# Understanding People, Their Livelihood Systems and the Demands and Impact of Innovations

*A Synthesis*[1]

Ann Stroud [a]

[b] African Highlands Initiative, Coordinator, P.O. Box 26416, Kampala, Uganda. A.Stroud@cgiar.org

## Abstract

*This paper summarizes a theme of a conference hosted by the National Agricultural Research Organization of Uganda in 2004 to advance their institutional change agenda in support of Integrated Agricultural Research for Development. The theme is reflected in the title of this paper, and emphasized methods for diagnosis and assessments in targeting, reviewing process and – given the need to integrate understanding with change throughout an R4D process - managing change itself. In addition to summarizing theme presentations, this paper represents a synthesis of the literature and experiences of the author in institutional change, and was such seen as fitting for this Working Paper Series. After a brief introduction, the paper summarizes the evolution of institutional "world views" in the agricultural research and development establishment to set the stage of the IAR4D concept. The author follows with a series of case studies to illustrate the multiple uses and functions of diagnostic tools and methods, both for R&D program development and influencing broader aspects of policy and R&D. The paper concludes with a discussion of directions in diagnosis and assessments for IAR4D.*

*Keywords:* IAR4D; Institutional change; National agricultural research systems; Diagnostics

## Introduction

This paper originated as a theme summary at a NARO-hosted conference on Integrated Agricultural Research for Development (IAR4D) in 2004. Papers submitted under this theme were supposed to identify strategies, "to generate and ensure utilisation of accurate information and knowledge on people and their livelihoods in designing research interventions" (NARO 2004). This paper provides an overview of the IAR4D "world view" and utilizes examples and lessons learned from a synthesis of submitted conference papers to illustrate major points and challenges related to diagnostics for implementing the approach. The paper considers a range of 'diagnostics,' including diverse types of studies conducted to gain understanding as well as strategies for changing policy and assessing impact. Although 'diagnostics', such as these, are often considered to be at the beginning and the end of the research process this review suggests that they should actually be 'blended' into the entire implementation process.

## Evolution Of Approaches: The World View

The evolution of approaches and viewpoints in Africa, in particular, has been as a result of iterative introspection, analysis and evaluation over time very much influenced by history, development aims, and the overall institutional environment as well as pressure from the 'outside'. Researchers, being analytical by nature, have been remarkably flexible and, in hindsight, adaptable, although this is often debated. Basically, they want to be useful and produce information and findings that will make a difference.

In a recent review of approaches (Stroud and Khandelwal 2003) the birth and revision of approaches has been remarkable over the last 2 decades[2], and has occurred at a speed that actually does not allow for assessment of

[1] Published as Stroud, A. (2004) Understanding People, Their Livelihood Systems and the Demands and Impact of Innovations: A Synthesis. *Uganda Journal of Agricultural Sciences*, #9: 797-818.

[2] Some of the approaches included: farming systems research, participatory agro-ecosystem management, participatory technology development, farmer participatory research, landscape management, integrated watershed development,

one before the next one has been borne or the last one added to. Although these approaches usually involve the whole R&D continuum, their concepts, philosophy and methodologies influence the stage of research covered here – diagnostics and assessments. Insightful information gleaned from the review was the identification of key factors that lead to sustainable development and natural resource management as summarized here:

- Policy environment that favours local participation and institution involvement – e.g. not restrictive, but inclusive, able to manage multiple interests (vis a vis use of resources) and land tenure security (entitlements, access, usufruct, rights);
- Investments have to pay - benefits need to be fairly immediate and express themselves in better food security and improved incomes;
- Processes need to strengthen and favour local institution building and need to factor in conflict resolution, and collective action, and disparities (power, gender, pro-poor), e.g. start from the poorest, most marginalized scenarios;
- Economies, generally, need to diversify so as to absorb and provide other kinds of employment this precludes pubic investment in other development areas to enable healthy transition from agrarian to urban livelihoods;
- R&D institutional arrangements, roles, and responsibilities and outputs add up. e.g. relevant technological innovations, communication and information strategy, efficient planning and networking.

These factors are useful to keep in mind while reflecting on HOW the research process and organization can play a role in development along these lines. In reviewing the approaches and concepts, Stroud and Khandelwal (2004) highlighted the following cross cutting features, which are also important to keep in mind throughout this paper:

- All have varying degrees of participation but the overall recognition that ownership, access and control are inherently very important to support;
- Integration of biophysical, social, institutional, ecological etc. – components such as these but might be defined differently. Even if approaches are led by a certain component, these do not dominate the approach. They basically try to adjust to accommodate and integrate various components;
- Reconciliation of different interests with an equity goal, even though there are trade-offs;
- Recognition of a hierarchy of use and decision making;
- Acknowledgement of the necessity of vertical links between policy, markets and other external factors with community development;
- Assume a high degree of coordination, networking and facilitation structure and capability – NRM approach is highly dependent on some sort of organizational (often project) entity that brings different components (stakeholders, expertise, knowledge) together.

Many of these approaches and their features come from the development rather than research arenas and have often originated from more distant, intellectual analyses without firm linkages to lessons from the ground. Nevertheless, the movements and changes appear to be global and motivated in many corners and sectors. There has been an uptake and parallel change taking place in research, which has often been delayed by organizational mind-sets, professional biases and perhaps pragmatic conservatism (Opondo et al 2003; Stroud 2003a). Highlights of the "evolution" in 1.1 are followed by more specific changes that have a major influence on diagnostic and assessment in practice. The following sections provide an overview of the evolution, tracking the changes in diagnostics and impact assessment.

## COMMODITY TO FSR

In the 1930's African colonial governments expanded the national agriculture research stations to emphasize cash crops of their interest. These priorities were inherited by African governments (around 1960s) which later

agro-ecosystem, ecoagriculture, integrated wildlife and livestock management, collaborative forest management, Landcare, community based natural resource management, community-based conservation, integrated natural resource management, sustainable livelihoods and Integrated Agricultural Research for Development (IAR4D).

added food crops to the agenda to address small farmer needs using a commodity approach in the classical reductionist tradition. In colonial times, some researchers documented the farming systems in great detail, primarily through observation and categorization into zones and practices. Researchers continued to focus heavily on agricultural productivity and efficiency for mandate crops (rice, wheat, maize, beans, potatoes, cassava, etc) with emphasis on genetic improvement to maximize yield under fairly uniform, well-managed experimental conditions. Research also worked on pest and disease resistance, nutrients, adaptability to various environments, stress tolerance and water distribution networks and on crop adaptation to water stress. The so-called "commodity approach" still strongly dominates most agricultural research today. Usually any diagnosis during this era had limited contact with farmers, and if made, were usually those who were better endowed and were enhanced yield was the primary need.

Many characteristics of classical experimental methods used on research stations were very dissimilar from situations faced by small farmers, so recommendations were not useful, particularly for: labour requirements, land preparation methods, cash for inputs, etc. Diagnosis and assessment methods did not include farmers' criteria and priorities, or other production factors like returns to labour and land, risk avoidance, or links to other enterprises that were competing for scarce resources. The FSR approach evolved to address the issue of non-adoption and relevance to farmer conditions and objectives. (Stroud and Kirkby 2000; Collinson 2000) In early farm management investigations by Norman, Collinson, Mellor and Ruthenberg "By examining how farm households deployed their labour and other resources in order to secure food requirements under high–risk conditions, they gave a new dimension to the understanding of farmer rationality." These economists used intensive sample surveys of farmer practices, frequent recording techniques and questionnaires. This was coupled with biophysical scientists observations and insights. This multidisciplinary team effort set the trend for farm surveys on into the 1970s and 1980s. (Farrington 2000) FSR was an approach embraced by some NARIs in Africa, particularly when donor supported, and involved more comprehensive farming systems characterization and on-farm experimentation and multi-locational testing, and generally, heightened farmer involvement and use of economists.

Another breakthrough was with the advent of the 'sondeo' approach (in C America) (Hildebrand 1981) which experimented with quick reconnaissance, 'informal', qualitative surveys built on semi-structured interviews and checklists. These were quicker and more flexible than the formal surveys and fulfilled two functions: characterize general attributes and identify parameters for system improvement for subsequent quantification using formal surveys. This was the beginning of the rural rapid appraisal (RRA) and participatory rural appraisals (PRA) that followed. These methods were still relatively extractive.

## THE 'PARTICIPATORY' MOVEMENT

Greater consultation and involvement of farmers in research started to emerge. Biggs (1989) typology on types of relationships between the research community and farmers (the contractual, consultative, collegial, R&D continuum) is useful to tease out the nuances inherent in 'participation'. As one moves up the spectrum, the involvement, power and decision making balance moves more towards the farmer. The next two models that emerged and pushed the process in this direction were: (i) *farmer back to farmer* (Booth and Rhodes in 1982) which stressed more thorough farmer involvement in problem diagnosis, testing and evaluation in practical ways; and (ii) *farmer first and last* (Chambers and Ghildyal in 1985) which emphasized joint learning during the diagnostics, joint experimentation and evidence of adoption or change that would evaluate the usefulness of the research. The latter authors stressed the need for methodological flexibility, innovation, inter-disciplinarity (involvement of different perspectives including farmers'), adequate time and resources in the field, rewards for practical achievements (not just publications) and capacity building to change mindsets so farmers could be treated more as equal partners. Much of this is still being discussed and recommended.

