

# The State of Food and Agriculture 2000

World food and agriculture: lessons from the past 50 years

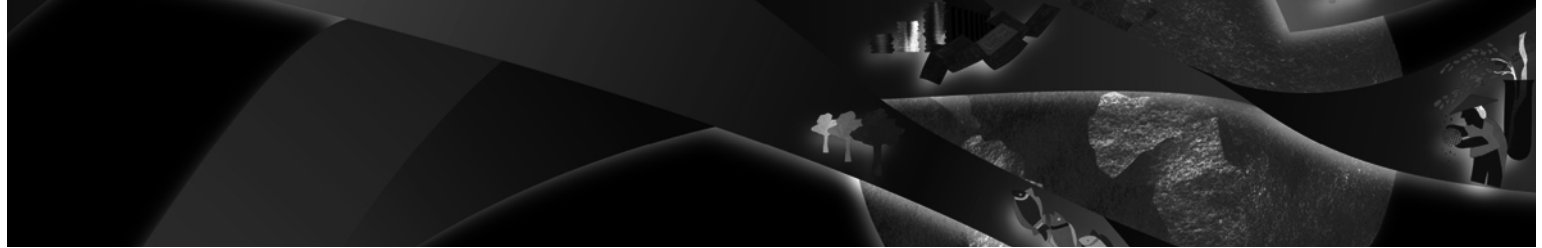
## INTRODUCTION

This year's annual report by the Food and Agriculture Organization of the United Nations (FAO), *The State of Food and Agriculture 2000*, includes a special chapter on lessons learned over the past 50 years, with a view to deriving policy messages for the years to come.

No other 50-year period in history has brought such wide-ranging and rapid changes, affecting every aspect of our daily lives. Food and agriculture have been no exception. Farm production techniques and systems have undergone major transformations, as have agricultural and rural societies. Food consumption levels and patterns have profoundly changed, for the better, for most of humankind. Economic and technological progress have made it realistic to conceive of a world free from hunger.

The past 50 years have witnessed the following developments:

- *A shift in regional concerns*, from Asia, formerly seen as a region with almost unsurmountable food security problems, to Africa, which turned from a land of promise into a major focus of developmental concern. For Latin America and the Caribbean the review shows a very uneven path of economic progress and contrasting situations of wealth and destitution, modernity and backwardness.
- *The occurrence of famines and food emergency situations*, frequently associated with wars and conflicts. Especially in Africa, conflicts were for many countries the single most important factor behind situations of economic regression and hunger.
- *The alternance of periods of growth and depression, the policy response to these cycles and the consequent emergence of winners and losers*. While high growth did not necessarily translate into commensurate poverty reduction, economic depression and related austerity measures represented immediate and severe blows for the poor.
- *Transformations in the political scene*, including the emergence of new nations, the cold war and East-West political alignments, the rise and fall of centrally planned systems of economic management, and the implications of these events for food security in the countries concerned and worldwide.
- *The evolution of approaches to economic and agricultural development*: industrial autarchy, the move from state intervention and central planning to market liberalization and institutional regulations governing international trade.
- *Changes in the concept of, and approaches to, food security*: agricultural market control, strategic food stocks, self-sufficiency and access and entitlements.



In this evolving context, agriculture and food security have not always occupied a priority position, suggesting inadequate awareness of the role of the sector in economic and social development. Such general neglect on the part of governments has mirrored a similar neglect from the media and, therefore, public opinion at large. Hunger and food insecurity have tended to attract media coverage only when dramatic events brought to light their most severe manifestations. This also holds true for the positive developments, which have “made the news” to a lesser extent still. Surprisingly little attention has been paid to what can be seen as the most significant achievement of humankind over the past 50 years: the major retreat of world hunger, particularly in densely populated Asian countries.

However, the public and policy-makers are becoming increasingly aware of the importance of the food problem, as shown by a flurry of national and international initiatives addressing the interrelated issues of poverty reduction, sustainable development and food security during the past decade. Yet, the progress over the past 50 years has been spectacular in some areas and disappointing in others. More than 800 million people still suffer from hunger and related diseases – much fewer than the 960 million estimated 30 years ago, but still a massive number, accounting for 13 percent of all humankind. Inequities in incomes, assets and opportunities among and within countries remain acute, and have even been accentuated in many cases.

The special chapter of *The State of Food and Agriculture 2000* includes four studies:

- **The socio-economic impact of agricultural modernization, by Professor Marcel Mazoyer**
- **Food and nutrition security: why food production matters, by Professor Michael Lipton**
- **Agricultural production and productivity in developing countries, by Professor Robert Evenson**
- **Political economy in the alleviation of poverty and food insecurity, by Professor Pranab K. Bardhan**

