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Introduction

Sustainable agriculture has been chosen by DCA as one out of four priority areas to accomplish the objective of assisting poor and food insecure populations to claim and uphold their right to food and sustainable livelihoods. This paper outlines the principles and modalities of DanChurchAid's support to sustainable agriculture through its partner organizations.

1. What is sustainable agriculture?

The definition of sustainable agriculture varies among development organisations and academic traditions, each emphasizing different values, priorities and goals. DCA has, however, adopted the following broad definition: "sustainable agriculture encompasses that resources for agriculture are successfully managed to satisfy changing human needs while maintaining or enhancing the quality of natural environment". It should be kept in mind that the concept of "sustainable" refers to the agricultural system and not to the livelihood system (cf. the overall objective of the Food Security Strategy). This means that the term "sustainable agriculture" does not necessarily imply that food security and sustainable livelihoods can be attained solely through production (e.g. crop production, livestock keeping and gardening); rather agriculture is one of several sources of livelihood income of rural households (although in most cases the primary one). It is also worthwhile mentioning that agriculture is not restricted to rural areas, but can also exist in urban areas as part of a portfolio of economic activities. Agricultural sustainability implies better use of nature's goods and services, and of peoples knowledge, technologies and collective capacities (IJAS 2003).

If poor farmers' agricultural production systems are to be a vehicle for satisfying the needs of the present poor and allow room for a production increase to satisfy the needs of the next 2-3 generations, it is crucial that farmers have access to and assurance of continued ability to use a range of opportunities for a productive, environmentally sensitive and socially acceptable agriculture. Crucial elements for sustainable agricultural development among poor farmers are increased productivity, better adaptation to location-specific agro-ecological and socio-economic conditions, environmental sustainability and flexibility in response to changing external market conditions. Technology should be understood in a broad sense, comprising techniques, capital, organization, skills and knowledge (Rip and Kemp 1998).

Agriculture can be divided into three very broad forms of farming practices of farming practices. The first two forms of farming practices: industrialized and Green Revolution agriculture, have been able to respond to the science-based technological packages, producing high input – high output agriculture in industrialised countries and areas in developing countries where groups of farmers have been able to adapt to and benefit from such agricultural practices. The third form of agriculture described as "diverse, complex and resource-poor agriculture", comprises all the remaining agricultural and livelihood systems, which are largely based on indigenous practices and characterised as complex and diverse low external input systems. While well adapted to local conditions, the productivity of such agricultural systems is commonly low. A transition towards sustainability is estimated to result in a 10-20% fall in yields for industrialised agriculture, maintaining yields while substantially reducing external seasonal inputs for 'green revolution' agriculture and doubling or trebling crop yields in diverse, complex and 'resource-poor' areas (Pretty 1995).

Sustainable agriculture can provide farmers with more output from less external inputs by substituting these inputs with enhanced knowledge, skills, organisation and labour. It is the hope that we through sustainable agriculture are able to produce more food to meet human needs whilst protecting and improving national resources. It is possible, though not easy, to have diversity in both human and natural systems without giving up economic efficiency. There is a wide range of proven and promising resource-conserving technologies and practices in the areas of pest and diseases, regeneration of soil fertility, genetic resources and water management. There may also be synergy effects from further integration of crop and livestock production. Many of such farming techniques are multifunctional, implying that their adoption will mean favourable changes in several components of a farming system at the same time.

The two most widely used comprehensive approaches to sustainable agriculture among poor farmers are: Permaculture and Low External Input Sustainable Agriculture (LEISA). These systems are based on principles of ecological agriculture and livestock management. Sustainable agricultural systems beneficial to poor farmers are viewed as essentially healthy and productive ecosystems. Humans then link into the ecosystem as many times during the agricultural season and in as many locations as possible and feasible. Transition towards sustainability of indigenous agricultural practices in diverse, complex and 'resource-poor' is viewed as incremental and evolutionary (e.g. progress will take place by adding to or changing components of the existing farming system, not by replacing the existing system entirely).

Through the past decade international (for instance CGIAR) and national research organisations have increasingly focused on developing technologies targeting poor farmers. The resulting range of pro-poor technical solutions is largely based on ecological principles and aim to increase productivity of biological resources existing within a given agro-ecological area.