Another main shift from a scientist-directed FSR approach in the mid-1980's was movement towards greater farmer and community "participation" and links to empowerment. The goal of 'empowerment' started to become more fundamental and politically laden than trying to improve the farming system. The move towards increased participation of 'users' or 'clients' was coupled with 'proof' and recognition that farmers have confidence and ability to define their own needs; and diagnostic processes moved towards being less extractive along these lines, using participant observation and PRA techniques. This movement started with NGOs where

they had a number of special projects to support farmers in identifying the opportunities and constraints they faced in agricultural development (reviewed by Farrington and Martin 1988). Researchers, then and now, usually view 'participation' of farmers in a more functional way – that is, to enhance *their own* efficiency in research design, testing leading to the uptake of technologies. However, stronger application of participatory learning and action research (PLAR) approach, which includes diagnosis and evaluation, mixes the functional and empowering aspects of participation; but, philosophically most research organizations are still in the 'functional' realm.

These gave impetus to the upsurge of PRA and associated techniques, which moved us into the next era – Farmer Participatory Research (FPR), which is an approach to research that often uses PRA and associated methods like Participatory Technology Development (PTD).
PRAs are still commonly used to inform research. If used well, they allow for rural households to contribute to planning, develop a sense of ownership, can identify local terms, knowledge and innovations that can be a basis for research, and they can influence policy. PRA toolkits have helped them to spread and be widely used. It is 'quick' method, but can be 'dirty' and has received criticism (Farrington 2000; Russell and Harshberger 2003): the toolkit becomes gimmicky and has lost its analytical base; sampling methods have become messy; it does not capture social relations and organizational interests, so can be misleading; it is basically superficial and can give a false sense of assurance. It has led some researchers to abandon more rigorous tools and methods altogether.

The 'participatory movement' was also the root of recognizing that local knowledge was valuable and recognized that PTD was a joint (rather than extractive) learning process (Box 1). This moved the assessment process from the end of the research spectrum to happen iteratively and inform throughout and strengthened the idea of 'joint learning' that had its beginnings at the end of the FSR era and was reinforced by PTD, FPR and PLAR. Some researchers abandoned statistical analysis and gave greater emphasis to farmer assessment methods.

**Box 1**: Features of Participatory Research

- Core principle: devolve management to units closest to the ground ("subsidiarity")
- Local knowledge is central to management strategies
- Without participation there can be no sustainable benefit
- Participation generates better research
- Participation leads to empowerment
- Reality check:
- Participation means many things to many people ("participation" can be obligatory!)
- Few people know how to do genuinely participatory research
- Most research is structured for the convenience of the researcher
- Communication flows are poorly understood
- Our ideas of community are simplistic
- We leave out the political (including micro-political) dimension and power dynamics
- We often forget to factor in the impact of our own presence and investments
- Jealousy is a major constraint
- People get tired of being researched
- Many tools are poorly understood or misused
- Short-term research/data collection that is not supplemented by longer term observation and informal research is shallow and can lead to lack of true understanding
- Research results not returned in a useful form cannot help improve management

*From: Diane Russell presentation to: Launching Phase 3 of AHI (2002)*

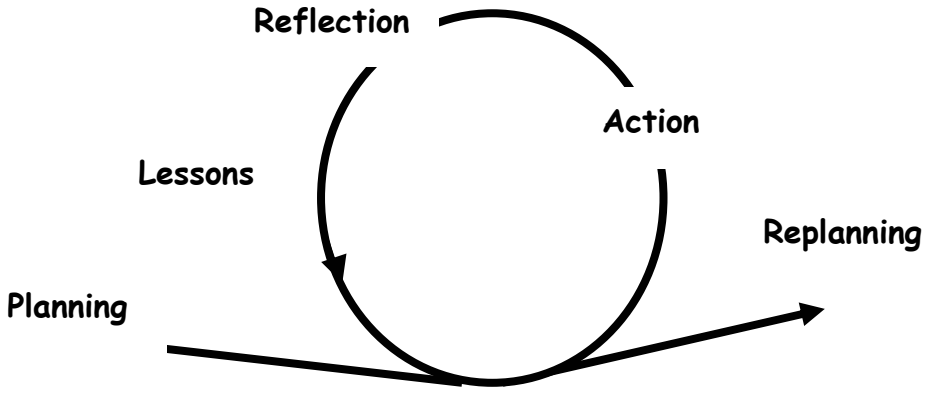
## MOVING TOWARDS SOCIAL LEARNING

FPR goes beyond "studying" the situation so as to provide expert opinion for improvement by attempting to solicit full participation of farmers in all stages of research. During implementation of FPR, largely done by

biophysical scientists, the effect on social dynamics and local institutions was remiss. For example, researchers entered the community and established research groups based on volunteerism for their work rather than understanding community dynamics and traditional structures and building upon this. In this regard, Scoones (1999) states that understanding institutional processes is a prerequisite to identifying restrictions and barriers and opportunities with regard to sustainable rural livelihoods. In hindsight, this had led to greater awareness about the social and political processes, of skewed participation where marginalized farmers fail to participate and do not benefit. The appreciation of social and anthropological science contributions to understand and manage these dynamics, upscaling, and collective action useful to NRM among other areas, has risen markedly, although there is still a dearth of expertise, which in turn has led to diagnostic methods that look into social aspects (wealth ranking, gender analysis, institutional linkages, etc) as well as diagnostic studies and monitoring schemes to provide more information on these areas.

In the FPR era (which is still ongoing), the participatory learning and action research (PLAR) methodology was borne. "PLAR is a process approach by which change and understanding can be pursued at the same time. PLAR combines various types of research with participatory community development. As a methodology, it can be used for achieving change and improvement *(action)* while gaining understanding *(research)* and knowledge *(learning)* where R&D actors work directly with communities *(participatory)*. PLAR is especially useful where social, economic, policy and technical aspects are interlinked, as in "integrated watershed management". It is usually described as a cyclic and iterative process, with action and critical reflection taking place in turn. The reflection is used to review the previous action and plan the next one – and if done well, adds rigor and responsiveness to the process." PLAR has brought research closer to development and embraced the empowerment philosophy more fully. It has also made 'tighter' more frequently 'renewed' definition based on analysis and social learning processes on what should happen next. The annual or biannual cycle (presented in Box 2) is being overtaken. Monitoring by reflection is built in rather than waiting to the end of the season to analyze data so as to redesign for next season. Thus, the demarcations between the R&D continuum and therefore, the components that had been seen as step-wise, are becoming more blurred.

**Box 2:** Participatory Learning & Action Cycle




Another concept borne from this work was the "research to development continuum" where different types of research were placed along a continuum with loops feeding iteratively from one to another – basic to strategic to applied to adaptive. Now, researchers are realizing that they can do strategic research on development processes, and that there should be more iterative learning between the "types" of research and their links to development. This concept has a bearing on the research contributions that can be made in this theme.

## DEALING WITH DIVERSITY: LIVELIHOODS AND AGRO ECOSYSTEMS

In the mid 1980s, *agroecological and agroecosystems research* approaches came to the fore, and the ecoregional approach was borne. These approaches took remnants from FSR, adding hierarchies, analytical and diagnostic techniques, and concepts and this has been added into FPR (participatory agroecosystem management). Thinking was stimulated by Conway's landmark papers (1985 and 1987) where he described the principles, strategies and links of agroecosystems that are modified by human beings to produce various products and that their dynamic and complex nature arises from the interactions between socio-economic and ecological processes, to performance of agricultural development programs. Conway's ideas were used by modellers who developed techniques to handle multiple factors and interactions, but were limited due to heavy data demands and limited practical application. The agroecosystems approach allowed FPR farmers to understand and design their system taking into account the multiple parameters using non-quantified diagrams (Lightfoot et al 1989; Lightfoot et al 1993). Modelling and participation are now being combined to find trade-offs to systems management where experimentation is not feasible but decision makers need information to make positive changes (McIntire et al 1992; Amede, Stroud and Aune, 2004). Nutrient flow analysis (an example of PLAR), also combined farmer diagrams with scientific quantification (Defoer et al 2000). Systems mapping and analysis (usually at farm-level) could lead to discussions and decisions regarding what changes could be tried using options at hand. Using PLAR methods farmers tested, chose and incorporated a number of changes simultaneously into their system, exploring ways to exploit niches. This methodology can help deal with different "types" of farm households determined by resource endowment levels, grouping these into "typologies" to understand diversity of natural and human led processes. Research became more efficient in dealing with diversity on one hand, but the method was very intensive and expensive.

It was thought that "by aggregating into agroecological zones, research on common agricultural problems in those zones would be facilitated and lead to better scaling up." This led to identification of key cornerstones of the 'ecoregional approach' by the CGIAR (TAC 1991), which has further broadened the scope for diagnostic studies and research by bringing in policy, institutional, cultural, and social along with systems dimensions more strongly:

- To embrace the complexity of *sustainable improvement of productivity* through the integration of NRM and productivity concerns;
- To emphasize *human decisions as causal factors* that impact biophysical processes such as land abandonment;
- To *use multi-level hierarchical approaches* encompassing site-level to wider systems and recognizing *human decisions at different levels*, from farm household to local to national and even global levels;
- To *link research with externalities such as policy and development actors* incorporating these elements into the approach;
- To highlight the *role of the social sciences* in understanding the social and policy dimensions to sustainable agricultural development and the balance needed between social and biophysical sciences in ecoregional research;
- To pursue *working relationships (e.g. multi-disciplinary teams)* that could enhance the examination of a number of resource management themes - such as soil water relationships, soil fertility and plant protection and pursue the *complementarity of institutional skills* across IARCs, NARIs, Universities, NGO's and farmers organisations as a rationale for increasing partnerships; and
- To use a more *holistic, systems approach as well as a research to development continuum* to reflect a scientific sequence of characterization and diagnosis, technology development and extrapolation of successful solutions.

