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Capacity Development for Environmental Management in the Agricultural Sector in Developing Countries

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CAPACITY DEVELOPMENT FOR ENVIRONMENTAL MANAGEMENT IN THE AGRICULTURAL SECTOR IN DEVELOPING COUNTRIES

Constance L. Neely, Consultant

Keywords: Capacity development, environmental management, environmental governance, agricultural sector, developing countries, sustainable agriculture

JEL Classification: O20, Q1,Q2, Q56

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ABSTRACT

The relationships between agriculture, the environment, and development are deep and complex. By 2050 a 70 per cent increase in production will be needed to feed an additional 2.7 billion people on an already degraded natural resource base. In light of this and amid the realities of climate change, the agricultural sector is now coming to terms with its potential role for contributing to – rather than diminishing - environmental, institutional, social and economic resilience.

The purpose of this paper is to highlight the importance of environmental management and governance in the agricultural sector; to present environmental goals, requirements, entry points, and strategies/approaches to capacity development for the environment (CDE) in this sector; and to discuss implications for donors. The focus is on CDE in a developing country context.

The paper recognises that CDE must be seen as part of an endogenous process of change, and that it must operate at multiple levels: the enabling environment, the organisation, and the individual. The paper argues that CDE should focus on the sustainable production and provision of sufficient, safe, and nutritious food that simultaneously builds and reinforces ecosystem resilience, leading to equitable and economically viable livelihoods at an adequate scale. The paper links these concepts to the country systems approach to development assistance advocated in the *Paris Declaration on Aid Effectiveness.*

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RÉSUMÉ

L'agriculture, l'environnement et le développement entretiennent des liens étroits et complexes. D'ici à 2050, il faudra avoir accru la production de 70 % pour nourrir les 2.7 milliards d'humains qui seront venus s'ajouter à la population actuelle, et ce à partir d'une base de ressources naturelles d'ores et déjà dégradée. A la lumière de cette donnée et compte tenu des réalités du changement climatique, le secteur agricole accepte peu à peu l'idée que, au lieu de diminuer la capacité d'adaptation de l'économie, de la société, des institutions et de l'environnement, il est à même de contribuer à l'améliorer.

Ce document de travail se propose de souligner l'importance de la gestion et de la gouvernance de l'environnement dans le secteur agricole; de présenter les objectifs, exigences, points d'accès et stratégies/approches en matière de renforcement des capacités pour l'environnement dans ce secteur ; et d'examiner les conséquences pour les donneurs. La réflexion est axée sur le renforcement des capacités pour l'environnement dans les pays en développement.

Ce document considère que le renforcement des capacités pour l'environnement doit être conçu comme s'inscrivant dans le cadre d'un processus endogène de changement, et qu'il doit s'opérer aux niveaux organisationnel et individuel et par la création d'un environnement propice. L'auteur affirme que le renforcement des capacités doit être axé sur la production et de la fourniture durables d'aliments nutritifs, sains et en quantité suffisante qui assurent et renforcent simultanément la capacité d'adaptation des écosystèmes, conduisant à des moyens de subsistance équitables et économiquement viables à une échelle appropriée. Le document établit un lien entre ces concepts et l'approche de l'aide au développement fondée sur l'utilisation des systèmes des pays partenaires que préconise la *Déclaration de Paris sur l'efficacité de l'aide au développement*.

Classification JEL : O20, Q1, Q2, Q56

Mots clés : développement des capacités, gestion environnementale, gouvernance environnementale, secteur agricole, pays en développement, agriculture durable

FOREWORD

This report on "Capacity Development for Environmental Management in the Agricultural Sector in Developing Countries" is an output of the OECD Task Team on Governance and Capacity Development for Natural Resource and Environmental Management, which is overseen jointly by the Working Party on Global and Structural Policies of the Environment Policy Committee (EPOC) and the Network on Environment and Development Co-operation (Environet) of the Development Assistance Committee (DAC). It was commissioned as background for the development of the upcoming Policy Guidance on Capacity Development for Environmental Management.

