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Sustainable Agricultural Development
For Small Hillside Farmers in Jamaica

L. Van-Crowder
Jamaica, W.I.

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SUSTAINABLE AGRICULTURAL DEVELOPMENT FOR SMALL HILLSIDE FARMERS IN JAMAICA

L. Van Crowder
Technology Generation
& Transfer Specialist

July, 1993

PREFACE

This publication contains two papers that deal with sustainable agricultural development for small hillside farmers in Jamaica, focusing on institutional and technological considerations.

The first paper briefly establishes the background for a discussion of sustainability and looks at the issue in terms of institutional factors that influence technology generation and transfer appropriate to the needs of small hillside farmers.

The second paper draws upon experiences of the MINAG/IICA Hillside Agriculture Sub-Project (HASP), and in particular on-farm adaptive research, to address the topic of sustainability.

QUICKENING AGRICULTURAL DEVELOPMENT THROUGH SUSTAINABLE TECHNOLOGY

Prepared for the Jamaican Society for Agricultural Sciences (JSAS) Symposium "Quickening Agricultural Development."

L. Van Crowder
Technology Generation & Transfer Specialist
IICA/Jamaica

June, 3, 1993

INTRODUCTION

"Sustainability" is a term that we have heard with increased frequency during recent years. In particular, the term "sustainable development" has been fashionable in the donor community.* Less often do we hear about "technological sustainability." There is, however, a vital link between sustainable development and sustainable technology. Furthermore, it is evident that in many cases institutional reform is required for technological sustainability. Thus, it is possible to conceptualize a "sustainability triangle" that consists of the mutually supporting components of sustainable institutions, technology and development (see Figure 1).

Technological sustainability can be defined as those technologies that are both profitable to the farmer and environmentally acceptable. A key question is: Why are many of the prevailing technologies in Jamaica not sustainable for limited-resource farmers?

The focus of this paper is on technological sustainability with special reference to small, limited-resource Jamaican farmers.

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* FAO defines sustainable development as "the management and conservation of the natural resource base and the orientation of technical and institutional change in such a way as to assure the continuous satisfaction of the needs of present and future generations."

TECHNOLOGICAL SUSTAINABILITY FOR RESOURCE-POOR FARMERS

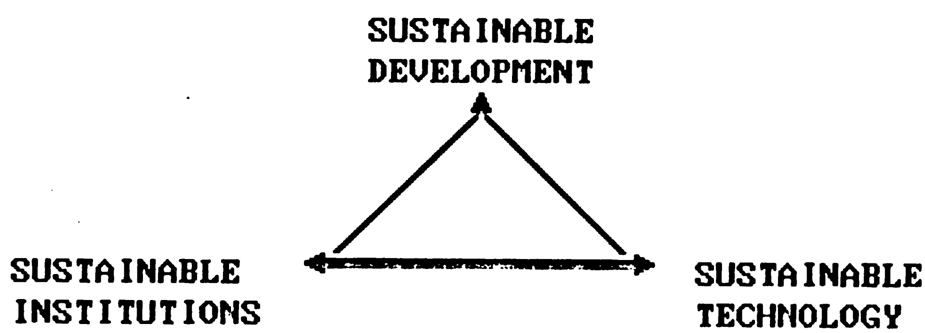
In agriculture, choice of technology is obviously an important determinant of project success if farmers are expected to adopt the recommended technology. The World Bank's Operations Evaluation Department (OED) observes that where improved technology has been adopted, projects tend to be relatively more sustainable. A critical question is whether "improved technologies" are sustainable -- that is, how well do they fit the technical and socio-economic criteria of farmers and at the same time protect the environment?

This is a different problem for "resource-poor" as opposed to "resource-rich" farmers. The poorest farmers usually occupy the marginal agricultural areas, while the more affluent ones farm the better lands. Both types of farmers have sustainability problems but they are usually different. For example, on the one hand, there is a lack of technological alternatives and suitable cultivation practices and on the other, a reliance on expensive inputs that tend to degrade the environment.

It is generally accepted that agricultural technology generation and transfer are fundamentally integrated with political, economic and institutional factors and events. There is not a neutral, apolitical research and transfer system; in practice, decisions regarding technology are based not only on scientific criteria but also political and economic criteria.

