



**POLICIES AND MANAGEMENT FOR RESEARCH WITH A SUSTAINABLE
PERSPECTIVE: A COUNTRY'S VIEW FROM A POLICY MAKER**

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Policies and Management for Research with a Sustainability Perspective: A Country's View from a Policy Maker

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Demand for agricultural research services is endogenous to the development process, and therefore depends on economic, social, political and cultural factors. In consequence, at any point in time there is a limit to the possibilities of developing research organizations in developing countries. This limit is related, among other things, to the degree of diversification of the economy and to the rate of urbanization. Adding sustainability to the research agenda does not change this fact.

Rich societies are more concerned with future generations than poor societies. One wants future generations to enjoy the same high level of living present generation enjoys. The other wants the majority of the present population to enjoy basic living conditions that only a minority now enjoys. Even in rich societies, recessions make governments to compromise between sustainability and employment. In general, however, rich societies take better care of the needs of future generations.

Recognition of the necessity for sustainability can thus lead to different reactions, according to the level of satisfaction of current needs. It is not that developing countries do not care or do not know, though information is always more scarce.

It is not an easy task, even in developed societies, as Hartman and Wheeler² show, to design and implement environment controls and incentive regulations. It is easier for an industrialized country to press for conservation of a rain forest in a developing country than to press for environment protection measures that affect negatively employment at home. It is also difficult for a developing country to impose restrictions that affect, for instance, poor farmers' capacity to produce their own food.

Perceived need for agricultural research services is larger than effective demand. Increasing resources for agricultural research is generally considered an economically wise decision. To fully contribute to economic growth, to intra- and inter-generational equity, and to political stability, it is thought that agriculture should be supported by higher levels of investment in research. Crosson and Anderson³ discuss the points of endogeneity of demand for research services and of underinvestment in research.

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² Hartman, R.S. and D. Wheeler, Incentive Regulation: Market-Based Pollution Control for the Real World? (mimeo), in Claudio Fritschak (ed.), *Regulatory Policies and Reform in Industrializing Countries*, forthcoming, 1995.

³ Crosson, P. and J.R. Anderson, Concerns for Sustainability-Integration of Natural Resource and Environment Issues in the Research Agendas of NARS, ISNAR, Research Report 4, October 1993, The Hague.

Terms of reference for this paper listed four issues, discussed in the following four sections. The first section introduces the question of the relevance for developing countries of the issues of agriculture and environment. The second section discusses NARS priorities for management of natural resources. The third section attempts to evaluate levels of policy and technical commitment. The last section discusses resource implications of explicitly including sustainability in the research agenda.

Agricultural-environment issues: their relevance from a country perspective

Environment protection, resource conservation, and sustainability have been important for agriculturalists since the early history of agriculture. British farming systems in the nineteenth century had conservation as an important objective, together with production. Mismanagement of natural resources and environment degradation have however occurred as agriculture developed. Demand pressures and economic and population changes made increasing production and productivity to gain precedence over sustainability.

Economics of agricultural production and general economic conditions and policies, or lack of policies, are major reasons for the use of farming practices that are not consistent with environment protection, resource conservation, and sustainability. Because externalities are not accounted for in costs of production, "bad" technology or the "bad" use of otherwise safe technology become a problem.

Since the same forces conditioning past developments in agricultural production may be guiding the future, and probably in a more intense way, the question is what agricultural research can do to reverse the trend. What kind of farming systems will be able to satisfy present and future demand for agricultural products in a sustainable way? Can it be done independently of general economic forces or macroeconomic policy must be made consistent with sustainability?

Some NARS have started working with sustainability. The case of EMBRAPA in Brazil, a large research organization, may be interesting. Since its creation, EMBRAPA has devoted resources to develop technology for specific ecoregions. It created a center for dealing with the huge "cerrado" region (savannas), another for the problematic semi-arid zone in the northeast, and a third one for the humid tropics in the northern area of the country. They were called resource centers.

Initially, the driving idea was to develop technology to "open up" these areas for agriculture or to intensify production. But in so doing, EMBRAPA has helped to set the development of the areas in a more sustainable track, since agricultural entrepreneurs, driven by economic forces, would have "opened up" or intensified production in the areas anyway. It may be that research has accelerated the rhythm of occupation and reduced resource degradation in some areas, and accelerated both occupation and degradation in other areas. A detailed study of what really happened is still needed.