2. How can sustainable agriculture contribute to food security and poverty alleviation?

Most poor who live in rural areas in developing countries depend on agriculture for their household food security and the larger part of their income. Development of smallholder agricultural production is often the main opportunity for achieving household food security and poverty alleviation. Smallholder agricultural production has considerable potential as vehicle for rural poverty alleviation. In the past this potential has only been realised to a limited extent. There is a great need for access by smallholder farmers to a technology development process that allows them to increase production and income in a sustainable manner.

In spite of considerable investment in agriculture by external donors and national governments, only a minority of poor farmers who live in diverse, complex and 'resource-poor' areas have today access to technology that improves agricultural productivity in a sustainable manner. This has to do with institutional and social issues rather than a lack of technical knowledge. A large body of agricultural research results and technical knowledge exist. The question is how to stimulate a process of technological development among farmers and how to define a new division of labour between state institutions, the private sector and farmers.

Technology offered to smallholders suffers from two major problems: (i) limited relevance because of low control by smallholders over the research process, as well as high demands set by the technology in terms of capital, resources and crop husbandry; and (ii) limited outreach, because of failure of public and private service provision. While there is a clear need to get technology 'off the shelf', the fact is that much of the technology that remains 'on the shelf' is there for good reasons, e.g. that resources and management required by a technology are not available among farmers, that a technology is not economically viable, that a technology entails unacceptable risks for farmers, etc.

A key notion of the conventional approach to technology development is that universally applicable technical solutions can be found to resolve most agricultural problems. Agricultural research stations have developed technological packages largely based on on-station trials. Blanket recommendations for use of chemical inputs and farm management are developed by research and delivered to farmers by extension services. However, while such a broad focus is convenient for research institutes and agricultural advisory services and input suppliers, such technologies do not cater for the specific needs of individual farmers that produce under a wide variety of agro-ecological and socio-economic conditions. While the technologies developed by centralised research institutions aim to be widely applicable, they have tended to (i) involve too high risks, (ii) be economic unattractive, (iii) be too demanding in terms of access to and management of resources.

Technology developed and knowledge accumulated by smallholders themselves is an essential factor in current livelihood strategies. But locally developed technologies and social management practices are not necessarily the cost-effective way of exploiting the smallholders' potential or confronting their constraints. Local knowledge and local farming systems are not necessarily indigenous, in the sense that many of the crops cultivated today are relatively recently introduced. Perhaps more important, many communities have experienced considerable migration, and a significant proportion of people living in a given community may have immigrated from

elsewhere. The idea that local indigenous farming systems and technologies represent optimal resource use is often questionable. Local methods of cultivation are often well adapted to the local agro-ecological and socio-economic context. However, such technologies often cannot alone provide a basis for household food security and the required significant growth in productivity and income that is needed to alleviate poverty.

A substantial proportion of poor farmers living in diverse, complex and 'resource-poor' areas face conditions of difficulty and stress to which both indigenous and science-based technologies have few real answers. Technically sound farm management practices and technologies often turn out to be financially or managerially unacceptable to farmers. Much technical research continues to focus on narrow technical agricultural problems and too little effort is made to tie the results to the socio-economic context in which the farmers are living.

Achieving household food security through sustainable improvement of household agricultural production requires that poor farmers improve their productive assets and enhance their capability of using them, while poverty alleviation often requires additional involvement in market exchange. It is unrealistic to expect that farmers who are food insecure can rely on marketing surplus production, as output markets in diverse, complex and 'resource-poor' areas are unreliable and subject to frequent 'market failure' by both public and private sector actors. Improvement of such farmers' knowledge, skills, organisation, and access to information is crucial for enhancing farmers' access to markets and ability to mitigate associated risks.

3. Gender

DCA is currently working towards adopting a Gender Mainstreaming Approach in its project and programme work, which means that the gender perspective should be incorporated into all aspects of programme/project planning and implementation. The overall aim is gender equity, and that gender should be understood as part of all activities, rather than as separate activities.