This approach still explicitly embraces participation but has added dimensions to it beyond the farmer:

- Explicit involvement and capacity building of resource managers and users recognizing that change and development required specific adaptations under their control;
- Increased level of dialogue and deliberation among stakeholders and improved interaction of research within the system;
- Addressing high levels of uncertainty, non-linearity, and time lags, involving multiple scales of interaction and response, with multiple stakeholders with contrasting objectives and activities; and

- Incorporation and facilitation of social learning processes for various actors and their organizations, including community and research entities.

The *Sustainable Livelihood Approach* was developed in the late 1990's to specifically target poverty, and is based on 5 sets of assets (or capital) required for livelihoods: social (groups, networks, trust, access to institutions), human (skills, abilities, knowledge, entrepreneurship, health and awareness), financial (savings, credit, remittances, pensions), natural (land, water, forest, biodiversity, wildlife, environment) and physical (infrastructure, equipment, shelter, water, energy). Improving and sustaining assets, their availability and their management to minimize vulnerability to shocks and stresses without undermining the resource base is the aim of this approach. This framework encourages R&D practitioners to look at: sources of vulnerability, assets and resources available for survival, policies and institutions that impact on their lives, how they respond to threats and opportunities (strategies), and what sort of outcomes people aspire to. This approach leads into looking at context and relationships, horizontal and vertical and macro and micro linkages, and process and policy dialogue are implicit. It promotes a holistic analysis but does not necessarily lead to holistic implementation as it tries to balance between what is needed and what is feasible. Interventions are described in terms of 'people' not products and productivity. The sustainable livelihood approach as it relates to diagnostic work involves:

- Assessing livelihood resources and strategies of different sections of the community.
- Ascertaining the impact of livelihood strategies on local natural capital – land, water and forests.
- Assessing the impact of degradation, decline or loss of natural capital on livelihood strategies.
- Identifying and analysing the social, institutional and technological options for strengthening the livelihood – natural capital linkages.
- Monitoring impact on livelihoods and on stability / productivity of natural resources.(Scoones et al 1999)

## LIMITED UPTAKE OF NEW APPROACHES: THE CONTRIBUTIONS OF IMPACT ASSESSMENT

Although research has made great strides in boosting productivity, there are persisting problems of food security, poverty and natural resource degradation. In the 1980s after the Green Revolution, donors and others became concerned about whether or not research outputs resulting in or leading to changes in development terms and the returns to investment.

Regardless of all of the various approaches (those mentioned above) that had come about to 'correct' for deficiencies, there has been limited uptake and institutionalization. FSR was seen as downstream and therefore fitting more into NARIS, but often remained as an enclave given that FSR was not fully integrated for various reasons: the way in which research was structured; barriers to the acceptance by more conventionally trained researchers; and lack of a strategy developed with support and expertise to move from small, modular FSR teams to scaling up. There were also performance issues: FSR could not keep pace with new emerging methods, the difficulty in understanding and applying new concepts and tools, and lack of organized learning from experiences. FPR suffers from similar problems and remains largely in project funded enclaves that are de-linked from each other (Opondo et al 2003). This said, many NARS are trying to embrace the new concepts and practice (client-oriented research; demand led research, etc), but are having trouble implementing them for a number of systemic reasons: limited capacity of personnel; monitoring and reward structures that do not favour integrated, team work nor motivation; limited resources or misplaced to move out to farmers and hold stakeholder consultations frequently enough; scepticism in participatory methods – are they scientific? due to professional traditions and biases; and organizational culture and management styles that are still relatively centralized and limits fostering of partnerships.

Thus, although many adoption and impact studies had been done, a greater emphasis was placed on ensuring that investments were leading to impact which has greatly influenced the whole research process and institutional structures. 'Returns to research' and impact studies were conducted (Gilbert et al 1984); many research entities started units that looked after M&E and impact assessment; indicator definitions and types were developed; logical planning and program definition methods were developed ('ZOPP' and the 'logical framework'; results-based management; results oriented framework; etc.), and impact assessment started to

become a more overt part of research. Recognized advantages of using impact assessment are: to quantify benefits, to obtain a better understanding of the processes by which research translates into impacts, more transparent accountability, facilitation of learning by providing feedback to improve the effectiveness of research, and information that helps to make more informed decisions and assessing various research areas to set priorities (Gottret and White 2001).

"Generally, donors investing in research are interested in diverse impacts and can include: increased productivity and efficiency, increased income or welfare for the poor, improved nutrition or health status, the welfare of women or particular social groups, empowerment of the less privileged, environmental quality, welfare of present or future generations. Different investors give different weights to these ultimate impact outcomes, so almost inevitably, impact assessment means different things to different people. These differences in what impact to assess, or how to measure it, are rooted in difference in values or differences in utility functions as economists might prefer to have it." (Pachico et al 1998) Impacts depend on a range of other factors besides research and frequently these other factors will mask or dwarf the contribution from research, making it exceedingly difficult to track what happened and why.

Impact assessment is related to monitoring (systematic and continuous process of assessing progress and changes caused by implementation) and evaluation (broader outcomes of an activity that draws conclusions about its overall value. Participatory monitoring and evaluation (PM&E) has gained credence and its benefits are that it: improves the accuracy and relevance of the data; makes a powerful contribution to local institution building and enhances local capacity to record and analyse change; is cost effective in that it employs local capabilities, and increases the probability that the data and results will be used. Its drawbacks are: difficult to sustain in that it is voluntary and it might be expensive to locals if a significant amount of time is required (Gottret and White 2001). 'Reach' is another concept that is important that has implications on the research activities and process: "Reach as defined by Smutylo and Carden (IDRC) as 'the groups that are touched by the results of a program."

The current thinking is that impact assessment should not be thought of at the end of the research process, but rather it should be part of the research planning, influence priority setting and be integral to ongoing monitoring of progress and product development during the life of the project, similar to the idea of integrating diagnostics as part of social learning. (Pachico et al 1998) Thinking through the desired impacts and how they might be measured, will assist in the specification of the research, so consequently, a precise definition of the outputs and a clear link between them and the desired impact can be a base for planning, priority setting and later impact assessment.

The concept and model where 'paths to development impact' is used brings together outputs that lead to outcomes that lead to impact (the pathway). "Paths make it easier for all stakeholders to understand the ways in which research-based interventions are interrelated within complex systems."… "It is not enough to only produce outputs (the 'whats') that permit better understanding of system dynamics and processes in a variety of sites (the 'where'). It is essential to identify 'who' is going to implement and adopt changes, and 'how' best to improve livelihoods." Local and expert knowledge about the situation are required to define these. The direct and indirect beneficiaries need to be defined as well as a possible set of 'routes' by which research can make an impact. These become alternatives that can be assessed using either or both 'expert' science or local knowledge. Ex ante impact studies, which may be costly and take time and alot of data, can be undertaken to better quantify the trade-offs to investment; however, participatory methods involving stakeholders assessments are also being tested (Gottret and White 2001).

Assessments can be made through formal structured surveys, or can be based on judgements and preferences of researchers, farmers or scientists. Actual measurement of impacts can be challenging: depending upon data availability and how complex the phenomenon is – but it is recommended that an indicator should be detectable, relatively simple, cost effective and use existing information if possible (Pachico 1996). A number of ways to assess research in process include: on farm trials, farmer evaluations, surveys, and reflection sessions (see PLAR).

Ex post impact assessment will then appraise what has happened drawing upon the process along the way. Ex post work can feedback into modify ex ante assessment that can be used to assess ongoing or future research. Ex ante assessment helps to apprise the selected indicators that can be used to measure the expected impacts, whereas ex post addresses whether the planned research outputs have in fact been generated and sued, the degree to which this use has led to the expected impacts among the potential beneficiaries (Pachico et al 1998). A variety of different methods and tools have been developed and utilized: measuring indicators, spatial models and GIS, economic surplus models and economic returns, farmer participatory techniques and empirical field surveys. Large amounts of time and funds are now invested in participatory processes to consult stakeholders, plan, priority set and set strategies in order to improve the implementation and use of diagnostics.