The mix of a big exogenous push for sustainability and scientists receptive attitude, prompted research organizations to move resources to focus technological requirements for growth with sustainability in ecoregional areas. In the case of

EMBRAPA, a long strategic planning exercise concluded that sustainability and environment protection had to be not only part of specific lines of crop research but also a well defined program to generate information to support rational management of natural resources in some ecoregional areas.

After the strategic exercise, EMBRAPA has reorganized some of its research units in certain areas of the country in ecoregional research centers. EMBRAPA now has 36 decentralized research centers, 13 being commodity research units with national mandates, 8 being centers related to basic themes, and 15 being agroforestry or ecoregional agricultural research centers. This structure represents the formal institutionalization of environment and sustainability in the Brazilian agricultural research. It is expected that, starting with some limited capacity in terms of resources, human and others, these new research centers will gradually develop strong research programs for sustainable development in important ecoregions in Brazil.

Conscience has been raised to the point where everyone wants a good research program with growth and sustainability as joint objectives. These are not conflicting objectives as they might appear to be. In the long view, they are clearly complementary objectives. Thus it should be expected that agricultural research in developing countries will be better focused in the future. The most compelling reason for this are projections showing population in the developing world will increase by about 3 billion people in the next three decades. However, even in the short run there are possibilities for developing technologies that increase yields and are sustainable.

Agricultural research is expensive only if not done well. To be well done it requires an adequate team of good, well trained and motivated scientists supported by research facilities. Adding difficult new objectives -sustainability, environment, poverty- to research agendas of NARS in developing countries experiencing economic crises may aggravate inefficiency and ineffectiveness of research organizations. Where inefficiency and ineffectiveness are already present, trying to deal with additional problems may not be the best strategy for institutional strengthening. Research institutions first must be strengthened and then charged with new responsibilities.

The picture is complicated by the idea that agricultural research should be privatized. Patents and property rights laws will certainly create conditions for the private sector to invest more in agricultural research. The private sector, however, may not take over many of the activities public research organizations are conducting today. Besides, institutions like patents and intellectual property rights have distributional aspects, as Helpman⁴ notes, with implications for developing countries.

Developing countries must weight the pros and cons of participating in a world where private enterprise will reap the benefits of agricultural research. Given the asymmetric global distribution of private entrepreneurship in agricultural research, some developing countries may prefer to increase support for public research rather than let technology be outside their control.

The relevance of the issues of agriculture and sustainability is obvious. But experience with research shows that food prices and research budgets are positively related, and that research budgets lag somewhat behind food prices. That is, it is not

⁴Helpman, E., Innovation, Imitation, and Intellectual Property Rights, *Econometrica*, Vol.61(6), 1993.

sufficient to show policy makers evidence of tendency for food prices to increase. They have to "feel" the increase before they will raise research budgets. Research on environment and natural resources problems may show the same pattern. Before adverse environment and natural resources effects begin to be "felt", financing an adequate level of research for sustainability may be more an intention than a fact. The idea here is that some critical level of damage has to be reached before political decisions are made to support environment protection measures and conservation of natural resources.

Ruttan⁵ says institutional innovations are capable of creating conditions for adequate treatment of environment and sustainability questions to support development during the next century. He says also that the greatest contribution in the 19th century was the "invention of a method of invention". NARS in developing countries have learned the method, despite problems in implementation. But in the 21st century molecular biology and other frontier issues in biology will be major sources of innovations. NARS are far behind in this area. Ruttan still sees an important role for traditional research in improving living conditions for populations in developing countries. But competing in the world market may require more than traditional research.

NARS priorities for management of natural resources

NARS research priorities are frequently established on the basis of empirical experience of research leaders about agricultural problems, relative importance of different commodities, ecoregions potentials and risks, and the need to keep participating of the science and technology game. No explicit information system can be perceived as a basis for priority setting and resource allocation.

With the exception of forestry research, usually an underfunded activity in developing world, other important questions of management of natural resource in general do not receive attention from agricultural research organizations.

The way NARS respond to the current pressure for sustainability and growth is to add studies on some of the major ecoregions in the countries. Areas where natural resources are fragile and population pressures stronger are chosen as priorities for research. This is similar to what has occurred in IARCs.

The case of the tropical region of Bolivia is an example. Noting that population is moving into this large and scarcely populated area, the Government of Bolivia reacted starting an effort to build a research capacity for that ecosystem. In this case the Government of Bolivia did not depend on information provided by any mathematical model to make the decision to invest in research for the tropical part of the country. And this is so because the need for this research effort is obvious. In this case it seems that the Government of Bolivia started to "feel" the problems of initial degradation of an important natural resource and, additionally, received support from international agencies.