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## THE SOCIO-ECONOMIC IMPACT OF AGRICULTURAL MODERNIZATION

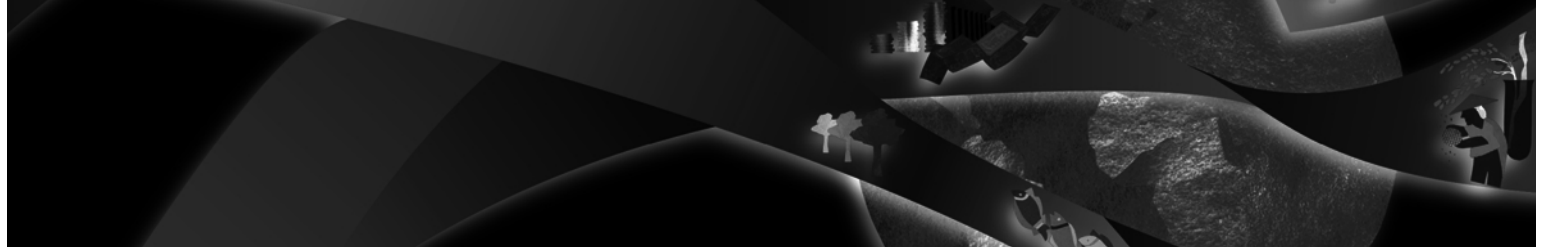
(A summary of Professor Marcel Mazoyer's contribution to *The State of Food and Agriculture 2000*)

The world's population now exceeds 6 billion people, consuming a daily average of about 2 700 calories per caput, compared with a population of 2.5 billion in 1950 and an average daily intake of fewer than 2 450 calories per caput. This means that, over the last 50 years, the increase in global agricultural production has been 1.6 times greater than the total production level obtained in 1950, after 10 000 years of agricultural history.

This enormous increase in food production is attributable to:

- the spread in the developed countries of the modern agricultural revolution (involving motorization, large-scale mechanization, biological selection, use of chemicals, specialization) and its expansion into some sectors of the developing countries;
- the more noteworthy occurrence in the developing countries of the green revolution – a modern agricultural revolution that is not dependent on heavy, motorized mechanization but instead involves the use of chemicals and the selection of high-yielding cereal and other domestic plant varieties suited to warm regions;
- the expansion of irrigated surfaces, from about 80 million ha in 1950 to about 270 million ha today;
- the expansion of arable land and land under permanent cultivation, from some 1 330 million ha to 1 500 million ha since 1950;
- the development of mixed farming systems using high levels of available biomass (combining crops, arboriculture, livestock and, sometimes, fish farming) in the most densely populated areas that lack new land for clearing or irrigation.

However, even these considerable advances in agriculture cannot hide the fact that most of the world's farmers use inefficient manual tools and their plants and domestic animals have benefited very little from selection. Moreover, these underequipped farmers, with their inefficient production methods, are exposed to increasingly fierce competition from better equipped and more productive farmers as well as to the strong decline in real agricultural prices. This condemns




resource-poor farmers with low productivity to extreme poverty, making them vulnerable to hunger and prompting their migration to towns and cities that are themselves underequipped and underindustrialized.

The outcome is a contrasting situation between the modern agricultural revolution, the green revolution, the expansion of irrigation, the clearing of land and the development of mixed farming systems using high levels of available biomass, on the one hand, and stagnation and impoverishment, on the other.

The current agricultural revolution with all its attributes – in particular its heavy, complex and very expensive motorized mechanization – has not extended far beyond the developed countries. Although it has reached small portions of Latin America, North Africa and South Africa and Asia, it has only been adopted in those areas by large national or foreign farms with the necessary capital. Alongside this, numerous small farmers continue to farm manually or using animal traction. Heavy motorized mechanization is also virtually non-existent in most parts of sub-Saharan Africa, in the Andes and in the centre of the Asian continent.

As a result of the green revolution, other regions have benefited from high-yielding varieties of a number of crops selected in international research centres, as well as fertilizers and phytosanitary products. There have been significant increases in yield in several countries, particularly with large-scale irrigated agriculture and proper water control. Increased production and productivity levels have enabled certain countries to reduce undernutrition significantly (e.g. India and China) or even to become rice exporters (e.g. Thailand, Viet Nam and Indonesia). Yet, despite these gains, extreme poverty and chronic undernutrition have by no means disappeared even in these countries.

***After 50 years of modernization, world agricultural production today is more than sufficient to feed 6 billion human beings adequately.*** Cereal production alone, at about 2 billion tonnes or 330 kg of grain per caput/year and representing 3 600 calories per caput/day, could to a large extent cover the energy needs of the whole population if it were well distributed. However, cereal availability varies greatly from one country to another: more than 600 kg per caput/year in the developed countries, where most is in fact used as animal feed, but fewer than 200 kg per caput/year in the poorer countries. Moreover, within each country, access to food or the means to produce food is very uneven among households. Consequently, in many countries, large segments of the population do not have enough food. And the large majority of the 830 million chronically undernourished are in the poor peasant farming community.