A number of challenges, however, remain that are still being worked on:

- Dealing with different spatial scales where there are different indicators
- Dealing with temporal scales – time periods needed for outputs to outcome to impact realization (somewhere between 6 to 20 years depending on the type of innovation)
- Stakeholder participation in the process
- Selecting indicators as criteria of success. Indicators are central and help to communicate information about complex processes and events or trends. A range might be used for each output, outcome and impact; time factors; different cultural values and priorities; influenced by practicality and cost; are different at different scales; human well being factors are difficult to measure
- The logical framework does not provide a means to track the paths and does not consider who would adopt and why and how adoption will contribute to the project purpose and goals
- More complex process-types of approaches (INRM and IAR4D) are difficult to assess given their complex dimensions and potential data needed and methods do not yet exist to do this. Ex ante and monitoring will continue to be key tools that can include different parameters (economic, environmental, social and institutional impacts) (Fujisaka and White 2003)

Some "words of wisdom" may be most effective in distilling key principles:

- "Rather than a few indicators, IA should be concerned with the processes of knowledge generation and diffusion" – Fujisaka and White, 2003 (CIAT)
- "Consider different types of development outcomes (referring to INRM research assessment) with accompanying indicators: welfare of resource users and local communities; societal welfare; environmental effects; and governance" – Scherr, 2000 (Future Harvest)
- "Progress has been made on conceptual frameworks to use the sustainable livelihoods approach in assessing the impacts of agricultural research on poverty using a variety of methods and data pieced together" – Adato and Meinzen-Dick, 2002 (IFPRI)
- "How far along the path to development must/should research organizations dedicate financial and scientific resources will depend on the strength of local organizations and on donor requirements." – Gottret and White, 2001 (ISS and CIAT)
- "What is clear is that there is no single pattern for introduction and wide implementation of improve diagnostic methods in the future. Local agroecological and socio-economic settings will increasingly determine the choice of methods, and institutional configurations will have to be tailored to local settings" – Farrington, 2000 (ODI)

# CASE STUDIES: EXPERIENCES FROM UGANDA & BEYOND

## MULTIPLE USES AND FUNCTIONS OF DIAGNOSES AND ASSESSMENTS FOR R&D

Diagnostic studies and activities are conducted for a number of reasons, and can fulfil many different objectives:

- To provide understanding through analysis and/or description of a situation or an issue;
- To document specific information so as not to 'loose it', for example, indigenous knowledge, environmental trends, etc;
- To share learning, build partnerships and build capacity;

- To make an assessment so as to improve a process, strategy, operations;
- To understand the influence or effect of an action so as to change or maintain the course of action; and
- To determine demand and priorities for R&D.

For the purposes of this review and synthesis, the function have been divided into: those that influence R&D program development and progress (*R4D*); those that inform policy and the R&D process (*R on D*); and lastly, those that influence aspects of development directly given how they are implemented (*R embedded in D*).

### *R&D Program Development and Progress*

Several types of diagnostic research fit into this category: baseline surveys, broad descriptions of farming systems, a sector, an innovation system, exploration of a specific problem or opportunity, and studies conducted to direct program focus and priorities.

- A baseline survey provides the status of a situation at the time of starting or designing a project which can be used to build understanding as well as to guide impact and adoption studies at a later stage, so as to understand the changes or not made by the project and why. The baseline should provide not only a description but optimally make a contextual analysis of conditions, trends and the external environment, such as the policy setting, history, climate, terms of trade, agroecological conditions, demography and social differentiation, among other areas. If it is to be used for comparison of 'before' and 'after' the project, e.g. impact assessment or evaluation, it is recommended to map out the pathway to development impact (as described above) so as to know what parameters you might be focusing on. Even if there are several options, the baseline can assist in clarifying where it might be beneficial to concentrate research efforts and in what order. The review of the characteristics of rural goat production and marketing is made to provide a "baseline benchmark" (Ssewannyana, et al 2004) describes the production system touching on some gender issues related to management and decision making, but does not go deeply into market issues and the economics of the system nor poverty links, so may miss out on some key variables for impact. The project will focus on production issues and the study provides good information on these aspects. A third study discussing baseline was by Nassif (2004) in relation to management of agro-biodiversity in Morocco, where the objectives were to identify, categorize and describe the farming systems and to provide a benchmark of information to inform technology research and transfer. This was a fairly typical example of a farming systems survey which provided a very broad description of crops, livestock, gender aspects, diversification strategies, income generating options, etc which were used to describe recommendation domains (typologies) which provided a focus and scaling up framework for the work. This work expanded the understanding of researchers particularly of the socio-economic elements and provided a frame of reference for a number of disciplines and helped to streamline activities who subsequently worked on components. The authors highlight the important contribution of socio-economists in this work, but state that unless this data is expressed in quantitative terms, it is not easily used or accepted by biophysical scientists. The study on rural transport and livelihoods (Kleih et al 2004) probably provides the best example, in that it makes a broader and useful analysis of the sector and what this would mean to livelihoods and local assets; and after characterization analyzes what is needed over time vis a vis transport solutions to make a difference. This provides more "meat" and rationalization for the program focus than the previous study. The authors also make the point that "an innovations systems approach should place emphasis on the building of partnership and use of PM&E as two essential cornerstones of the project.

- Most studies provide a description as a major output, for range of reasons illustrated by a number of papers. Descriptive outputs can provide detailed information on specific aspects of the system that will be used to guide and target very focused research programs using participatory techniques that solicit information from farmers on their preferences, status or situation (such as gender and wealth analyses): such as the study on farmer preferences and strategies for choosing agroforestry species for degraded terraces (Bamwerinde et al 2004a); description of land management strategies (Bamwerinde et al 2004b); crop production and in situ management of germplasm (Nassif 2004); the use of ITK for controlling termites (Kiwuso et al 2004); using wealth ranking and institutional influence mapping to target soil fertility research (Brinn et al 2004); a farmer-led process that provides information on farmer's R&D needs for NAADS (Draa et al 2004); on information dissemination pathways (Bragnell-Oakley et al 2004); and to sample perceptions and knowledge on GM FOODSs (Kimenju et al 2004).

These studies can also very comprehensive in their description as illustrated by the systems approach used for problem diagnosis and development strategy formulation in N Sumatra on the mandarin industry (Mengistu et al 2004). This diagnosis covered the whole sector including production, marketing, information management, the way it was organized and policy support. Likewise the livelihood approach used in the East India Rainfed Farming Systems Project (EIRFP) was also very comprehensive which led to sequential strategies to improve the various 'capitals' (Sahay 2004). These types of studies help to focus very large and long terms programs, as well as provide a comprehensive picture and starting points for multiple actors involved in the reforms including research, thus are starting points not only for research but also for local collective action, partnerships, and policy change.

- Studies on trends provide information in a historical and time context that are useful to update policy makers, development strategists, and the research managers themselves for decision making and raising awareness. These are particularly useful for raising awareness so as to provoke better management and policy support in relation to natural resources such as fish (Okaronon 2004); land abandonment (Bamwerinde et al 2004b); tree resource exploitation (Katumba et al 2004) among others. These types of studies can also be provocative in providing a view into the future as illustrated by the socio-economics of livestock management work in Kenya by Ouma et al (2004) that provides information on mom-market variables that influence productivity now and suggests how development of this sector might change productivity variables in the future. The paper on transport (Kleih et al 2004) makes similar projections as does the paper by Hauser et al (2004) on projecting the market for the organic products.

- Problem and opportunity exploration is another explicit reason for diagnostic research and specific examples were provided by Kiwuso et al (2004) on the termite issue on trees, by Archambault (2004) on addressing food for work program concerns; by Draa et al (2004) on NAADS and NARO processes for amalgamating demand; by Ouma et al (2004) on understanding the livestock industry shortcomings; by Sseguya et al (2004) on understanding rural producer organizations performance, among others. An excellent review of opportunities was made by Hauser et al (2004) for organic products expansion, which provided a useful analytical framework (reviewed below under methodology).

## INFORMING AND INFLUENCING POLICY AND R&D: METHODS, ORGANIZATION, FOCUS

Relatively recently, there is an increase in diagnostic research carried out to with the aim of influencing and informing policy and R&D program methodologies, focus and organization, and in doing so employ a wide range of study methods usually incorporating qualitative information derived from consultation and discussions with quantitative data. This provides analyses that are useful in priority setting, planning and management of processes.

- Influencing policy: A number of authors focused on 'policy makers' as decision-makers and their main audience. Some papers made recommendations for development and investment: on livestock markets and infrastructure (Ouma et al 2004); on organic product support (Hauser et al 2004); and on transportation systems (Kleih et al 2004). Other papers made recommendations regarding avoidance of exploitation of natural resources such as: on solutions for land abandonment in terms of consolidation and rationalization (Bamwerinde et al 2004b); on medicinal trees (Katumba et al 2004) and the fishing industry (Okaronon et al 2004). These types of papers typically must have convincing data that is presented to policy makers and followed up with dialogue so that it can make an impact on their decision making. The study and a communication strategy needs to be designed with this in mind.

- Improving development processes: Four authors focused on improving development processes: improvement of food for work programs raising concerns about beneficiary targeting, control over planning and implementation, quality of assets created and long term sustainability. Archambault (2004a) provides specific interventions to address these issues with the aim to improve development. Similarly, Sseguya et al (2004) look into constraints currently faced by producer organizations, such as, inadequate resources, technical knowledge, markets, income sources and market issues in order to highlight policies, facilitation of local by laws and planning to raise skill levels, and establishment of income generating

activities that are adequately linked to markets as recommendations. The paper on NAADS (Draa et al 2004) presents a detailed critique of the way demand is amalgamated in NAADS and NARO looking at inclusion, representation and accountability issues; general principles for improvement are highlighted but more detailed recommendations are not forth coming and apparently left up to the entities to decide upon ways to apply the principles. Likewise, the otherwise innovative analysis of the agricultural knowledge and information systems (Bagnell-Oakley et al 2004) provides only generalized recommendations, such as better links and coordination, better packaging of research results, etc that have been recommended for years. The challenge here is to go beyond the obvious with deeper analyses of causes for not carrying out the obvious, the 'why's' and 'how' to overcome these barriers.

