumhealth.org/Non_compliant_pages/forum3/Forum3doc327.htm

⁶ <http://www.who.int/nut/vad.htm>