This report is authored by Constance L. Neely. The author would like to thank Roberto Martin-Hurtado (OECD) for guidance in the development of this paper. In addition, the author would like to recognise the insights and comments provided by Louise Buck (Cornell University), John Dixon (ACIAR), Erick Fernandez (World Bank), Dennis Garrity (ICRAF), Arthur Getz-Escudero (Heifer International), Peter Kenmore (UN FAO), Ron Kopicki (retired, World Bank), Dominique Lantieri (UN FAO), Robin Marsh (University of California, Berkeley), Sara Scherr and Seth Shames (EcoAgriculture Partners), and members of the OECD DAC-EPOC Task Team on Governance and Capacity Development for Natural Resources and Environmental Management. Special thanks are extended for assistance provided by Andrew Fynn (C Restored).

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Further enquiries on ongoing work on Capacity Development for Environmental Management should be directed to Shardul Agrawala, OECD Environment Directorate (Email: Shardul.Agrawala@oecd.org; Tel: +33 1 45 24 16 65).

ACRONYMS

AfDB	African Development Bank
AWARD	African Women in Agricultural Research and Development
CAADP	Comprehensive African Agriculture Development Programme
CBD	Convention on Biological Diversity
CBO	Community-Based Organisation
CCD	Convention to Combat Desertification
CD	Capacity Development
CDE	Environmental Capacity Development
CDM	Clean Development Mechanism
CEE	Central and Eastern Europe
CFS	Committee on World Food Security
CGIAR	Consultative Group on International Agriculture Research
CO_2	Carbon dioxide
CoAg	Committee on Agriculture (FAO)
CoFI	Commission on Fisheries
CoFO	Commission on Forestry
COP	Community of Practice
CSO	Civil Society Organisation
CSD	Commission on Sustainable Development
CSW	Committee on the Status of Women
FAO	Food and Agriculture Organisation of the United Nations
FARA	Forum for Agricultural Research in Africa
FFS	Farmer Field Studies
FSU	Former Soviet Union
GCWG	Grassland Carbon Working Group
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GIS	Geographic Information System
GNI	Gross National Income
GO	Government
HASHI	Hifadhi Ardhi Shinyanga
IAASTD	International Assessment of Agricultural Knowledge, Science and Technology for Development
ICLEI	Local Governments for Sustainability
ICRAF	World Agroforestry Centre
IFAD	International Fund for Agricultural Development
IGO	Intergovernmental Organisation
IPM	Integrated Pest Management
IPPM	Integrated Production and Pest Management
IT	Information Technology
LCA	Life Cycle Assessment/Analysis
LMI	Landscape Measures Initiative
LMRC	Landscape Measures Resource Center

MDG	Millennium Development Goal
MOFA	Ministry/Ministries of Food and Agriculture
NARS	National Agricultural Research System(s)
NEPAD	New Partnership for Africa's Development
NGO	Non Governmental Organisation
OECD	Organisation for Economic Co-operation and Development
PES	Payment for Environmental Services
R&D	Research and Development
REDD	Reducing Emissions From Deforestation and Degradation
SAI	Sustainable Agricultural Intensification
SAI	Sustainable Agriculture Initiative
SI	Sustainable Intensification
SLM	Sustainable Land Management
UNCBD	United Nations Convention on Biological Diversity
UNCCD	United Nations Convention to Combat Desertification
UNCED	United Nations Conference on Environment and Development
UNFCCC	United Nations Framework Convention on Climate Change
UNEP	United Nations Environmental Programme
USD	United States Dollar
WBCSD	World Business Council for Sustainable Development
WOCAN	Women Organizing for Change in Agriculture and Natural Resources
WRI	World Resources Institute

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EXECUTIVE SUMMARY

Global per capita food production has increased over recent decades, yet there are now over 1 billion undernourished people in the world. By 2050 a 70 percent increase in production will be needed to feed an additional 2.7 billion people. In addition, the agricultural sector is extremely vulnerable to the impact of climate change – food production in many developing countries is projected to decreases substantially. Because skewed incomes also lead to different levels of demand, it is important to sustainably increase yields while addressing socio-economic and political constraints that influence both production and consumption.