- Improving research methods and aims: A number of studies made analyses to improve research focus and methodologies, aiming at improving relevance for the end users. Several studies used participatory methods to solicit and understand farmer, consumer or market criteria that was taken into subsequent research: on medicinal trees (Katumba et al 2004); of choice of trees for degraded terraces (Bamwerinde et al 2004a); and on soil fertility (Brinn et al 2004); on ITK for termite control (Kiwuso et al 2004); for marketing organic products (Hauser et al 2004) and mandarin ((Mengistu et al 2004); and on development of GM FOODSs (Kimenju et al 2004). The paper discussing research planning for integrated crop management (ICM) by Lusembo et al (2004) provides a multi-stakeholder consultative methodology to arrive at priorities for a number of actors, including research.

- R&D program evolution analyses: Three studies provide interesting analyses of R&D programs and processes evolution and influencing institutional aspects indicating why and how modifications took place:

  (i) In the case of the ERIF Project in India, project direction and implementation was greatly affected by 'development philosophy' and government policy that promoted certain types of investments which evolved from large investments in infrastructure/assets to investments in health and education and finally to investments in governance and institutions. The insertion of participation and livelihood concepts into the process was another determining factor. ERIFP evolved from an FSR orientation and 'provider' orientation to an 'enabler' project that employs facilitation for communities and an 'asset based' livelihoods strategy. Other methods used such as PM&E that uses qualitative indicators and reflection have propelled it along its path to impact.

  (ii) The other paper, written by Nassif (2004) tracks the evolution through the eyes of a social scientist. The author reviews the historical progression through an FSR era which brought socio-economic and systems information to biophysical researchers to an era where participation of multiple actors was encouraged by an collaborative in situ conservation project towards a fully farmer-led effort with built in social learning processes for both farmers and researcher on participatory plant breeding (PPB) which was most transformative. The research methods basically took the evolutionary course presented in chapter 2. This analysis provides the reader with important lessons on ways methods and inter-disciplinary inputs, particularly highlighting the importance of social scientists, can transform research and the advantages to doing so.

  (iii) The third paper by Archambault (2004b) provides a framework for analysis that would propel institutional change. Although the example focuses on agricultural industry, the framework has useful principles and factors for other organizations. The particular aim here is to integrate ecological principles into development in a way that favours win-win situation. He explores factors and linkages between ethics and commitment, interest groups and lobbyists, policies, balance of competitive forces with collaboration and takes into account a complex set of variables and interests. The method illustrates how to 'study' and analyze the political ecology of an industry or sector and use the findings to uncover points of intervention.

Project and program focus" examples were also provided above under types of descriptive studies and their objectives. Diagnostic and ex ante as well as ex post impact studies provide important inputs into planning. Some of the aims of these types of studies should help planners consider: sustainability, processes and methods to use for example avoiding dependency and ensuring local ownership, assure added value, help to match goals and scope with expertise and resources, decide on targets and beneficiaries with strategies for inclusion, and a communication strategy. An excellent paper of relevance was "Poverty analysis in integrated agricultural

research for development" by Bashaasha and Boesen (2004) which provides appropriate methodologies, concepts and implications for targeting and implementing research to reach differentiated groups with differing livelihoods and farming systems. A second paper that provides a number of generic issues and suggestions on organizational orientation is by Archambault (2004a) using the food for work case.

### *Side Benefits becoming Primary Benefits*

It was noted in nearly all the papers that there are many 'side benefits' to diagnostic studies: soliciting participation of those involved in future work including farmers involved in research (Nassif 2004; Lusembo et al 2004; Kiwuso et al 2004; Katumba et al 2004; Bamwerinde et al 2004a) and other stakeholders involved in implementing other parts of the work related to the whole innovation system, where there may be a move towards partnership formation (Mengistu et al 2004; Lusembo et al 2004; Brinn et al 2004). In addition, many of the techniques build capacity and knowledge of the participants, for example, the soil analyses by Brinn et al (2004) medicinal tree inventory by Katunba et al (2004); the poverty analyses by Bashaasah and Beosen (2004); the visioning by the ICM groups (Lusembo et al 2004) among others. Diagnoses experiences build 'social capital' between researchers on the team and foster appreciation between disciplines (Nassif 2004); between researcher and farmers and within communities. This provides a starting point for improved coordination, collaboration and linkages.

## METHODOLOGICAL AND PROCESS MANAGEMENT ISSUES

### *Participation*

One of the main challenges for designers of studies is to make a number of decisions on 'how participatory' should the process be, such as: What processes should be used and how should they be facilitated? Who should be involved? Who do we ensure that marginalized groups are able to participate? What criteria and method should be used for selection of those who participate? As mentioned in Chapter 2, the trend has been to move from an "extractive and functional" based approach to a more participatory approach. The various studies and surveys above reveal the multiple uses and objectives that may focus any piece of work – and even in a given study, the objectives might be multiple and participation varied accordingly. Examples were: very little participation in the fish survey (Okaronon et al 2004); more extractive type of participation in the NAADS and goat studies (Draa et al 2004; Ssewannyana et al 2004); very consultative but efficiently managed in the ICM work (Lusembo et al 2004); very extensive with multiple methods and steps in the mandarin study which was looking at the whole production to market to consumption continuum (Mengistu et al 2004).

So, the answer is that 'IT DEPENDS' on the desired output, outcome and use of the information and what or who needs to be influenced in the process (see section 3.1.3). Institutional support, for example, the translation of mandate into roles and responsibilities, and professional philosophies can influence these decisions. There can be many pitfalls. There are many examples of 'missed opportunities' and 'misplaced analyses' because a critical analysis of participation was not made in the design phase. The error can be made in either direction – either 'under' or 'over' participation. Participation can raise expectations; it can be poorly facilitated and create a loss of credibility; it may be expensive in time and money; it may provide information on aspects that are too broad and will never be used; it may be over-burdening recipients and causing survey 'burn-out' without follow up (Draa et al 2004). On the other hand, lack of participation may lead to poor local ownership, limited buy-in from partners, shallow understanding and interpretation by others instead of by locals; exclusion of important target groups leading to missed information and skewed program design; missed information on local structures and technical knowledge that can be incorporated into research, etc.

If participation is involved there were some key points provided by the ICM (Lusembo et al 2004), NAADS (Draa et al 2004), Brinn et al 2004), and other literature reviewed (Russell and Harshberger 2003; German 2003; Farrington 2000): Time should be taken to ensure there are shared views of concepts. Survey findings should be shared back and validated by target groups. Explicit socially optimal techniques need to be used to ensure involvement of marginalized groups. If researchers do not have good facilitation skills, then partner with NGOs. Quick PRAs or other participatory techniques need to be supplemented with longer term studies and

observations to capture social interactions. If the 'solution' involves other actors then they should be involved in beginning.

*Design and Methodological Issues*

Survey and study design involve decisions related to sampling regimes, data to collect, analytical methods, sequencing of methods and processes, complexity and comprehensiveness, and efficiency related to cost and speed. Design may need to take into account future communication of results, implications for future implementation or use of the information, and scaling up strategies. Similar to the participation issues, there is no cook book but there are many principles to keep in mind when making these decisions.

Most papers reviewed pertaining to informal and formal surveys explained their sampling strategy in terms of numbers of households, groups, or key informants that were interviewed, although this was missing in some (Bagnell-Oakley et al 2004, Bamwerinde et al 2004a, Mengistu et al 2004) which brings quality and rigour into question. Some surveys used a purposive sampling technique to ensure participation and information solicitation from different types of people: Brinn et al (2004) wealth groups for soil fertility investigations; Hauser et al (2004) for sampling different stakeholders for the organic products work; Lusembo et al (2004) for sampling different perspectives in the ICM innovation process; and Kimenju et al (2004) of different types of consumers for the GM foods survey. Draa et al (2004) used a rigorous sampling of wealth categories to better understand inclusion and transparency aspects of NAADS. Likewise, Bagnell-Oakley et al (2004) used wealth ranking to stratify their interviews on AKIS.

Another consideration is choosing and zoning the target or sample area to assist in priority setting and understanding diversity from another angle. The Moroccan paper (Nassif 2004) mentions the usefulness of using survey results to zone the territory so as to assist researchers in targeting their research; however, later in the paper the author mentions the use of farmers to fine tune variety selection for very heterogeneous micro environments in PPB. The fish survey used zoning of the lake to sample different areas having different locations and depths at different times of the year to sample variability due to climate (Okaronon et al 2004).

Others have chosen areas where the issue they want to investigate is present (goat production systems, NAADS pilot districts, different sorts of markets, near natural forests that are threatened, the lake for fish issues, etc.; while others sampled pilot or project areas where they are working (ICM, agroforestry, AKIS).
FSR used the concept of recommendation domains to stand for similar circumstances (in a broad sense) where there would be high probability of scaling up of solutions. Currently the definition of scaling up and out is more complex and includes vertical and horizontal 'reach' through various means: through institutions, farmer-to-farmer and community to community, etc. and 'what' you are scaling up may be technologies, methods and tools, practices and principles, etc. Therefore, the 'pathways to development impact' is useful to think through to enable decision making on sampling 'who' and 'where'.