Resource allocations to technology generation and transfer tend to be determined by the predominance of one group of actors over others. The trend has been research directed mainly towards production specialization with technologies being generated that apply more to favorable, uniform (monoculture) conditions of large farmers than the diverse, multicrop (polyculture) conditions of small farmers.

Figure 1 SUSTAINABILITY TRIANGLE



THE JAMAICAN CONTEXT

It is widely accepted that generation and dissemination of technologies for areas without irrigation or reliable rainfall is difficult. Thus, while there is the potential for substantial productivity gains, new technologies will have to be tailored to the diverse and complex agroecological and socioeconomic conditions of these regions. The idea that research institutions respond to farmers' demand is more strongly challenged the further one moves from the more favorable, resource-rich agricultural areas to the "peripheries" of the difficult, resource-poor farming conditions. In Jamaica, these areas are the hillsides where small farmers produce mainly domestic food crops in mixed farming systems under marginal production conditions.

A critical question is what is the best institutional "configuration" for technology development for resource-poor farmers operating under difficult conditions? Critical issues concern 1) the types of technology being generated and transferred; 2) the types of institutions (and institutional processes) involved and 3) the factors influencing the flow of funds to technology generation and transfer.

Placing these issues in the Jamaican context of small, resource-poor farmers and research and extension we can ask:

1) Are sustainable technologies being generated and disseminated to small, hillside farmers (i.e., technologies that are both profitable and environmentally acceptable)? If so, what types?

2) If not, then what kinds of institutions and institutional processes are required to generate small-farmer sustainable technology? Is there an institutional capability within the national research and extension system (e.g., on-farm adaptive research and technology transfer) to accomplish this task?

3) What are the political and economic factors that influence the flow of funding to technology generation and transfer for small, resource-poor farmers? Similarly, what are the agricultural research priorities, how are they determined and what place is given to the needs of resource-poor farmers?

In conclusion, there is increased focus worldwide by both public-sector and non-governmental agencies on small-scale farming in rain-fed environments. This is due in part to the perception that there are opportunities for productivity gains and improved employment which can contribute to greater income equality across the farming community and more long-term rural stability.

Developing sustainable technologies under such conditions is extremely difficult. Often, institutional reform is required in which alternative organizational structures and procedures are introduced. Participatory research methods such as on-farm, adaptive research are needed, but in many developing countries this capability is weak or missing. What is almost certainly true is that collaboration between a resource-constrained public sector and private-sector agencies will be required. How Jamaica responds to this challenge will have a major impact on the wellfare of small, limited-resource farmers and the hillsides they farm.

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RESEARCH AND DEVELOPMENT FOR HILLSIDE AGRICULTURE IN JAMAICA: LESSONS FROM THE HILLSIDE AGRICULTURE SUB-PROJECT (HASP)

Prepared for the Hillside Agriculture Project
Seminar on Sustainability

by

L. Van Crowder
Technology Generation &
Transfer Specialist
IICA/Jamaica
June, 29, 1993

Introduction

Evaluations of agricultural development projects in Jamaica have found that when the projects ended, farmers did not continue to use many of the technologies introduced (Armstrong, et al.,1986; Harris, 1985). If farmers do not continue to use introduced technologies, projects are, by definition, unsustainable.

A recent World Bank study of project sustainability states that "in most cases where the improved technology was adopted, the projects tended to be relatively more sustainable." However, "technological success" depended on "the creation of a supportive institutional framework to ensure the delivery of the technical package and its compatibility with the sociocultural environment" (Bamberger & Cheema, 1990).

The reasons Jamaican farmers do not use technology introduced by development projects, as evidenced in the evaluations cited above, may be related to 1) the lack of a supportive institutional framework to generate and transfer technology and 2) the sociocultural appropriateness of the technology itself. This paper will address these two factors in the context of the Hillside Agriculture Sub-Project (HASP).

Institutional Considerations

A critical question is: What are the types of institutions required to generate technology for hillside farmers, the bulk of whom are small farmers (< 5 acres) that produce largely for the domestic food crop market? Basically, the options are public- and/or private-sector institutions.