Capacity development for environmental management and governance within the agriculture sector is based on the goal of ensuring a fundamental shift towards the sustainable production and provision of sufficient, safe, and nutritious food that simultaneously builds and reinforces ecosystem resilience, leading to equitable and economically viable livelihoods. Environmental Capacity Development (CDE) that integrates ecosystem health and environmental services into every agricultural decision is necessary to move towards a sustainable and equitable food system.

Enhancing capacity development in the agriculture sector must play a role in the transformational change of the current development framework, ensuring that agriculture and environment along with other relevant sectors are systematically integrated. This integration will employ inter-sectoral, inter-institutional, multi-stakeholder and multi-level participatory processes that are supported through capacity development within the enabling environment, organisational and individual dimensions.

There are multiple entry points for environmental capacity development in the agricultural sector within and across stakeholder groups and within national development plans, sectoral strategies, and action plans as well as through public finance mechanisms. There are clear roles for government actors at national and sub-national levels as well as civil society and the private sector. In the agriculture sector there is enormous diversity within and among these stakeholder groups as well as a wide range of interest areas and capacities. Innovation and learning platforms that bring these actors together to negotiate shared values and synergies in a transparent way will bring benefits globally from the farm and pasture to the consumer. The future is in collaborative management of sustainable food and energy producing landscapes that maintain and build ecosystem resilience, providing global goods and services and sustainable livelihoods.

Capacity development for environment (CDE) can contribute to some of the key changes that need to occur in the agricultural sector, including: a) developing an appreciation and foundational awareness and competency in agri-environmental approaches and win-win opportunities; b) synthesising current capacity development principles into an up-to-date comprehensively holistic approach that bridges environment and agriculture with all relevant sectors; c) recognising the full value of and accounting for the ecological, economic, and sociological costs and benefits associated with agricultural production and ecosystem services; d) implementing a systematic integration of the agricultural and environmental sectors in concert with other sectors, to ensure jointly developed and consistent policies, programmes and plans that address root causes and reduce risks and vulnerability to shocks; e) developing people-centred and concentric, household-, foodshed-, and landscape-scale perspectives, as well as urban-rural linkages, for the planning, monitoring and management of environmental services and sustainable food systems with a view to sustainable management of value chains; f) promoting inter-level multi-stakeholder innovation or learning

platforms for debate, problem-solving and decision-making that recognise and include the pivotal role of direct natural resource managers, farmers and pastoralists—particularly women, youth, and elders; g) scaling up successful practices related to sustainable land, water and biodiversity management associated with ecological intensification and integration; and h) rewarding farmers, pastoralists and direct agricultural and natural resource managers for ecosystem stewardship and provision of safe and nutritious food that meets local and consumer needs.

Donors have a strong role to play in affecting change and catalysing the transformation towards a more holistic approach. The reshaping of the donor landscape over recent years has taken advantage of lessons learned in order to realise greater outcome per development dollar. Most recently, financial and economic crises have reduced the flow of donor dollars from traditional channels while non-traditional donors have become more prevalent and influential. Agreed upon principles that ensure a greater degree of harmonisation, synergy, partner country ownership, and accountability have great merit in this newly configured resource setting however constraints in terms of time, resources and donor-driven agenda are still echoed. The potential exists for principled and co-ordinated action to be parlayed into the transformation and capacity development necessary for better integration of agricultural and environmental challenges. In order to ensure long term solutions that build upon locally-owned strategies, adequate resources, enhanced co-ordination in international fora, and on-the-ground monitoring and evaluation of capacity and impact are needed.