The diagnosis methodological processes and sequencing followed is now seen as quite important design consideration, particularly in steps that combine participatory or more qualitative inputs with quantitative steps. As in later years of FSR, an informal or reconnaissance survey was used to scope the situation and advise on the content of the formal survey. This is still useful. Various papers using a more participatory approach can be reviewed to get details of the processes and sequencing used: sector diagnosis involving multiple stakeholders (Mengistu et al 2004); deriving a research agenda for the organic food sector (Hauser et al 2004); comparing processes to assess demand (Draa et al 2004); research planning for ICM (Lusembo et al 2004); consumer awareness and attitudes to GM foods (Kimenju et al 2004). Process approaches and methods to diagnosis and research generally, need skill and experience to plan and implement – and could be considered an art. There is little written about this and is currently the subject of methodological research.

Complexity and comprehensiveness of surveys vary according to objectives; however, with new approaches the complexity of investigation is increasing; for example, poverty studies (Adato and Mesizen-Dick 2002); understanding partnerships (Alsop et al 2000); integrated natural resource management (Barret 2002; Campbell et al 2001; Campbell et al 2003; Gottret and White 2003); tracking the fate of innovations (German and Mowo 2003); PLAR and soil fertility management (DeFoer et al 2000); and impact assessment (Fujisaka and White

2003). Two papers highlighted a sector type approach to their work (organic products by Haust et al and mandarin by Mengistu et al) while the political ecology paper looks at major interactions within the agricultural sector (Archambault 2004b). Some pertinent challenges, that were also present when things were simpler, are priority setting, cost, and implications for follow up and action, as well as speed to deliver. It may be that the development of frameworks and priorities within the frameworks might alleviate pressures to 'do all' as well as to limit the frequency to which large studies might be done. For example, Sahay (2004) provides a rationale using the livelihoods approach to start with social capital and move to other assets over time.

## TOOLS

Tools and toolkits are part and parcel of diagnostics and assessments. There are numerous books, references and inventories made. Tools, which are techniques and processes, should help researchers and participants to comprehensively understand the issues; should expand knowledge sharing amongst those having different perspectives and abilities; should be easy to use by the target group; should promote learning; and should foster combinations of qualitative and quantitative methods. They should not be used as blueprints without testing or accompanying analysis. Innovative development of tools should be encouraged. A number of innovative diagnostic tools and analytical technqiues mentioned in the various papers are worth mentioning here:

- The Contingent Valuation Model (CVM) combined with a Tobit model was used in the socio-economics of livestock management study (Ouma et al 2004) that values non-market benefits;
- The Livelihoods Asset Status Tracking System (LAST) used by the EIRF project in India to monitor progress on asset building (Sahay 2004);
- The use of BLAD (Between life and death households, e.g. widow, handicapped, etc) as a differentiated approach to help the very poor and a *jankar* system to facilitate empowerment in India (Sahay 2004);
- The use of diagrams to map inter-relationships flows and factors affecting various aspects of a system (Mengistu et al 2004; Bragnell-Oakeley 2004);
- On-farm trials and a preference ranking system (Bamwerinde et al 2004a);
- Visioning and actors linkages for ICM and soil fertility planning (Lusembo et al 2004; Brinn et al 2004);
- Farmer evaluation and ranking of multiple lines (Nassif 2004);
- Participatory generation of poverty indicators that involved statistically quantification of local perceptions (Bashaasha and Boesen 2004); and
- A matrix containing quality criteria, indicators and methods for a demand assessment process (Draa et al 2004).

## CHALLENGES

### *Strength of Analysis and Recommendations*

Pitfalls related to this aspect might include the following. Results and conclusions may be stated in general statements even though the study and critique might have been well done (Bagnell-Oakley et al 2004; Brinn et al 2004; Sseguya et al 2004; Draa et al 2004); the study or conclusions may have a limited cause and effect analysis due to design, analytical method used or origin (Ssewannyana et al 2004; Bamwerinde et al 2004b; Bashaasha and Boesen 2004); certain blind spots, such as aspects related to livelihoods, socio-economic factors, gender or differential social groups, might limit the findings and relevance of the work (Okaronon et al 2004; Ssewannyana et al 2004; Kiwuso et al 2004). It should be noted that there were very few examples that used gender analysis techniques.

### *Strength of the Design Decisions*

As reviewed, there are many design decisions that need to be made in relation to participation, targets, samples, etc. and many of these are circumstantial, that is, related to the overall purpose of the study and future implications for implementation. Quality in decision making is often very difficult to judge without interviewing the researchers and seeing the field work. Two examples are focused on here: the GM for food

appeared to have positive design features: it took into account different users, different information modes and organized logistics in a way to sample these and combined informal and formal techniques to increase robustness. The results are skewed however by the fact that those who did not know about GM foods were not surveyed for obvious reasons which presents a design dilemma (Kimenju et al 2004). The land abandonment study provided a conceptual model derived from other research that guided the study which used econometric tools to look into decision making that was both subjective and objective. Although the tools and design were robust and well implemented the study had some limitations (as stated by the authors) it was done in one season and a huge volume of data that made interpretation difficult (Bamwerinde et al 2004b). These lessons might provide key learning points for others.

*Scope and Definition of "Pathways to Development Impact" as a Starting Point*

In our examples, some studies had a huge scope (organic products, mandarin, political ecology) while others had a much smaller scope related to their overall objectives. Other than the purpose the scope can be influenced by institutional mind sets; for example, donor or government policy and support might ensure poverty, gender or a livelihoods focus, or an emphasis on a market or environmental approach or integration of a number of factors. Thus, the mandate and policy of implementing and supporting organizations can go a long way to ensure that the scope is meaningful (or not). Individual mind sets also influence the scope: whether the individual works alone or in a team might influence the broadness of the factors looked into, as noted by Nassif (2004) in stating the important contributions of social scientists; and, professional experience and biases, including depth of conceptual understandings, may influence definition of the scope, 'who' is involved and 'how' they are involved in the study. Some studies lacked a policy orientation where it might be important (transport); others lacked poverty or gender dimensions (goats, fish); no communities or collective management aspects were investigated in the land abandonment study, and there were other examples. To help make these decisions, it would be useful to adopt the 'pathways to development impact' mapping technique (reviewed in Chapter 1 on impact assessment section) at the start of the project and test and refine this with the survey information.

## IMPLICATIONS of NEW DIRECTIONS IN DIAGNOSIS and ASSESSMENT FOR IAR4D

This section of the paper summarizes the major trends taking place as noted in the literature review and analyzes what these might mean for implementers, their organizations and partners if these trends were to manifest themselves in Uganda. The following section looks at what the impact of IAR4D might look like, the role that diagnosis in this and the implications for roles and relationships between researchers and others involved in development. Finally, implications for institutionalization (capacity building, organization and management) are explored.

### MAJOR TRENDS IN DIAGNOSTICS AND ASSESSMENTS

*'Extractive' to Participatory*

The evolution of research approaches from extractive towards incorporating the participation of multiple actors has influenced methods related to the various stages of research, including diagnosis and impact assessment. A pragmatic approach needs to be taken to make decisions on 'how participatory' participation should be, given that FPR is complementary to more formal research approaches, not replacing them. In cases where participation is used, the nature of 'participation' is slowly evolving from one that is merely 'functional', where researchers are using participation to meet their own goals with some spill over to their 'clients', towards a more 'empowering' form of collaboration where there is 'joint learning' and shared outputs and outcomes. Wide evidence supports that joint ownership and learning is advantageous when wanting to foster development while doing research.

Some of the outputs coming from participatory techniques include: incorporation of ITK, local innovation, farmer criteria and as well as recognition that technology development is an innovation process that needs to be

managed; better targeting (more inclusive diagnostic processes), and identification of new problems to work on (closer interaction and more time in the field and with partners), for example.The number (or types) of actors considered in diagnostics and impact assessment is increasing. In the past diagnostic processes used to be largely farmer-centred, now whole communities as well as other actors involved in the development process are involved. This goes along with an 'innovations systems' approach which looks at ALL the actors in a given process and what they ALL need to do to ensure the innovation takes place. When using a multiple stakeholder approach facilitation skills are needed to manage groups, unequal power relationships, and emerging forms of collaboration, such as partnerships, that foster collaborative R&D. Active participation in diagnostic work is now considered to be a strong pre-cursor to the implementation of R&D itself in that it is the starting point of the relationship and building trust and joint understanding, capacity building and local ownership.

There has been wide recognition of the importance and value of ITK and the perspectives and experiences of farmers, of indigenous social structures, and differentiation and heterogeneity of people's assets, particularly when it comes to poverty alleviation and making an impact on more marginalized groups. Specific methods are being used to ensure adequate 'sampling' and involvement by these groups in the diagnostic processes.
The emphasis is now more on improving local capacity to solve problems in whatever way seems to work. It is "learning together by doing together". Stakeholders, particularly the farming communities, are encouraged to share, examine, expand, and analyze their own knowledge of their own conditions, needs, and problems and to suggest community-based solutions. The primary criteria for success are adoption of technologies and behavioural change by farmers. The focus is on people.