There appear to be limited profitable opportunities, and therefore incentives, for private commercial enterprises (agribusinesses) to invest in small-farmer agriculture.

Commodity boards, which are mixed public/private organizations, have developed technological packages that are crop specific and perhaps more appropriate to high-resource mono-culture conditions than the low-resource, multiple-cropping conditions of small farmers.

Donor-funded, private research foundations, while efficient in terms of research management, tend not to focus on small-farmer research unless it is specifically part of their mandate. In general, foundation research focuses more on export commodities rather than the domestic food crops grown by small farmers.

And, while the "grassroots" nature of non-commercial private agencies (e.g., voluntary agencies) makes them potentially effective disseminators of research results, they generally have limited research capability.

Thus, the apparent conclusion is that the primary responsibility for small-farmer research falls to the public-sector, or Ministry of Agriculture. This does not mean that the Ministry should not initiate opportunities for collaboration with both commercial and non-commercial private-sector agencies in small-farmer technology testing and disseminating.

One of the intended final products of the HASP is a "farming systems methodology institutionalized within the Ministry of Agriculture's Research and Development Division." To date, this has not been accomplished. The original intent of the project was for R&DD to be responsible for the "management of project execution in the field" including "executing all on-farm trials." However, because of limited capability in R&DD to do on-farm adaptive research institutionalization has not taken place as expected.

There is, as evidenced by a recent round-table discussion ("The Institutional Context for On-Farm Adaptive Research, May 19, 1993) sponsored by MINAG and IICA, considerable interest in creating this capability. Also, a recent inception report for the Commission of the European Communities recognized the need for "specific support to on-farm adaptive research" and proposed that this be done through R&DD (Chapman & Wedderburn, 1993).

Research Considerations

It is now widely accepted that on-farm, adaptive research (OFAR) with a farming systems approach is "needed because of the inability of the traditional or classical agricultural research approach to solve the problems of the small farmer outside the most favourable natural environments" (Shand, 1985).

The complexity of Jamaican small farm systems, and their interactions with the natural elements of the watershed (water, soil, vegetation) as well as social and economic factors, means that a "systems approach" to hillside development is needed. Given the complicated interactions between farmers and resources, an approach which takes a single perspective (e.g., tree crops only) is unlikely to be as successful as a multi-perspective approach.

A farming systems research approach responds to the intricate nature of agricultural development by attempting to integrate the components of the farm system in technology generation. This requires researchers from various disciplines in order to understand the farm as an interacting system. It also means that research must move to farmers' fields, enlist their collaboration and address the multi-dimensional problems they face.

The HASP offers a methodology and experiences that can be applied to the institutional development of OFAR in Jamaica. The broad objective of the HASP is to develop tree-based production systems which contribute to increased incomes for small farmers while protecting watershed resources. It began in 1989 and is in its final year; its area of operation is northeastern St. Catherine Parish.

The HASP approach can be described as an "Integrated Farming Systems Research and Extension" methodology. HASP field work is carried out by a multidisciplinary team and involves OFAR primarily with tree crops; dissemination of tree-crop technologies through demonstration plots; farmer organization and participation through Farmer Action Committee Teams (FACTs); economic analysis of alternative crop interventions; a Market Fair; and an input-supply (farm store) and credit program run by the FACTs. The OFAR includes work with ackee, coffee, coconut, mango, cacao, plantain, banana and various vegetable intercrops.

While the HASP carries out OFAR and operates under the general rubric of farming systems research, it has not dealt with farms in a holistic fashion but instead has a tree-crop bias. Essentially, it has been farming systems research with a predetermined commodity focus.

More work needs to be done on the crop/livestock/resource conservation problems of specific farming systems, taking into account social and economic factors. It should be recognized, however, that the relatively short life of the project has limited the research that could be carried out; four years is not sufficient time to adequately research tree crops and related farm system variables.

Also, the on-farm research component of the HASP has been weakened by asking researchers to carry out a wide range of other tasks (e.g., farmer organization, input supply, marketing). While these tasks are important, they should not be the sole responsibility of researchers.