A key objective is to create incentives for effective in-country co-ordination by strengthening the local capacity necessary to lead co-ordination processes (OECD, 2006), while also embarking on more effective implementation of multi-objective development strategies. Towards this end donors can: i) support participatory and multi-stakeholder processes in support of outcomes that ensure long term social change and local ownership; ii) support the integration of agri-environmental aspects into national planning and national capacity development approaches; iii) support transparent decision-making around the nexus of food systems and the environment; iv) build out effective investment strategies based on long-term funding horizons; support cross-sectoral collaboration to move beyond current sectoral perspectives and structures at the ministry level within countries—as well as within the intergovernmental organisations and other agencies that provide technical support; v) advance ownership and sustainability through strengthening local institutional capacity, particularly emphasizing local government units and urban authorities to enhance urban-rural linkages; vi) apply results-based planning and evaluation measures to innovate rather than constrain, adding process-based outcomes into results frameworks; vii) promote and invest in education and increasing leadership skills for women and girls; viii) enhance knowledge and science systems focused on agri-environmental approaches; and, ix) start with those options for increasing environmental sustainability in agriculture through both process and technical approaches that are already working.

PART I. INTRODUCTION

1 Agriculture, Environment and Capacity Development

1.1 Rationale

Development efforts in many of the poorest countries will fail, even if they are supported with substantially increased funding, if the development of sustainable capacity is not given greater and more careful attention.

The Challenge of Capacity Development: Working Towards Good Practice, OECD, 2006b.

World governments, the private sector and civil society are contending with the substantial decline of human well being, with ever higher numbers of hungry and malnourished people and the severe degradation of supporting ecosystems. Climate change, economic and food price crises, the urgent need to move away from traditional energy sources, and record rapid onset disasters have severely limited opportunities to plan for, much less invest in, long-term solutions.

Most ecosystems on which human beings rely are being used unsustainably and thus being degraded. Agriculture and the environment are inextricably linked because agriculture occurs in wild, semi-wild and managed ecosystems, and makes use of natural capital. If these natural resources are consistently used in an unsustainable way, step-by-step or run-away degradation results. Agricultural inputs are harvested indirectly from the surrounding ecosystems; agricultural waste products and by-products are returned to the ecosystem. Natural resources are the basis not just for food production but also fibre, shelter and environmental services that producers may take for granted until it is too late.

For the agricultural sector to respond to the challenge of feeding the world while preserving the natural resource asset base, capacities for environmental management need to be developed. Capacity development is not a matter of sporadic measures but concerns attitudes and conceptual approaches. An understanding of these and other holistic concerns in recent years has lead to very significant changes in capacity development, which now includes the following perspectives:

- Capacity as the ability of people, organisations, and society as a whole to manage their affairs successfully.
- Capacity development as the process whereby these actors unleash, strengthen, create, adapt, and maintain capacity over time.
- The need for co-operation and agreement on priorities among donors and partners.
- Ownership in the target country of programmes and outcomes.
- The need for holistic diagnostic approaches on the part of donors and partners in order to improve the effectiveness of development aid.

- The need for integrated development and strengthening of existing best practices, rather than an uncoordinated series of ad hoc programmes.

- A country systems approach in development cooperation (the Paris Declaration), implying the need: to mainstream environmental capacity across government agencies and address the role and capacity of non-governmental actors in civil society and the private sector; and to integrate capacity assessment and development activities into "the normal programme and budget processes of the whole government and individual agencies." (OECD 2009)

- There are three commonly recognised levels of capacity development: individual, organisational, and enabling environment (OECD identifies a fourth level for public management systems: partnerships and networks of organisations, which includes the quality of interaction and co-operation among actors (OECD 2009)). The interaction of these levels needs to be carefully considered during capacity assessment and development implementation and monitoring.

- The importance of South-to-South, North-South and triangular co-operation.

- The question must be asked *capacity for what?* What kind of development is desired?

Source: OECD, 2009a; OECD, 2006b

The task now at hand is the mainstreaming of these principles from best practice into common practice. All of the above apply to the agriculture sector, which is more affected by ecology, climate and weather events than other development sectors. These factors intensify many of the dynamics in evidence across other sectors. The long-term interests of producers and future generations are aligned with sustainability; short-term decisions leading to environmental degradation, loss of biodiversity and missed opportunities result largely from constrained financial circumstances (including a lack of investment resources) and a lack of education and training. Capacity development in the sector must bridge these gaps by 1) making it economically viable for producers to switch practices in the short and medium term, and 2) providing tools, education and other resources for long-term sustainable systems that provide greater net benefits than business as usual practices.