With regard to agriculture, incorporating a gender perspective is of utmost importance. Thus, in many parts of the world, for instance Sub-Saharan Africa, women do a larger part of the work than men, while at the same time; they enjoy less rights and privileges than men. Women are thus often discriminated with regard to assess/entitlement to land, membership of cooperatives, access to credit, livestock, and other vital resources, and often men hold the right to the income from an agricultural production even through women have contributed at least as much labour as the men. Due to the lack of understanding of women's vital role within agriculture there has been a tendency during colonial time, but also more recently by national and international development bodies to assume that the men are the only and main actors within agriculture. In consequence with regard to introduction and development of agricultural technology, extension service, cooperatives, and new cropping patterns (for instance introduction of cash crops) the external bodies have approached only the male farmers with the effect that men and not women have gained control over and access to new crops, new agricultural technology, and new farming practices. Moreover, in many areas there has been a tendency for men to take over the right of disposal to various agricultural products as soon as these could generate an income (for instance commercialized food crops), although women originally disposed of the income of these crops.

Generally, with regard to the priority area of sustainable agriculture, it is thus important to pay attention to women's vital role within agriculture and to involve and support women in all aspects of agricultural interventions. It is paramount not only because it does not make sense to develop an area without including the major actors, but it is also important from a food security perspective. Thus, women do hold the major responsibility for food security at household level (in many cases this implies that they are responsible for the production of food crops), and approaching the women is more likely to impact directly on the food security of the household.

4. Target group

The target group for DCA and its partner organizations' interventions within sustainable agriculture are the poorest and food insecure farmers. Women farmers will attain special focus as they often have an underprivileged

position, and they moreover in most parts of the world play a crucial role with regard to the attainment of food security. As described in the Food Security Strategy, it is crucial to conduct a target group analysis, identifying the target group prior to the planning and implementation of the food security programme (please consult the Food Security Strategy for guidelines for identification of the focus group).

5. How can DCA stimulate sustainable agricultural development among poor farmers?

Stimulating sustainable agricultural development among poor farmers is a team effort, in which DCA is one among several stakeholders, including both central and local government institutions, NGOs, CBOs, the private sector and farmer groups. Strategic consideration about which role DCA can play in a given area must take into account the range and focus of existing activities. There will thus be large differences in DCA activities in different regions of the world.

The socio-economic context of agricultural production and marketing for smallholder farmers has changed dramatically since the completion of macro-economic structural reforms that were carried out in many developing countries during the 1990s. Often smallholder farmers have too few resources to cope with such rapid changes and seldom receive appropriate advice from extension services or other external actors that could guide the processes of change. The state institutions themselves are subject to substantial policy changes, such as decentralisation, privatisation, deregulation and democratisation. The diminished involvement of the state in the agricultural sector combined with the current process of change and reorientation within state institutions, has on the one hand reduced the level of state support to farmers from the state, but does on the other hand also mean increased opportunities for the private sector, including local-based initiatives.

NGOs, donors and governments have since the mid-nineties experimented with approaches to generation and dissemination of agricultural technology aimed at smallholder farmers. This has increased the number of actors involved with technology development. Which type of actors participate in technology generation processes varies according to the agricultural problem at hand and the local institutional capacity, and include different social and cultural groups of farmers (e.g. poor and non-poor, men and women, different ethnic groups, etc); agricultural researchers; agricultural advisory services; local government officials; staff of donor projects; NGOs; private companies within the marketing chain of particular crops; private companies engaged in input and output marketing; and community networks and institutions. These experimental approaches are typically implemented as part of NGO/donor financed projects and concerned with particular problems within a given area (i.e. district or province). The key elements of these new approaches are:

- A more diversified and locally (agro-ecologically and socially) adapted range of agricultural crop production technologies that minimize the dependency of external seasonal inputs and use local biophysical inputs more efficiently (e.g. integrated pest management, (IPM), participatory plant breeding (PPB) and integrated soil fertility management (ISFM)).
- A more participatory approach to generation of agricultural technology, i.e. a technology dialogue between farmer and external agents of change.
- Technology dissemination based on a client driven, pluralistic and decentralised farmer advisory service system.
- A decentralised system of production and distribution of biologically based inputs.

With this in mind, the following three sections discuss broad principles for how DCA can stimulate sustainable agriculture among poor farmers through three forms of support: (i) Area-based participatory technology development; (ii) Poor farmers' organisational capacity; and (iii) Training for transformation among NGOs and GO organisations involved with sustainable agriculture.