### *Moving from 'Reductionist' to Comprehensive: Broader Dimensions and Integration*

There is an increasing level of complexity taken on in diagnosis and impact assessment, but with a greater gap in impact assessment methodologies which are striving to catch up with new concepts. The usefulness of 'reductionist' research is still recognized, but is being complemented by research on systems, differentiated users and scenarios, and more dimensions that calls for an integrated multi-disciplinary approach to diagnosis in these instances. So, challenges on one hand are to look at multiple factors and relationships over time, space and levels of decision making together with diversified landscapes and stakeholders having varying strategies; in other words, bringing in most of the dimensions that exist in real life. At the same time, adding a participatory dimension which means not only managing learning for research sake but also for the sake of others involved. This is a tall order, but may be necessary to make an impact on development and break through the adoption barriers.

Researchers are still grappling with how to manage and prioritize diversified demands and needs, particularly to answer marginalized interests and needs when using a poverty focus. Likewise, the integration of social, cultural, policy, economic, institutional and biophysical aspects and their interactions are important in trade-off studies, construction of decision guides, and in other multi-sectoral issues where expectations are to influence many layers at once in order to effect a change. Other dimensions challenging dimensions are studying behaviour and cultural issues to better understand change; inclusion of 'external' factors that influence management (policies impacting on inputs and output marketing, social values and norms, security, governance) among other newer areas of research coming out of development spheres and fall well beyond technology development. These demands require new organizational and collaborative forms.

### *Expansion of Methods and Tools*

Methods and tools are being invented at a fast pace and it is challenging to keep up with new concepts embodied in the approaches that are in turn being integrated into diagnostic work. Tools and methods must add value and help people make productive investments in diagnosis. They cannot be used blindly or as a blueprint. Each situation or need demands a different set or combination; therefore it becomes more of an 'art' to choose combinations and invent new ones.

There has been a proliferation of qualitative methods that can be used to enhance participation and local capacity. Combined use of multiple methods and tools, both quantitative and qualitative is increasing, even in impact assessment. Action research does not produce "silver bullets", but findings and principles more and

more are being derived from analysis of cross-site experiences and lessons. Generalization in the 'statistical' sense is still an issue, as outcomes can be context specific-driven patterns of 'what' has worked well, 'where' and 'why'.

Facilitation skills are required to have the desired outcome as well as facilitate more empowering forms of participation throughout the process. FPR and PLAR diagnostic techniques now encompasses gender and stakeholder analyses, agro-ecosystem analyses, inclusion and group forming and strengthening, farmer experimentation, assessment and monitoring, and dissemination among others. There is increased attention for research to focus on the "how" to do "x" as a means to find ways that lead to understanding, joint analysis, action on to change rather than on the 'what', which has been a more empirical approach to seek understanding. Therefore, a number of process-oriented and analytical tools that facilitate knowledge-based exchanges and consensus building are being developed (Hagmann et al 2002; German and Stroud 2003a). They require neither advanced modelling skills nor large investments in time, data collection and analysis, but do facilitate necessary mutual understanding and shared visions that are inputs into designing a set of coherent and interlinked sectoral initiatives. Generally, the best of both worlds integrated both action and more empirical research.

### *Blending of Research Processes*

FPR / PLAR research philosophy and processes now aim to empower farmers to be innovators and this has fostered changes in the research agenda setting and implementation processes. In so doing, the new thinking on managing innovation systems and using PLAR is blurring the past distinction and linear steps of the so-called research-development continuum. Diagnosis is not something that is happening only at the beginning of the research process, but rather is now occurring throughout (ref PLAR learning cycle, chapter 1). Effective monitoring should be carried out throughout the process. The pathway to impact should be designed at the beginning and redefined on the way if needed, rather than conducting an impact assessment at the end of the process. The products emerging from research are not just technologies, but policy options, principles, methods and processes, understanding and analyses of systems so as to improve them, monitoring of trends and impacts, etc. The research stream must be flexible and process oriented and keeps the desired outcome in sight.

Researchers are recipients as well as others. Thus, the old mental models are being challenged at a fast pace. In line with this, the consensus is that an impact orientation should be built into all parts of the research process. There is conclusive evidence that iterative learning (Sahay 2004) and thoughtful evolution based on solid analyses (Nassif 2004; (Archambault 2004b; (Sseguya et al 2004) improve the functioning of R&D. Analyses and reflection should question assumptions, hypotheses, concepts and review quality and operational models. The importance of continuous monitoring has been underscored (Archambault 2004a; (Hauser et al 2004).

Most R&D programs emphasize, design but do not often use PM&E and assessment information. Why is this? An analysis conducted by Cash and Clark (2001) highlighted some reasons: (i) failing to appreciate the context, where type of assessment, the methodology and the perspectives should be useful to the users but is not; (ii) failing to address the needs of the potential users, where issues seen as relevant to science were not relevant to the users; (iii) failing to treat the assessment as a communication process, where written reports were not used by those it was intended for and no dialogue was created; (iv) failing to connect global and local levels of assessment, where diverse concerns remained disconnected. Although the paper provides more detail and new models, it is basically stressing the need to involve stakeholders in the process.

### *Linking 'R' to 'D': Research 'on', 'for' and 'Embedded in' Development*

Some of the general issues that need to be taken into account when working in development context might include: targeting beneficiaries, control (by whom), power relations, quality and sustainability, improving livelihoods without creating dependency, economic returns to investment, influencing policy, and organizational setups and linkages (Archambault 2004a; (Archambault 2004b). When research focuses more on development issues, then these areas have to be considered. This is a departure from technology generation. Some examples where 'diagnosis', monitoring, and assessments that are fitting within R&D follow:

One area where a number of examples were presented above was research that informed policy makers. If done well, information derived from research results could be targeted to help institutions and programs to more clearly perceive trade offs inherent in a policy, could be used by interest groups so as to 'democratize' the policy analysis process, and could "promote more open and informed debates on issues by various groups (university researchers, NGOs, trade, professional and even producers' associations). This is an example of *R 4 D*. New types of research questions are emerging that require broader, more comprehensive diagnostic work and may require new types of science (e.g. PLAR), new processes (e.g. integration & multi-disciplinarity), new skills, BUT must be linked to IMPACT (Campbell et al 2001; Hagmann et al 2002; German et al 2003). PLAR and empirical work can go a long way in defining, facilitating, documenting and refining development processes, e.g. to learn more about 'how' to do development (methodology development/PM&E). Recent studies on NAADS provided feedback, lessons learned, and possible way forward on revising development processes (Draa et al 2004; Stroud et al 2004). Likewise, two papers presented covered analytical frameworks that can be used to revise policies and institutional arrangements that are currently operating (Archambault 2004a; Archambault 2004b). This is an example of *R on D*.

Lastly, the PLAR process is designed for *R to be embedded in D* such that ensure 'traditional research' (formal) enables and links to and informs development processes through the PLAR process. Design and implementation sequencing is particularly critical to ensure that the need for more formal studies arises from the development process and that information feeds back into that process to inform it. Developing an integrated watershed management approach would provide an example of this approach. This type of approach is particularly useful social and institutional processes are involved, which is inherent in much of the R&D work.

In these 'blended' processes, researchers, extensionists, farmers and NGOs are recognized as joint partners in the R&D process, including diagnosis and impact assessment, even though each partner has specific roles. Thus, more emphasis is on fostering closer researcher-farmer-development partnerships than in the past. Multi-agency involvement may improve communication, understanding of varying perspectives and appreciation of different skill sets. There is less division between R and D and the ideal is to work towards complementarity of R&D skills rather than being top-down and one-way. Again, there are no methodological blueprints or strict guidelines on when to use what form of collaboration (Alsop et al 2000) and there are many challenges in implementation particularly between government and non-government and private sectors.

### *Amalgamating and Negotiating Demand and Priority-Setting*

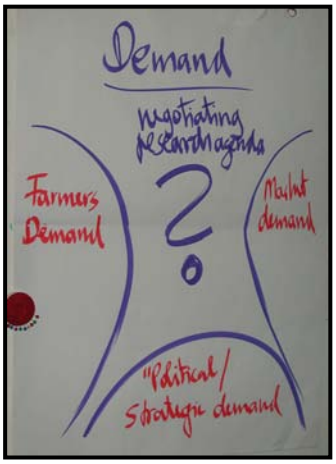
One of the main functions of diagnostic work is to serve as an input into determining demands, priorities and influencing planning and replanning. The desire to have demand-led research is to ensure relevance to users on one hand, and promotes a service or client orientation putting the auspices on the users rather than on the provider. These concepts arose as part of the 'people first' models and have gained strength along with enhanced models of participation. The process itself has some key assumptions: that those making the demands 'know what they want' which presumes analytical capacity and some exposure to options; that those making the demands are free to articulate them, which presumes balance of power and confidence to do so; and it presumes an equitable process to collect, weigh and judge these demands to as to prioritize.

The paper by Draa et all (2004) makes an excellent critique of the difficulties in designing and carrying out such a process – highlighting issues of inclusion, transparency and accountability, power balances in decision making, and the design of the process itself. They also compare processes where there is direct contact made with the clients (NAADS) versus indirect contact involving representative or other stakeholders (NARO). Various issues in organizing process include: issues of inclusion (Bashaasha and Boesen 2004; Sahay 2004); on what is the demand for research on new areas (Hauser et al 2004; Kimenju et al 2004; Katumba et al 2004); and on stakeholders involvement and a broad process for bringing in different perspectives or brokers (Lusembo et al 2004; Mengistu et al 2004; Hauser et al 2004).