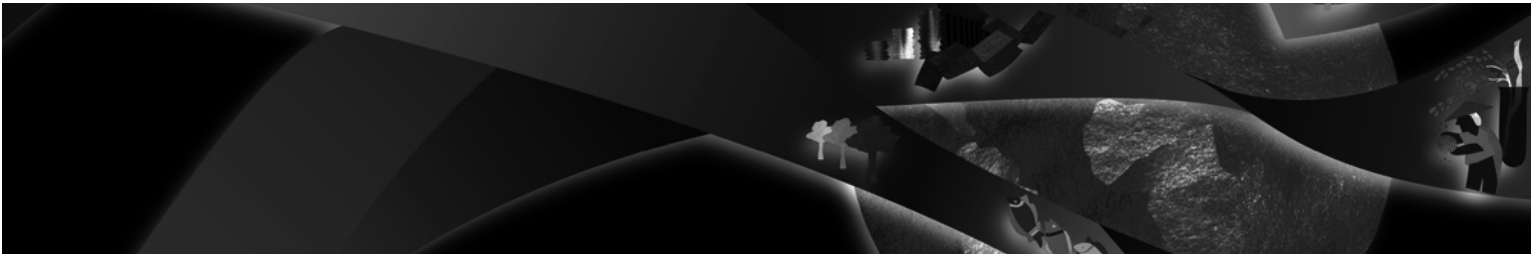


***World food security, therefore, is not an essentially technical, environmental or demographic issue in the short term: it is first and foremost a matter of grossly inadequate means of production of the world's poorest peasant farmers who cannot meet their food needs. It is also a matter of insufficient purchasing power of other poor rural and urban consumers, insofar as the poverty of non-farmers is also a product of rural poverty and migration from the land.***

Many demographers forecast a world population of about 10 billion in 2050, stabilizing at around 12 billion during the second half of the twentyfirst century: twice as many people as in the year 2000. It has been estimated that present world food production will have to be tripled if hunger and malnutrition are to be eliminated and if a population that has doubled, and consists of higher average build and age, is to be properly fed. The question is, therefore, whether these estimated needs of humanity are not beyond the capacity of the earth's land and water resources. Indeed, many regions are already fully exploited and sometimes even dangerously overexploited and degraded by erosion, reduced organic fertility and pollution.

On the other hand, many regions with potential have not been exploited or are underutilized. FAO data suggest that rainfed and irrigated cropland could be significantly expanded in several regions without much difficulty and without harming the environment, particularly through appropriate land-use management. Moreover, the current agricultural revolution can still produce higher yields in many regions. It can be extended to new land in developing countries and can even reclaim abandoned land in the developed countries (hilly and stony terrain) provided that its biological and mechanical resources are diversified and adapted. Similarly, the green revolution in its classic form can still make significant progress in yield and surface area in the regions where it is already developed.

Above all, however, a second green revolution could be extended to all hitherto neglected regions, including the most disadvantaged. This requires careful study of the agricultural systems, experience, assets, constraints and farmers' needs of these resource-poor regions to serve as the basis for related projects and policies, and that selection be now resolutely applied to "orphan" species and to varieties and breeds appropriate to these regions. This large-scale renewal and revival of the green revolution to encompass more regions, populations, plants and animals is referred to by some as the "doubly green" or "evergreen" revolution.



Definite action is required if enough food is to be produced and made accessible to the world's projected population of 10 billion to 12 billion people, and if their expectations of both environmental and product quality are to be fulfilled. First, approaches to development and food security need to prioritize the problems of the farming poor. Rescuing the most destitute half of the world's peasant farmer population from exclusion and poverty is in itself a fundamental social and humanitarian goal, but it is equally important to enable these farmers to play a tangible role in tripling world food production – the necessary goal to be achieved in the next few decades.

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## FOOD AND NUTRITION SECURITY: WHY FOOD PRODUCTION MATTERS

(A summary of Professor Michael Lipton's contribution to *The State of Food and Agriculture 2000*)

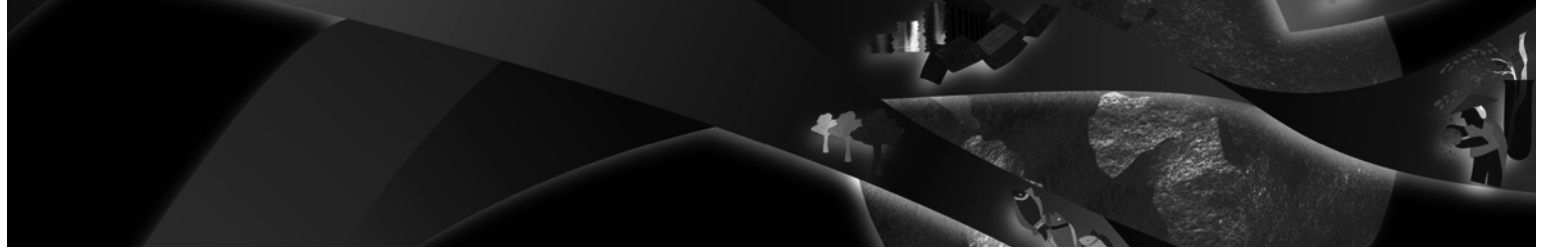
Postwar experience suggests that, to achieve continued reductions in undernutrition in the low-income African and Asian countries, where it remains worst, the yield growth for the main food staples will need to recover to the 3 percent level achieved in the 1970s – in the 1990s, as in 1950-1965, it was barely 1 percent per year in developing countries. Moreover, yield growth will need to spread to some of the neglected staple crops and poorly watered lands that were bypassed by the green revolution, especially in Africa. However, in real terms, funding for public agricultural research in international centres has been stagnant since the mid-1980s, and has fallen in Africa and Latin America.