6. DCA support for area-based participatory technology development

Sustainable technological solutions that are adapted to the local specific context are best developed in a dialogue between farmers and outside agents. Dissemination of technologies resulting from such a dialogue involves social and institutional processes of ensuring adequate capability among individual farmers to make an informed choice between technology options and access to the required knowledge, skills and inputs. Participatory technology development comprises a plurality of methods and may be divided into four phases: 1) Farmer need assessment; 2) technology dialogue; 3) technology adaptation; and 4) technology expansion.

The research and development team is the driving force in the early stages of technology development, followed by a phase of equal partnership, and ending with the stakeholders in change of technology dissemination, and the role of the rural development team is reduced to one of consultation. While this is likely to be the typical scenario for most participatory technology development activities, this is not always the case. Depending on the agricultural problems identified and the strength and knowledge of local knowledge and community organisation, farmers may be more involved in the initial conceptualisation process. In other situations, farmers' adoption and use of a given technology may require significant continued involvement by external actors.
DCA and its partners are required to engage in the following activities during the four phases:

Need assessment involves three separate tasks. Firstly, to carry out a need assessment that identifies causes and effects of agricultural problems for different categories of farmers. This can be done with or without the active involvement of the target population, depending on the local social and cultural context. Identification of needs requires a skilled person with the ability to acquire an in-depth understanding of the local ecosystem, and of existing farming practices. Secondly, to identify a range of sustainable technology opportunities. This involves reviewing available technologies among farmers and from agricultural service providers locally, nationally and internationally. It is crucial that DCA and partners do not regard the result of this exercise as the 'correct' technologies to be transferred to farmers, but rather as the point of departure for engaging in a dialogue. Thirdly, to examine existing social networks and relationships between the target group and other farmers within the community.

Technology dialogue involves three tasks. Firstly, to initiate a technology dialogue by demonstrating a range of technology opportunities in 'pioneer locations' within the community. The need assessment phase will assist the choice of pioneer locations within the landscape and the identification of farmers to carry out in situ demonstrations of identified technologies. Secondly, to stimulate farmers to articulate their needs and engage in a technology dialogue. The ability of farmers to articulate their needs varies significantly depending on the local context. Farmers' perceptions of agricultural problems and possible solutions are not simply influenced by technical issues, but by the socio-economic status of the household (relative wealth status, gender composition, age and ethnicity), its livelihood strategy and social relations within the community. Furthermore, farmers' perceptions of and willingness to take risks vary considerably across the categories above. However, neither indigenous knowledge systems nor conventional Training and Visit based extension systems have provided smallholders with an adequate level of preparedness for evaluating the recommendations they receive from different sources. Thirdly, to engage in the technology dialogue. A comprehensive range of general participatory techniques are available and a number of thematic participatory approaches to agricultural technology development have evolved and matured over the past 5-10 years, covering issues such as plant breeding, soil fertility, pest management, water management, agro-forestry, etc. The outcome of technology dialogue is local adoption of sustainable agricultural practices.

Local adaptation of sustainable agricultural practices involves expanding from the relatively small number of innovative farmers involved in the technology dialogue to include a wider section of the community. While a process of technology dialogue is likely to result in a technological solution that is appropriate for local conditions of production, there is a need for a period of adaptation in which a larger number of farmers fine-tune input requirements and management practices to their production preferences. A good understanding of the social networks within the community is useful for ensuring that poor farmers are included and indeed make up the majority of farmers involved.

Wider adoption of chosen sustainable agricultural practices involves three tasks. During the expansion phase, the use of inputs and/management practices generated by participatory technology development process is more widely adopted by other farmers. Adaptation of technologies to local specific agro-ecological and socio-economic conditions for agricultural production is a key element of successful participatory technology development. Scale thereby becomes a determining factor for how widely appropriate a given technology is. Firstly, to facilitate a group approach to agricultural learning based on non-formal adult education principles. Enabling poor illiterate women to acquire the necessary knowledge about the ecosystem and new skills to manipulate it, requires a contextual learning-by-doing approach, rather than formal teaching of technical messages. Following limited basic training, groups of farmers are assisted by external facilitators to carry out experiments in on-farm trials which stimulate contextual, experimental and social learning relating to technologies identified during the participatory technology dialogue. Secondly, to stimulate community level production and dissemination of biologically based inputs as required. Enabling farmers to produce and reproduce the required portfolio of biological inputs of adequate genetic and physiological quality is an essential element in stimulating sustainable agriculture. Currently availability of planting materials are limited to the type of seeds that are profitable to produce by seed industry, while biologically based inputs required for ecological approaches to soil fertility management (e.g. fertility improving and extracting scrubs and species) and pest management (e.g. botanicals) are not produced commercially. Thirdly, to facilitate collective management of private and common natural resources within enlarged spatial boundaries with the aim of reducing the labour requirements and thereby increase labour productivity and stimulate wider adoption of sustainable agricultural practices. Adopting technological solutions, which are knowledge and labour intensive rather than relying on high use of external seasonal inputs, often requires capacity for cooperation among the farmers sharing the resource in question. Ecological principles for solving agricultural problems are often appropriate for particular agro-ecological zones. The application of such principles within a particular landscape requires that farmers learn unique combinations of resources and management practices and integrate them into their farming systems. The technology adoption and dissemination process thereby becomes integrated with the technology generation.