Resource scarcity is always a serious constraint for agricultural research in developing countries. To additionally carry out research on natural resource

⁵Ruttan, V.W., Sustainable Agricultural Growth, in V. W. Ruttan (ed.), Agriculture Environment & Health - Sustainable Development in the 21st Century, University of Minnesota Press, Minneapolis, USA, 1994.

management, which is demanding in terms of research methodology and scientists capacities, and is time consuming and has less visible results, may put NARS under stress. It is therefore important to balance what should be done and what can be done. It seems that a good, practical rule-of-thumb is to start by defining areas where sustainability and productivity are complementary. First priority should be to start looking for an intersection of research areas where achieving productivity means achieving sustainability, Nitrogen fixation, biological control, integrated pest control, reduced or minimum tillage are examples of complementarity between sustainability and productivity under many conditions. The second priority should be an important ecoregion under risks of desertification, salinization, or any other type of degradation.

On the other hand, there is a sort of prejudice against modern inputs. Fertilizers is a case in point. But fertilizers have contributed to sustainability by replacing nutrients in the soil. They also cause environmental problems, as in the case of pollution of rivers by eroded soil with excess nitrogen. It may even be that the idea of fertilizers maintaining fertility has made farmers relax with respect to other possible negative effects of their agricultural practices.

Current levels of policy and technical commitment

Developing countries have internalized the idea that sustainability is important. Commitment in terms of intentions is higher than before and policies are improving. Capacity to commit technical resources, however, is less than adequate in many countries. The capacity to analyse the economics of sustainability and of environment protection must be developed. Sustainability and environment protection objectives are enhanced because of higher awareness of their importance and improvements in policies and in research programs. It should be expected that developing societies will pay increasing and improved attention to sustainability.

Economic crisis and political unrest due to extremely adverse living conditions of majority groups in developing countries make difficult to divert resources to seriously consider sustainability and environment protection in research programs. But if sustainability is not taken into consideration in today's production research, expectations for future living conditions must be lowered.

An imperative objective is to build stronger NARS now. This is a guaranty that the research system will in time be providing an acceptable level of information on natural resource management, sustainability, and environment protection. Stronger NARS will be capable of developing technologies that are complementary in the short run with respect to both sustainability and productivity. But this should not be done in place of adjusting policies to induce sustainability efforts.

The more difficult question of choosing between sustainability and productivity will have to be faced in the future. The deciding factor in the choice between the two will be the force of the political manifestation of the demand of present populations for improved living conditions.

Research resources implications.

The impact of demand to include natural resource management and environment protection in the research agenda is stronger competition for already very scarce resources, both financial and human resources. Both are scarce and cannot be increased in the short run. Rural poverty is also starting to seriously to compete for research resources. This is the social side of the demand for research services. Bronowski⁶ calls attention to the fact that science's concern with social issues is recent. In the past, science was concerned only with knowledge and the truth. At the end of the twenty century, people expect more of their scientists. Equity is in the research agenda and it will be necessary to attend this objective without jeopardizing efficiency in designing technologies for productivity *cum* sustainability.

NARS have to face the difficult decision of moving resources from high priority areas in the production side of the agenda to these more social research problems. Most NARS, if strengthened, should receive more resources, not less. It has to be noted that not everyone thinks agricultural research is underfunded. Fox⁷ raises a note of caution.

To really take care of sustainability and environment, NARS must be strengthened. If additional resources are not available, what decision should a strengthened NARS take? Cut core research and invest in environment and sustainability research, a research agenda with a longer period for results to become apparent? Keep doing production supporting research that will help reduce present generation's problems? The solution in developing countries has been to start some effort in the area of sustainability and environment but keeping the major thrust in production supporting research.

This problem is compounded in times of declining fiscal budgets for agricultural research in an area of research where private resources will be slow to come in. Human resources specialized in sustainability are not abundant and NARS have to invest in training, therefore consuming more of the limited budget. Groups pressing for research to include these issues in its agenda should be pressing finance ministers to invest more money in agricultural research and the CGIAR to finance expanded programs of institutions like ISNAR, whose mandates are specifically directed to helping NARS to strengthen their management and research program.

⁶Bronowski, J., *The Ascent of Man*, British Broadcasting Corporation, Science Horizons Inc., 1973.

⁷Fox, G., *Is the United States Really Underinvesting in Agricultural Research?*, AJAE, November 1993.