Consolidation of demand becomes a process of negotiation and priority setting. The following excerpt from a recent workshop held with Ethiopian NARS by AHI and facilitated by Jurgen Hagmann explains the complexities (Box 3).

**Box 3.** Negotiating Demand (Stroud and Hagmann 2004)

Are we producing technologies for markets or for the farmers interests? Farmers should work hand-in-hand with researchers and private sector to meet the quality and quantity of the product needed. How do researchers handle this is a dichotomy? What is the driving force to get innovation systems to work? Market demand? Farmers demand? Political or strategic demand? We have to be careful and consider the livelihood strategy of farmers – food and income needs both. We cannot jump from food aid to market orientation – needs to be pragmatic and use an evolution approach. Do not only concentrate on few large richer farmers. How are research stations responding to changes in farming, e.g. new crops and new demands that are not in the mandate of the research station? Research is in between and so what is our research agenda? The agenda is not exclusive – but can accommodate and combine demands.




Handling different demands requires different way of interacting with the various demands and we have to *negotiate* how research can make a difference. Do we also have to be negotiators as well as researchers? This seems to be the work of economists and social scientists, but it was noted that we are all negotiators. Think of our everyday interactions with our colleagues, our bosses, our families. At home – in daily life - you have many functions – and you don't need a sociologist and psychologist to talk to your wife. Our work is made up of science and also other skills and common sense to do our jobs. We don't need a 3-year study to learn how to negotiate because we do it everyday.

Those described primarily involve bottom up processes, while the impact assessment research takes a more top down view using more formal *ex ante* assessments; however, Gottret and White (2004) suggest an innovative process that involves stakeholders definitions of development impact pathways to guide the process.

Priority setting is another stage in the negotiation process – and can also involve top down processes looking at rates of returns; quantitative scoring techniques that incorporate qualitative assessments (ISNAR) or subjective participatory techniques that can be somehow quantified (Bamwerinde wt al 2004a). Depending upon the type of research, as seen in the typology of diagnostic studies, the demand can come from various types of stakeholders, not only farmers, or have other sources. This makes for a complex process; however, the conclusion is that optimally, there should be some form of representation and direct contact of stakeholders in the process, if this can be arranged.

## IMPLICATIONS FOR MANAGEMENT AND ORGANIZATION

It is difficult to project what is needed for the diagnostic processes alone without considering the research process that it fits into. The synthesis process only provided snapshots of diagnostic work that is being undertaken by NARO, but offers some interesting and innovative examples. It cannot be judged as to how widely such examples are spread throughout the research system, and so this synthesis does not constitute a thorough evaluation and analysis. Therefore, as a way to provoke thought about the way forward into IAR4D, the vision of what has been suggested in the review will be provided. This so-called 'paradigm shift' followed by a brief set of issues or questions raised at the organizational level, followed by some issues related to implementing theme 1. In this way, it is hoped that strategic thinking into the future will be stimulated.
To make the *paradigm shift* envisioned in the analysis presented in 4.1 above, the following is needed:

Weave together …

- New concepts - ways of thinking
- New competencies – ways of doing
- New dimensions – research topics & methods
- New relationships – teams, closer to communities, closer to development

The above requires creativity, trying out, no fear of making mistakes, and a sharing and learning culture. This, in turn, requires the integration of various experts, levels and perspectives, and encompasses the following features and principles if researchers and their organizations are going to achieve the outcomes envisioned for IAR4D:

- Empower relevant stakeholders, applying organizational development and change principles, to strengthen collective and individual decision making, analysis, planning and implementation, lobbying, negotiation and conflict management;
- Use a participatory social and experiential learning paradigm to guide the operational process (in contrast to a prescriptive or blueprint approach);
- Improve innovation and adaptive management capacity so as to generate and make use of a wide range of technological options successfully applied to different niches;
- Improve facilitation, coordination, and management of partnerships and institutional arrangements;
- Ensure that multiple level perspectives are considered using participatory, analytical tools or models to improve decision making and selection of option;
- Ensure research is aimed at solving development problems or addressing opportunities by integrating disciplinary perspectives and tools, developing and using new participatory research methods, and providing feedback to guide research on components;
- Promote the use of integrated, holistic farm and landscape systems management principles and work on interactions at the systems level (e.g. water x soil/land x pest/disease/weeds x genetic resources);
- Provide advice on scenarios that have inherent trade-offs between goals of productivity, sustainability, resilience and profitability which implies takes cognisance of multiple stakeholders that interact and operate at multiple levels and scales AND involve the perspectives of disciplines and actors required to find solutions; and
- Consider scaling up pathways and chains of partners throughout so as to identify and have early inclusion of stakeholders and their institutions.
  (adapted from Campbell et al, unpublished)

This paradigm shift has implications for the research organization and managing change:

- How far along the path to development should research go and dedicate resources and time along this line?
- What are the implications for roles and responsibilities of research *vis a vis* other actors involved in development? And what are the linkages to these actors?
- What management systems (planning, monitoring, incentives, logistics) will promote this paradigm shift?
- What new capacities and skills are needed to accomplish this vision?
- What is needed to foster a creative and innovative atmosphere but maintain integrity within the organization?
- What sort of management and processes are needed to manage change within the organization and of its staff?

The paradigm shift also has implications and challenges for the implementation of "understanding people, their livelihood systems, demands and impact of innovations" and the contribution to the research process.

(a) Organizational issues:

- What mechanisms should be used to integrate and 'blend' diagnostics (theme 1), in its entirety, into the research process?
- What are the mechanisms to foster better integration and multi-disciplinarity on technical content?
- What are the strategies to improve social science inputs when there are limited personnel with this expertise but an increased demand for this discipline?
- How can partnerships and other collaborative arrangement be fostered and modalities devolved to those in the field?
- What are the most optimum functional links and feedback systems between those doing broad versus more reductionist research?

- What is the strategy to ensure that research results are communicated and that scaling up is built in, similar to impact assessment?
- How can monitoring systems become 'reflection and learning' that is done iteratively on areas needed by implementers and collaborators?
- What are the roles and responsibilities of research in diagnostic work, and if different from the past, how can these be negotiated with researchers?
- How can researchers used to working primarily on diagnostics for technology development retool and broaden their skill base to take on other research for development assignments? And to improve their implementation of the processes (facilitation, negotiation, organizational development, policy dialogue etc)?
- How will impact assessment be integrated and linked to monitoring?

(b) Methodological issues:

- How should quality of diagnostics be assured?
- Is the identification of pathways to development impact useful for choosing research strategies, focusing investments and insuring delivery and impact at the end of the day?
- Should an 'empowerment' instead of a 'functional' approach be taken wherever possible?
- What are the operational strategies that can ensure inclusion in the diagnostic processes?
- What are the strategies to ensure that 'systems' issues and methods are utilized in diagnostics? (e.g. livelihood and agroecological)
- Although indigenous knowledge and social structures are valued, the techniques to bring science and local knowledge together need to be strengthened.
- What steps can be taken to improve the use of multiple tools and analytical techniques (both qualitative and quantitative) to ensure relevance?
- What are the strategies for amalgamating and negotiating demand and how can methodologies be developed and tested to this end?
- What are the mechanisms to ensure that priorities using a rigorous analytical process that is inclusive and balances the interests and needs of relevant stakeholders?

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The AHI Working Papers Series was developed as a medium for AHI staff and partners to synthesize key research findings and lessons from innovations conducted in its benchmark site locations and institutional change work in the region. Contributions to the series include survey reports; case studies from sites; synthetic reviews of key topics and experiences; and drafts of academic papers written for international conferences and/or eventual publication in peer reviewed journals. In some cases, Working Papers have been re-produced from already published material in an effort to consolidate the work done by AHI and its partners over the years. The targets of these papers include research organizations at national and international level; development and extension organizations and practitioners with an interest in conceptual synthesis of "good practice"; and policy-makers interested in more widespread application of lessons and successes.

## Acknowledgements

The African Highlands Initiative (AHI) expresses its gratitude to the Department for Research and Development of Tanzania (DRD); Ethiopian Institute of Agricultural Research (EIAR); FOFIFA of Madagascar; Kenyan Agricultural Research Institute (KARI); National Agricultural Research Organization of Uganda (NARO); International Centre for Tropical Agriculture (CIAT); World Agroforestry Centre (ICRAF); Tropical Soils Biology and Fertility Institute of CIAT (TSBF-CIAT); International Maize and Wheat Centre (CIMMYT); International Potato Centre (CIP); International Institute of Tropical Agriculture (IITA); Ministries of Agriculture and NGO partners operating in AHI Benchmark Sites of Ethiopia, Kenya, Tanzania and Uganda for the technical, facilitation and partnership roles they have played in our effort to develop tools and methods in Integrated Natural Resource Management together with local communities.

AHI is very thankful to the donors which tirelessly financed the regional and global engagement of AHI in improving our development and natural resource management research endeavours, namely the Swiss Development Cooperation (SDC); International Development Research Council (IDRC); Ministerie van Buitenlandse Zaken (the Netherlands government); Cooperazione Italiana (Italian government); the Rockefeller Foundation; the European Commission; the Consultative Group on International Agricultural Research (CGIAR); the Department for International Development (DfID); the Collective Action and Property Rights Programme of the CGIAR (CAPRi); the International Potato Center (CIP) and ECAPAPA.