7. Mobilising rural poor through support for Farmers Field School

Enhancing poor farmers' capacity to organise is an essential component of DCA and partners' support for sustainable agriculture, namely:

- As a means for technology dialogue between farmers and external actors.
- As a means to acquire the knowledge and skills necessary to use the selected technologies
- To enable the required changes to community management of private and common resources that improves profitability of sustainable agricultural practices
- To organise production and dissemination of biologically based inputs
- To facilitate the formulation of joint demands to external agricultural service providers and influencing policy and priorities of local government.

Support for enhancing poor farmers' capacity to organise should seek to build on, and influence the focus of, already existing institutions and avoid creating new and often unsustainable and donor dependent local institutions. Sufficient time and space should be allowed for different groups of farmers to participate, reach consensus and solve conflicts. Enhancing farmer' organisational capacity (both primary producers and other end users of technology) can enable them to access relevant and financially viable technology, appropriate to their location and circumstances that may generate sustainable increases in the profitability of their production unit.
Farmer groups can enable farmer to analyse and understand their resource base and experiment with optimising the use and allocation of resources under her/his control. This does not preclude the expanded use of specific technologies associated with, for example, integrated post management, participatory soil fertility management, and participatory plant breeding. Instead it seeks to enable producers to bring such technologies to bear where

relevant, as means of taking advantage of available business opportunities and overcoming risks, constraints and production inefficiencies.
The following outline one example (Farmer Field Schools) of a successful approach to support farmers' organisation and empowerment. Other approaches based on similar principles may be equally effective.
In contrast to the limited success achieved in past years by traditional extension methods, FFS, based on an innovative learning by discovery approach, have been the success story of the 1990´s. The FFS approach was developed by an FAO Project in South East Asia as a way for small-scale rice farmers to investigate, and learn, for themselves the skills required for, and benefits to be obtained from, adopting Integrated Pest Management (IPM) practices in their paddy fields. Subsequently the FFS approach was extended to several countries in Africa and Latin America. the FFS approach, although originally developed for IPM purposes, provides a proven people centred learning methodology whereby farmers can learn about, and investigate for themselves, the costs and benefits of alternative soil management practices for sustaining and enhancing farm productivity. FFS is aimed at exposing farmers to a learning process in which they are gradually presented with new technologies, new ideas, new situations and new ways of responding to problems. The knowledge acquired during the learning process can be used to build on existing knowledge enabling farmers to adapt their existing technologies so that they become more productive, more profitable, and more responsive to changing conditions, or to adopt new technologies. There is now a rapidly growing awareness that a much more participatory approach is required if extension recommendations are to be fully acceptable - technically, socially, environmentally and economically. The FFS approach is currently being piloted, as an extension tool, in several African countries, including Ghana, Malawi, Uganda, Zambia, Zimbabwe and Tanzania.

The characteristics of the approach are as follows:

- Farmers as Experts. Farmers "learn-by-doing" i.e. they carry out for themselves the various activities related to the particular farming/forestry practice they want to study and learn about. This could be related to annual crops, livestock/fodder production, orchards or forest management. The key thing is that farmers conduct their own field studies. Their training is based on comparison studies (of different treatments) and field studies that they, not the extension/research staff conduct. In so doing they become experts on the particular practice they are investigating.

- The Field is the Primary Learning Material. All learning is based in the field. The cereal/legume plot, coffee/fruit orchard, woodlot or grazing area is where farmers learn. Working in small sub-groups they collect data in the field, analyse the data, make action decisions based on their analyses of the data, and present their decisions to the other farmers in the field school for discussion, questioning and refinement.