Since 1945, the following global trends affecting food security and nutrition have emerged:

- an increasing accountability of states and the international community, not just for deaths from famine, but for food and nutrition security;
- from about 1980, a shift from state action to a reliance on markets;
- a shift from concern about national food security, measured by national staples self-sufficiency, to potential household food security, measured by dietary energy supply (DES), and then to actual household food security measured by the absence of protein-energy malnutrition (PEM);
- a shift towards consideration of food entitlements, rather than food availability, as the main guarantor of food security;
- major, although patchy, improvements in household food security and measures against undernourishment.

Three themes underly the trends described above:

**1) The end of the dichotomy between “productionist” and “distributivist” approaches to individual food security** – between failures of “food availability” and “food entitlements” as causes of famines (and chronic hunger). For most of the undernourished, extra income from employment in local staples production has been the key to enhanced food entitlements in the period from 1950 to 2000.



**2) Increased policy focus on nutrition security** in response to new knowledge and new problems and in recognition of the fact that nutrition encompasses aspects such as nutritional quality and balance, food safety and physical activities that prevent obesity.

**3) The need for people and organizations wishing to improve food and nutrition security to respond correctly to changes in the role of the state vis-à-vis markets.** Many opponents of “free” or globalized markets fear that these may harm some vulnerable groups in their progress towards nutrition security. Even though competition can make some poor groups poorer still, there is much evidence to suggest that countries that liberalize their markets are generally those most likely to raise incomes, and that this tends to reduce poverty faster.

In the developing world, falls in poverty, caloric underfeeding and protein-energy malnutrition (PEM) have generally accompanied rapidly increasing food staples output. Staples production is usually the main land use, employment source and output component of agriculture in most areas with serious food insecurity. Small farmers and landless labourers, the people most likely to be food-insecure, are especially concentrated on food staples production. This generates more employment per extra unit of land or of output than most alternative land uses. For food-insecure low-income populations, higher yields (per hectare and per litre) for food staples, and therefore extra employment and self-employment income in growing them, will be the main source of enhanced food security, at least until 2020.


The situation described above points to a number of areas for policy action aimed at significantly reducing poverty and undernutrition.

***Reducing poverty and improving nutrition through staples production.***

Progress in staples yield potential must be renewed. Researchers and policy-makers must address the reasons why the green revolution:

- lost momentum;
- failed to benefit most “complex, diverse, risk-prone” semi-arid and marginal farming;
- became less employment-creating per unit of yield increase; and
- lost funds and skills from open-access public research in the age of biotechnology, when agricultural scientists and patents were “locked into” a few private firms in rich countries.

A second labour-intensive green revolution that has the effect of improving nutrition will require more funds for public sector agricultural research; a



renewed focus on plant breeding; the buying in of biotechnology skills from the private firms that now control them; and stress on less-favoured regions, sustainable water use and labour-intensive cultivation of staples on smallholdings.

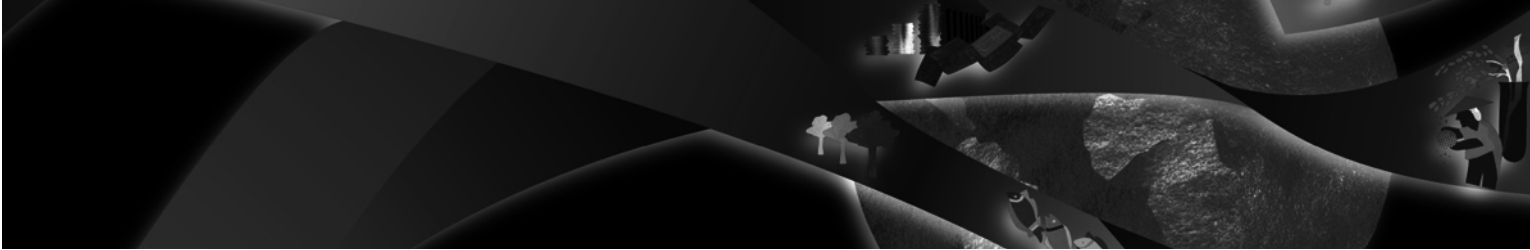
***The role of redistribution in achieving staples-based household food security.*** Household food security is assisted by better access to land, credit and institutions. Land redistribution is particularly important, given the extremely unequal landholding and farm income in some countries and regions. Land redistribution is a powerful source of employment-based entitlements to food. Land reforms between 1950 and 1980 achieved far more than fashionable scepticism suggests. A second wave of land reforms might result naturally in smaller and more equal farm units, by: i) removing selective support from rich farmers' inputs (especially water); ii) focusing water, market-access facilities, training, credit and research on small farms (and on the poor people trying to buy them); and iii) providing assistance or voucher-based schemes for poor farmers to obtain farmland.

***National staples self-sufficiency and food security.*** More food self-sufficiency may imply better or worse food security conditions for a country. Development typically involves two stages with regard to food imports, and policies need to follow the same sequence:

- i) In the first development phase, characterized by declining recourse to food imports, sound food self-sufficiency policies (that take into account comparative advantages and logistic and agro-ecological conditions), achieved through labour-intensive activities (especially in smallholdings), can reduce undernutrition.
- ii) In the later development phase, when net staples imports increase, policy action can contribute further to reducing undernutrition by promoting labour-intensive shifts out of staples production.