The composition of the on-farm research team is another important consideration. The HASP team has involved agronomists, an agricultural economist, a rural sociologist and a plant protection specialist. A missing component which has hampered the research effort is a biometrician. If agronomists lack this expertise, or it is not available through the Ministry, then experimental design may be substandard, trial data may not be analyzed and research results may not be reported.

Technological Considerations

Evidence shows that small, limited-resource farmers do respond to new technology that is appropriate, low cost, low risk and does not impose major new learning requirements (Chambers et al., 1989). However, for technology to meet these criteria (i.e., be socio-culturally appropriate) it has to be developed and evaluated in collaboration with farmers.

Researchers commonly evaluate technology using agro-economic criteria. Farmers' evaluations are needed because they tell researchers which features of a technology farmers consider important; how farmers rank alternative technologies in order of preference; why farmers prefer one technology over another; and whether farmers are likely to adopt a new technology (Ashby, 1990).

Involving farmers in the research process is more cost effective than when researchers do not consult or only have limited interaction with farmers (Ashby, 1987). OFAR has always emphasized the importance of farmer involvement in the research process, but there has been a divergence of opinion about the type and purpose of participation. Biggs (1989) describes four modes of farmer participation in research:

1. Contract: Scientists contract farmers to provide land or services.

2. Consultative: Scientists consult farmers about their problems and then develop solutions.

3. Collaborative: Scientists and farmers collaborate as partners in the research process.

4. Collegiate: Scientists strengthen the informal (indigenous) research systems in rural areas.

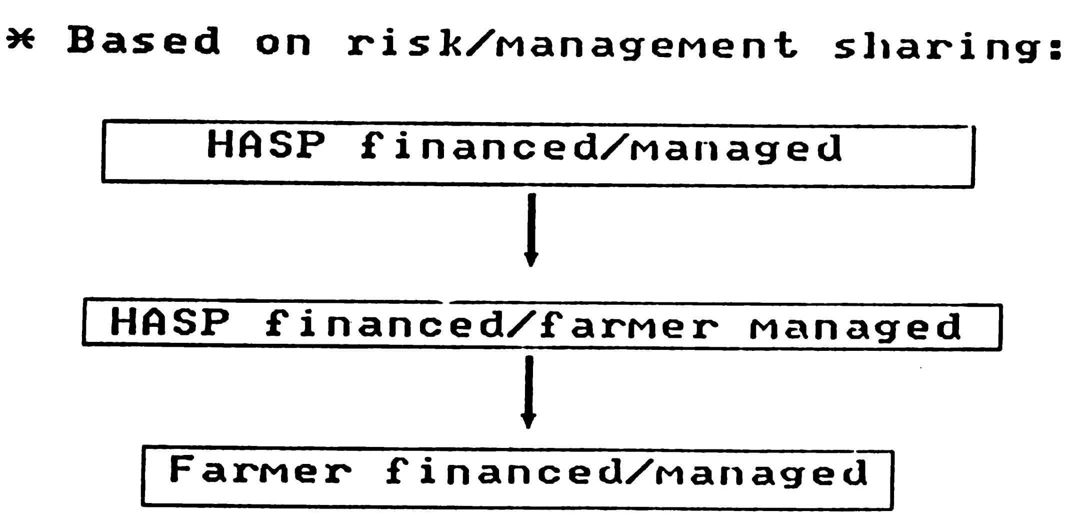
The HASP strategy for farmer collaboration in research was based on "risk/management sharing." It was envisioned that farmer participation in on-farm trials would progressively increase from "Sub-Project Financed/Sub-Project Managed with Farmer Participation" to "Sub-Project Financed/ Farmer Managed" to finally "Farmer Financed/Farmer Managed" (see Figure 2).

It is fair to say that the HASP has not progressed beyond the first stage and that in terms of the four modes of farmer participation it is between the contract and consultative stages. It should be noted that in over half of the 25 OFAR cases Biggs studied, farmers played a relatively passive role.

Improved strategies for farmer participation in OFAR need to be implemented. If continued adoption of introduced technologies is an expectation, then farmers should share the costs of on-farm work from the beginning. Otherwise, farmers become dependent on the project for inputs and are unable (or unwilling) to purchase them when the project ends.

FIGURE 2

HASP STRATEGY FOR FARMER PARTICIPATION IN OFAR



NOTES

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