- Extension Workers as Facilitators Not Teachers. The role of the extension worker is very much that of a facilitator rather than a conventional teacher. Once the farmers know what it is they have to do, and what it is that they can observe in the field, the extension worker takes a back seat role, only offering help and guidance when asked to do so. Presentations during group meetings are the work of the farmers not the extension worker, with the members of each working group assuming responsibility for presenting their findings in turn to their fellow farmers. The extension worker may take part in the subsequent discussion sessions but as a contributor, rather than leader, in arriving at an agreed consensus on what action needs to be taken at that time.

- Scientists/Subject Matter Specialists Work With Rather Than Lecture Farmers. The role of scientists and subject matter specialists is to provide backstopping support to the members of the FFS and in so doing to learn to work in a consultative capacity with farmers. Instead of lecturing farmers their role is that of colleagues and advisers who can be consulted for advice on solving specific problems, and who can serve as a source of new ideas and/or information on locally unknown technologies.

- The Curriculum is Integrated. Crop husbandry, animal husbandry, horticulture, silviculture, land husbandry are considered together with ecology, economics, sociology and education to form a holistic approach. Problems confronted in the field are the integrating principle.

- Training Follows the Seasonal Cycle. Training is related to the seasonal cycle of the practice being investigated. For annual crops this would extend from land preparation to harvesting. For fodder production would include the dry season to evaluate the quantity and quality at a time of year when livestock feeds are commonly in short supply. For perennial crops, tree production, and conservation measures such as hedgerows and grass strips, training would need to continue over several years for farmers to see for themselves the full range of costs and benefits.

- Regular Group Meetings**.** Farmers meet at agreed regular intervals. For annual crops such meetings may be every 1 or 2 weeks during the cropping season. For other farm/forestry management practices the time between each meeting would depend on what specific activities need to be done, or be related to critical periods of the year when there are key issues to observe and discuss in the field.

- Learning Materials are Learner Generated. Farmers generate their own learning materials, from drawings of what they observe, to the field trials themselves. These materials are always consistent with local conditions, are less expensive to develop, are controlled by the learners and can thus be discussed by the learners with others. Learners know the meaning of the materials because they have created the materials. Even illiterate farmers can prepare and use simple diagrams to illustrate the points they want to make.

- Group Dynamics/Team Building. Training includes communication skills building, problem solving, leadership and discussion methods. Farmers require these skills. Successful activities at the community level require that farmers can apply effective leadership skills and have the ability to communicate their findings to others.

FFS are conducted for the purpose of creating a learning environment in which farmers can master and apply specific land management skills. The emphasis is on empowering farmers to implement their own decisions in their own fields.

8. DCA support for advocacy in relation to agricultural development.

DCA will use two complementary strategies for its agricultural development advocacy: (i) Involvement in national level policy debates agricultural development and (ii) support a rights based approach. National and international agricultural and trade policies and regulations may negatively affect the extent to which NGOs such as DCA can implement successful interventions that stimulate sustainable agriculture at the local level. The national land tenure systems are also of utmost importance for the development of sustainable agricultural systems; thus, the problems of unequal distribution of land/shortage of land and the priority given to the development of surplus-producing areas rather than marginalized land areas are some of the main factors behind the violation of the right to food. DCA and partner organisations should contribute to developing a conducive national agricultural development policy framework for sustainable agricultural development among smallholder farmers and involve its target group in the policy process. This may be done using a participatory approach to policy advocacy, which involves a number of key stakeholders at different levels. (Further information may be found in: Holland and Black Burry, eds.1998. Whose Voice. Participatory Research and Policy Change.). The Nepalese NGO LI-BIRD (Local Initiatives for Biodiversity, Research and Development) has successfully been involved with agricultural development advocacy, using a participatory approach. The LI-BIRD approach include: in-house discussion among team members; review of existing policies; discussion with key representatives of different institutions; discussion with farmers and traders; analysis and synthesis of the findings; awareness and advocacy to policy-makers and planners on policy gabs, disincentives, constraints and their implications at the