***Coping with fluctuations in food supply and access.*** Policy options can help households in seasonal stress management. Fluctuations in income can be reduced by appropriate policies for irrigation, pest management and new varieties. Subsidized food distribution from public stocks is not usually well targeted at the poor, but helps them in years of dearth by encouraging earlier release of traders' hoards, thereby limiting price rises. No large country with undernutrition problems can sensibly dispense with public grain stocks, but they involve costs in foregone public investment. Accordingly, policy managers should explore alternative methods (forward or options contracts in international markets). Household coping mechanisms that reduce vulnerability to shocks include credit and other arrangements for smoothing consumption.

***Focusing on vulnerable and disadvantaged groups.*** Household food security can be improved in these groups by direct food distribution, food-for-work, food



subsidy or emergency relief schemes. In a long-term perspective, basic education constitutes the best investment in favour of the most disadvantaged groups. Education improves farm productivity and income, among labourers as well as farmers.

***Environment and food security.*** Both food security and the environment can gain from better policies. Trade-offs exist but they are often due to the wrong incentives or institutions: “thirsty” food crops, notably rice, imperil sustainable water use where rice is subsidized relative to other crops and water relative to other inputs. Environment and household food security gain from action that corrects anti-employment and anti-environment incentives and builds on the key role of employment income for food entitlements.

***From household food security to nutrition security.*** Developing countries must start tackling nutrition problems of late development, such as obesity, jointly with those of undernourishment, because: i) they frequently have both already; ii) resource allocation between them is biased by political structures; and iii) mishandling protein-energy malnutrition (PEM) and micronutrient deficiencies now greatly increases death and illness from overnutrition 20 to 50 years later.

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## AGRICULTURAL PRODUCTION AND PRODUCTIVITY IN DEVELOPING COUNTRIES

(A summary of Professor's Robert Evenson's contribution to *The State of Food and Agriculture 2000*)

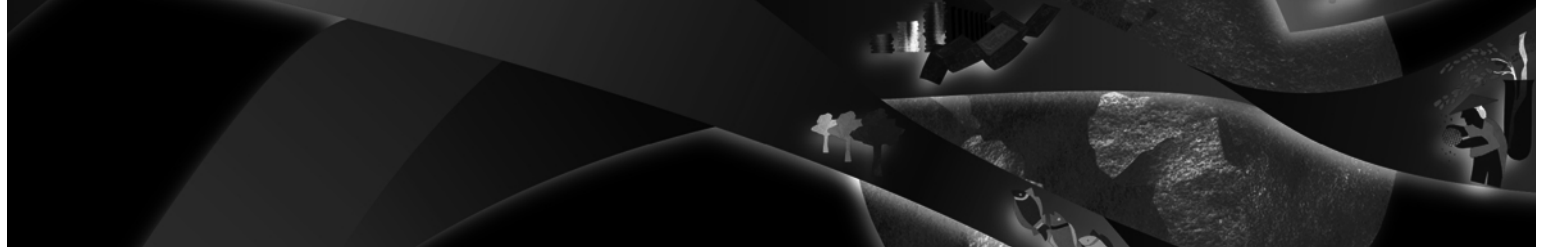
In spite of unprecedented rates of population growth during the second half of the twentieth century, significant increases in per caput production were nevertheless achieved as a result of dramatic increases in agricultural productivity. This production and productivity performance, although extraordinary, has at the same time been extremely uneven across regions and countries.

Indeed, evidence on agricultural productivity gains shows considerable variation in productivity performance across countries and periods. Studies of productivity change show that technological capital is critical in determining productivity performance. Technological capital is cumulated over long periods of time. Adaptive inventions enable developing countries to achieve high productivity growth. This implies building a national research capacity as well as a capacity to train researchers which, in its turn, requires investments.

Investments are essential for growth in agricultural productivity. Governments of developing countries and development agencies have not always been able to distinguish between productive and essential public investments and unproductive and non-essential public investments where the private sector is the efficient form of economic organization. However, the experience of the past half-century has shown that investments in true public goods production for agriculture (research, schooling and extension) have yielded high returns to taxpayers, while investments in most state-owned enterprises have not.

There is a significant number of studies on returns to investments in extension and agricultural research. These consistently show that both agricultural research and extension are very high pay-off investments. A survey of existing studies show that in 74 percent of the cases for studies on extension and in 82 percent of the studies on research, the internal rate of return to investments in these activities exceeds 20 percent. At the same time, however, the range of estimates is very broad.


Also, estimates have been prepared for FAO of growth in total factor productivity (which is a broad indicator of productivity growth) in agriculture



since 1961 for a number of developing countries, classified according to different levels of technological capital. These estimates show a strong relation between productivity growth and level of technological capital – which is achieved through investments: countries at higher levels of technological capital have achieved higher rates of productivity growth.