programme planning and implementation level. (Further information may be found in: Friis-Hansen and Sthapit. 2000. Participatory approaches to the conservation and use of plant genetic resources. Rome: IPGRI.).
A rights based approach is based on the premises that all individual, including women and children, have various rights, with reference to international agreements and national policies, strategies and etc., including a 'right to food'. DCA and its partners effectively use such a right based approach, for instance through involving in national and/or international organizations, which lobby or advocate for women's right to land and other resources as well as children's rights at a more general level.
In practical terms, DCA will through organisation of stakeholder workshops and etc. facilitate the involvement of local NGOs in agricultural policy advocacy and capacity enhancement of rural poor using a right based approach. DCA may create synergy by linking local NGOs working with advocacy and rights based approaches, with local NGOs involved with national and household food security issues. The outcome of these activities is likely to include projects carried out be local partner NGOs.

9. Challenges to DCA and partners

A range of skills are needed to undertake activities described in the previous three sections. DCA and partner staff in-house through training can acquire some of these, while other skills may have to be hired from specialised organisations or consultants. People with the following skills are needed:

- Knowledge of ecosystems and ability to analyse local agro-ecosystems.
- Ability to apply this knowledge to local agro-ecosystems.
- Ability to analyse socio-economic dynamics and social networks within local communities.
- Knowledge of a range of species, technologies and systems relevant for local conditions.
- Skills in those techniques and ability to demonstrate them.
- Ability to develop/adapt technologies/systems to local conditions in dialogue with poor farmers.
- Knowledge of national and international policies and regulations influencing agricultural development
- Skills in advocacy and lobby work within national and international agricultural organizations
- Knowledge of agricultural development in a gender perspective
- Skills to develop a Gender Main Streaming approach within agriculture

While it is a challenge to DCA and its partner organisations to acquire the considerable skills required to stimulate sustainable agriculture among poor farmers, this is not the only challenge. Opposing vested interests and influencing the institutional culture of institutions and individuals towards sustainable agriculture and taking dialogue with farmers seriously is perhaps an even bigger challenge. What constitutes pro-poor technology is one of the most contested issues of the rural development debate and one in which a wide range of opinions exists. What technologies are relevant for poor smallholder farmers are still largely determined by agricultural researchers, extension agents, politicians, parastatal input supply organisations, donor agencies and others, while farmers themselves have little influence on the content of externally supplied technologies. Direct or indirect subsidies, combined with various forms of pressure from state organisations, ensured farmers partial adoption of promoted technologies.

Changing attitudes and institutional culture (including a development towards a Gender Mainstreaming Approach) within DCA and its partner organisations and government research and extension organisations are essential preconditions for sustainable agriculture. Stimulation of a change in institutional culture within local level state institutions through extensive 'training for transformation' of involved staff has been shown to be possible and highly effective. In particular, changing the attitude and mode of operation for agriculture extension workers has shown to have dramatic effects for effectiveness as well as job satisfaction.

It is finally prudent to stress that only a combination of agricultural technological development, fair and equitable land tenure systems, enhanced market involvement by smallholder farmers, and women' equal rights to land and other resources provides an opportunity for the right to food for everybody. Increased productivity market surplus

among poor farmers will result in poverty alleviation if output markets are available, reliable and offer a fair price. Globally or nationally determined market requirements in terms of volume and quality standards may significantly influence farmers' opportunities for progress.

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WEB based sources of further information

Detailed description of the LEISA and wealth of articles from the LEISA magazine that discuss concrete experience from developing countries (since 1995) can be found at this website: (http://www.ileia.org/default.asp). The literature on farmer participatory research is well established, see the web site of IIRR and UPWARD in Philippines for practical insights and case studies (http://www.eseap.cipotato.org/upward/). Permaculture originate

in Australia which is the base for the Permaculture International Ltd.. A wealth of information can be found on their website: (http://www.permacultureinternational.org/index.htm). An informative magazine on Permaculture can be found on the following website: (http://www.permaculture.co.uk/).

Similarly, there is a rich and growing body of literature on Community IPM (http://www.communityipm.org/). A considerable volume of information about FFS may be found on the web (http://www.eseap.cipotato.org/upward/abstract/FFSBOOK2003.thm).. A quick introduction to FFS in India can be found on: (http://dbtindia.nic.in/farm/page3_5.htm).

For a philosophical discussion of a right based approach, see: http://www.law.asu.edu/HomePages/Nickel/rights%20and%20goals.htm

For an overview of economic and social rights, see:
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