Many lessons can be drawn from the experience of the past half-century. Although experiences differ by country, by period and by commodity, there are certain patterns that stand out and bear mention in the context of future planning:

- Population control programmes will not in and of themselves produce real welfare improvement, but must be complemented with investments in technological capital.
- Productivity gains require *investments*. They cannot be achieved simply via technological “spillovers” (or “spill ins”) without investment in technological capital.
- It is necessary both to ensure an institutional and policy setting framework to provide incentives for private sector investments (including foreign direct investment) and to engage in public investment, and in many cases public sector conduct of activities, in which the private sector cannot be expected to invest.
- Most inventions in developing countries are adaptive inventions, i.e. adaptations of inventions made in developed countries. In public sector agricultural research programmes, the international agricultural research centers (IARCs) facilitate adaptive inventions, as do private multinational firms. If developing countries are to exploit international productivity sources properly, they must be “open” to them and, just as important, they must have invested in domestic capacity for adaptation.
- There is a sort of technological sequencing to productivity improvement. Genetic improvement appears to be central in that it provides a complementary relationship with extension and with agronomy, pathology, entomology, economics and other research fields. Once an economy reaches an advanced level of technology capacity, the effectiveness of extension and management advice depends on investment in research.
- The full effects of productivity improvements are realized through broader economic changes. Agricultural productivity gains may not accrue exclusively or even primarily to farm producers. Markets distribute the gains to both producers and consumers and enable the general population to benefit.
- For most countries with low levels of technological capital, the agricultural sector is the dominant sector of the economy and is obviously critical to development. Moving on to more advanced levels of technological capacity requires investments in public sector agricultural research and extension.



When looking to the future, conditions appear to be favourable for a continuation of the “extraordinary” performance of the food and agricultural sector. Recent studies by the World Bank, FAO and by the International Food Policy Research Institute (IFPRI) have projected that, for the next 25 years or so, per caput food production will increase sufficiently to prevent food prices from rising. In fact, all three models project declining real food prices. The “unevenness” dimension of food and agricultural performance is unfortunately also likely to continue.

A number of favourable factors appear likely to condition the performance of agriculture:

- The decline in population growth rates worldwide will produce a “demographic gift” in the form of a falling dependency ratio, as the work force grows more rapidly than population.
- Although the strengthening of the technological capacity of countries with limited capacity has been hampered over the last decade by reduced international support, nonetheless, the existing capacity and the existing pipeline of improved varieties and agronomic practices provide momentum that will ensure further productivity growth.
- The biological sciences have made extraordinary progress in recent decades, with scientific discoveries occurring at an unprecedented rate. The advances in the field of biotechnology have, however, been led by private companies and pose challenges to developing countries, where the response of agricultural research systems has to date been slow.
- Records of productivity in recent decades clearly show that the agricultural sector benefits from robust growth and development in the industrial sector in both developed and developing countries. Industrialization in developing countries, notably in East and Southeast Asia has proceeded rapidly. The crisis of the late 1990s in Southeast Asia appears to be subsiding and the next decades are likely to be characterized by rapid industrialization.

Among unfavourable factors that will negatively condition developments in the future is land degradation, which has occurred at a substantial rate in some countries over recent decades. So, however, has land improvement, and good land management in most countries are positive signs in countries with high levels of technological capital and supporting institutions, land tends to be managed more efficiently.

Irrigation systems have expanded over the past half-century in most developing countries, but irrigation investment opportunities have probably been exhausted in many regions. However, scope exists for improvements in irrigation management, just as genetic improvement gains that enable greater production per unit of land also enable greater production per unit of water.

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## POLITICAL ECONOMY ISSUES IN THE ALLEVIATION OF POVERTY AND FOOD INSECURITY

(A summary of Professor Pranab K. Bardhan's contribution to *The State of Food and Agriculture 2000*)

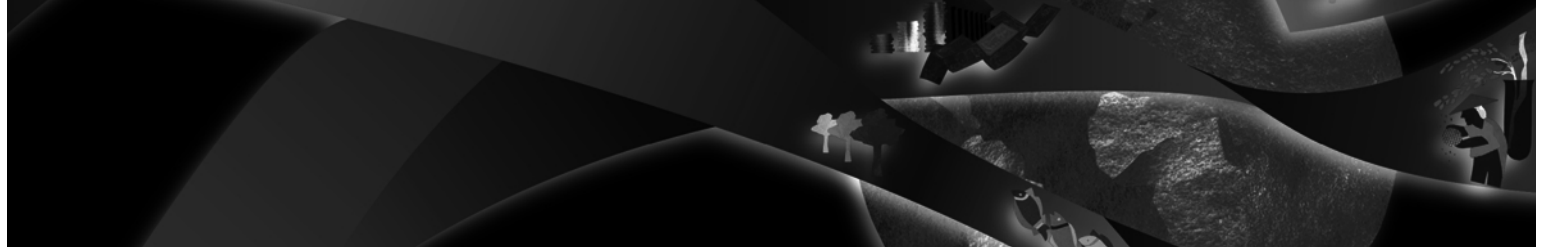
Although the past half-century has been characterized by major achievements in terms of increased agricultural production and productivity and greater food security for large parts of humanity, poverty and food insecurity continue to affect a large share of the world's population.

Rather than reducing poverty and food insecurity, a number of factors help to perpetuate them. It is important to identify the political and institutional mechanisms that prolong poverty and to draw lessons from the few cases among less developed countries where the obstacles have been successfully removed, so as to consider the context-specific prospects of replicating such cases. There is now a large literature on the processes that generate such poverty traps.

**Coordination failures.** The existence of poverty traps depends on failures in a society's various coordination mechanisms at the level of the market, the government or local community institutions. Credit market failures, for example, often play a crucial role in originating and perpetuating poverty, as the access of the poor to credit is often restricted, if not nonexistent. Attempts to correct credit market failures through various credit subsidy programmes in poor countries have been mixed and often beset by political and governance failures. The microcredit movement worldwide has yet to make significant inroads in areas where agriculture is the primary activity of the borrowers.

Also, failures of the insurance market make the poor extremely vulnerable to temporary shocks. Faced with pervasive risks, the poor try to follow risk management strategies (including crop diversification, use of low-yielding drought-resistant varieties, protective irrigation, sharecropping, migration of family members, etc.) or risk-coping strategies to smooth consumption intertemporally (dissaving, sales of assets, borrowing from relatives and other informal sources, remittances, withdrawing children from school, etc.). Yet these attempts are often costly and insufficient. Thus, a low-return low-risk approach tends to prolong poverty.

Some microcredit programmes, explicitly provide simultaneous access to credit




and insurance. Joint arrangements between state and community organizations mitigate different kinds of information problems and risks and can be crucial in building viable credit and insurance programmes for the poor. However, there are as yet too few of them in developing countries.

**Government intervention to alleviate food insecurity.** One of the main ways in which governments in some countries have tried to alleviate food insecurity is through public distribution of subsidized food. A much more cost-effective way of reaching the poor is through public works programmes, where work is made available for low wages whenever the worker wants. Of course, such programmes are more effective in relieving transient poverty and providing a floor to agricultural wages than in improving skills, sustainability of income or autonomy. Self-employment on farms and in artisan shops is a better avenue for the latter purposes. Among the constraints to self-employment are a lack of credit, marketing and physical infrastructure as well as cumbersome regulations and state interventions in pricing. Often serious underpricing of scarce inputs – such as capital, energy, water and environmental resources – leads to the adoption of capital-intensive and environment-damaging projects, which ultimately hurt the poor.

**Economic and social functions of the government.** It is now generally agreed that, while government often plays an obtrusive role in areas where it usually performs poorly (e.g. in certain lines of manufacturing or trade, including regulations in foodgrain marketing and pricing), it frequently does not play an important role where it should (e.g. providing basic education, research and extension services, public health and sanitation and roads). In particular, falling public investment in agricultural research and development in many countries is slowing the rate of technological progress in agriculture, while the decline of investments in the maintenance and repair of irrigation and drainage systems and rural roads as well as in the prevention of soil erosion has curtailed the effectiveness of earlier investments in agriculture.

Of particular importance are local governments that are accountable to the local people in the provision of public goods and services. Accountability usually brings responsibility in decision-making and in implementation, which helps in improving quality and cost-efficiency.

In government transfer programmes to the poor or the provision of safety nets, again, issues of local accountability are considered important for reducing leakages. However, it has been argued that a transition from a universal to a more narrowly targeted anti-poverty programme, designed to minimize leakages, may seriously erode its political support base and worsen the condition of the



poor. The poor are not usually sufficiently organized to mobilize political pressure and need explicit or tacit alliances with other groups in society to push for these programmes. Policies that combine growth with redistribution can soften the opposition to public anti-poverty programmes. In general, democracies provide a more hospitable environment for support to such programmes. More generally, regimes that are characterized by transparency and accountability in their institutions may have a better chance of reaching out to the intended beneficiaries of such programmes.

**Issues of governance.** The relationship between the state and local governance is important when thinking about why progress in the alleviation of poverty and food insecurity in recent decades seems to have been slower in some countries than in others. It is possible to argue that countries with slower growth in general may have seen no more government interventionism than other regions. More important than the quantity of intervention, however, is the quality of intervention. The quality of governance in some countries has been directly affected by rampant ethnic conflicts and civil wars. With weak and fragmented governments, the state often may not enforce the laws or property rights that provide the minimum underpinnings of a market economy.

Under these circumstances, in centralized regimes where power is in the hands of dominant ethnic groups or regions, decentralization in the sense of the devolution of power to local units and communities, together with the local accountability of officials delivering public services, is crucial in defusing ethnic tensions that often arise from minority groups and regions fearing discrimination and permanent exclusion.

A system of checks and balances against the arbitrary abuse of power to the detriment of minorities and regional autonomy in major political and economic decisions can go a long way to creating institutions of trust and commitment. Policies aimed at poor areas and groups as a whole may be fruitful in terms of equity, efficiency and intergroup harmony.

In conclusion, reducing poverty and food insecurity is not simply a question of enhancing agricultural productivity and production or of generating more income. It is fundamental to address institutional, political and economic factors that tend to exclude individuals and population groups from progress.

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## UNDERNOURISHMENT AND ECONOMIC GROWTH


by Professor Jean-Louis Arcand

In a study entitled *Undernourishment and economic growth: the efficiency cost of hunger*, prepared for the Food and Agriculture Organization of the United Nations (FAO), Professor Jean-Louis Arcand states that improving the caloric intake of populations in countries with high incidence of undernourishment can have an important impact on the growth rate of the gross domestic product (GDP) in those countries. The benchmark result of the study indicates that increasing the daily energy supply (DES) to 2 770 kcal per person per day in a sample of countries that were below that level, could have increased the average annual GDP growth rate by 0.8 percentage points during the period 1960-1990 covered by the study. This gives an idea of the magnitude of cumulative growth losses in countries suffering from undernutrition especially if one considers that the average annual growth rate in those countries for the period under consideration was around 2 percent.

Undernourishment negatively affects the productivity and hence the earning capacity of individuals in a number of ways. Undernourished adults can only support a limited workload and are more susceptible to illness. Undernourishment reduces children's capacity to learn through reductions in their knowledge absorption and school attendance ability. Thus, in societies with a large proportion of undernourished people, overall labour productivity, returns to aggregate labour input and, as a result, overall economic growth will be compromised.

Although such a conclusion seems reasonable and the negative effects of undernourishment on productivity have been supported by household-level studies, evidence at the aggregate level linking undernourishment and growth was previously lacking. It is this gap that Professor Arcand's study fills. He investigates the magnitude of the relationship between undernourishment and economic growth and attempts to distinguish between the channels (direct effects on productivity and indirect ones via impacts on health) through which hunger may affect growth.

The empirical model of the study uses percent changes in per caput GDP to represent growth, and two alternative variables to represent nutrition: per caput daily energy supply (DES) and the prevalence of food insufficiency (PFI), both taken from FAO's *Sixth World Food Survey*. The study examines data



from 110 countries during a period of three decades (1960-1990). The growth-nutrition relationship is investigated using country/decade averages of growth and of the two nutritional variables. An expanded version of the model includes data on years of schooling (to represent human capital variables) and life expectancy (to evaluate health conditions).

In addition to the main finding linking undernourishment to economic growth, the paper makes a significant contribution to the literature on the factors determining varying growth performance across countries and regions. It also demonstrates the existence, for countries with a high incidence of undernourishment, of an “undernourishment trap”, namely, low levels of economic growth leading to persistent poverty and undernourishment.

“Our empirical results show that the goals of “a world free from poverty” (World Bank) and “a world free from hunger” (FAO) are complementary. Not only may they improve human welfare, but they may also contribute to increasing the rate of economic growth,” writes Professor Arcand.

An important implication of the results of the study is that measures to reduce or eliminate poverty and hunger in poor countries should not be evaluated merely in terms of welfare and humanitarian benefits but also in terms of their implications for overall growth, Professor Arcand emphasizes. Thus, the fundamental message underlying Professor Arcand’s study is that feeding the poor is not only important from a humanitarian perspective but also a powerful means of enhancing national wealth.

#### **BIOGRAPHICAL NOTE**

Jean-Louis Arcand is currently Professor of Economics at the Center for Study and Research in International Development (CERDI), University of Auvergne (France), and was formerly associate professor of economics at the University of Montreal, Canada. Professor Arcand has written widely on how poor people respond to their conditions, and whether government interventions help or hurt them. He has also been an advisor to government officials in several developing countries to assist them in building up their institutional capacity.

# The State of Food and Agriculture 2000

World food and agriculture: lessons from the past 50 years

## Biographical Note on SOFA Special Chapter Authors

### Marcel Mazoyer

Marcel Mazoyer is Professor of Agriculture at the National Agronomy Institute in Paris. He has been awarded the Gold Medal from the French Academy for Agriculture, as well as the Mérite Agricole and the French Palmes Académiques. Professor Mazoyer has a detailed and practical knowledge of agrarian societies around the world and is especially known for his appraisal of centuries of agricultural development and modernization, including observations of the ways in which such development has affected society through the ages. He co-authored his contribution to *The State of Food and Agriculture* with Ms Laurence Roudart, researcher at the National Agronomy Institute.

### Robert Evenson

Robert Evenson is Director of the Economic Growth Center at Yale University, the United States, and Professor of Economics. An authority among agricultural development thinkers in the United States, Professor Evenson has written numerous influential books and reports and is a fellow of the American Association for the Advancement of Science and the American Association of Agricultural Economics. He is a strong advocate of the importance of public research efforts in obtaining agricultural productivity improvements that can reduce hunger.

### Michael Lipton

Michael Lipton is Research Professor of Development Economics at the Poverty Research Unit, University of Sussex, United Kingdom. His publications have addressed the causes of poverty and methods for its reduction – ranging from urban-rural relations and urban bias, to agricultural innovation and land distribution, nutritional status and most recently changes in fertility and age-structure. Professor Lipton's work with rural people, mainly in South Asia and southern Africa, has led him to form the view that, for most impoverished rural populations, substantially enhanced yields of food staples, together with access to land, are crucial to improving food entitlements and food security and to reducing poverty.

### Pranab K. Bardhan

Pranab Bardhan is Professor of Economics at the University of California, Berkeley, United States. During his career, he has held teaching positions at the Massachusetts Institute of Technology, the Indian Statistical Institute, and the Delhi School of Economics. Since 1985, he has been Chief Editor of the *Journal of Development Economics*, the leading academic journal in this field. In addition to publishing numerous articles on rural development, agrarian institutions, political economy and international trade, he is the author of eight books and editor of seven others on these same topics.