1.2 Capacity Development and the Millennium Development Goals

The Millennium Development Goals (MDGs) juxtapose interrelated priority needs for sustainable development. Progress on MDGs has been mixed at best (UN, 2010): hunger is increasing, 1.4 billion people live in extreme poverty, and there have been limited advances on environmental sustainability. Desired progress is not being made on carbon dioxide emissions, access to clean water, loss of forest cover and biodiversity. While some large gains have been made in reducing poverty, particularly in rapidly developing countries, stubborn challenges to environmental sustainability persist. The success stories highlight the need for a holistic approach (UN, 2010).

The report articulates three main requirements to accelerating progress on MDGs:

- scaling up implementation of proven and innovative interventions, including sustainable agriculture;

- building structural and economic foundations to support and sustain progress and mitigate risks of MDG reversal; and

- the broadening and strengthening of partnerships.

Capacity development is a major component of any strategy to achieve the MDGs. The three main requirements identified above are placed in the context of the following 'success factors': effective government leadership and national ownership of development strategies; effective policies to support implementation; improved quantity, quality and focus of investments; appropriate institutional capacity to deliver quality services equitably at national scale; civil society and community involvement and empowerment; effective global partnerships; and good governance.

The most significant trends in international processes in recent years in regard to capacity development are towards sustainability and aid effectiveness. International agencies now follow holistic models of capacity development close to that of the UNDP, which focuses on: supporting national partners to conduct capacity assessment and develop responses; strengthening existing capacities and systems; and moving beyond a typical focus on training to address broader questions of institutional change, leadership, empowerment, and public participation (UNDP, 2009).

1.3 Capacity Development for Environmental Management in the Agricultural Sector

The role of environmental management within the agricultural sector has become increasingly important. Environmental management is fundamental to achieving MDGs in terms of access to clean water, sustainable and affordable food and nutrition security, and poverty reduction through sustainable livelihoods and economic growth. Land degradation, loss of biodiversity and water drawdown have taken their toll on the poorest populations in rural and urban areas. In cases of extreme poverty and hunger, addressing environmental health has been viewed as a luxury. Climate change, along with an unprecedented and continuous series of devastating events, has brought ecosystem fragility to global headlines. Projected population growth rates and subsequent food requirements on ever-dwindling resource bases will continue to challenge supporting ecosystems as they move from a state of crisis to possible collapse. Environmental management that integrates ecosystem health and environmental services into every decision is necessary to move toward a sustainable and equitable food system.

In many developing countries, environmental policies and associated capacity development efforts have historically focused on regulations of protection and exclusion (forests, natural reserves), and on conservation of specific species. Due to the non-integrated operations of different ministries, environmental conservation and agriculture endeavours have been kept artificially apart. On the other hand where direct impacts on yields, water quality and water supply related to agriculture have been observed, soil and water conservation efforts have been established through conservation farming practices and watershed approaches. Watershed-level efforts have been built into development programs over the past 30 years, taking account of upstream actions and downstream impacts.

Over the decades we have learnt more about what works, why and why not. This learning process allows the refinement of best practices and the transition to more evolved planning and operational approaches. The development community now has a deeper understanding of: the complex relationships between practice and policy; the critical nature of ownership within communities and institutions; the perceived and real values of human and capital investments; inclusive processes that allow multiple stakeholders at all levels to learn, design, implement and evaluate a plan; and how capacity can be built in the present to ensure long-term change in the future.

At a variety of scales the agricultural sector is now coming to terms with the importance of environmental, institutional, social and economic resilience; in order to overcome biophysical and socio-economic constraints, and to maintain a secure balance of assets. While clear priority areas for developing specific capacity along different food and fibre production chains have been identified, implementation of

changes requires a paradigm shift at all levels. An overall approach for long-term change is required that will incorporate the raising of awareness in the short and medium term, and the fostering of increased analytical skills.

A range of stakeholders can contribute to enhance the environmental sustainability of the sector, but to do so they need to develop their capacities. The network of local authorities worldwide increasingly understands the importance of food-producing landscapes as well as urban infrastructure, but requires the skills to make more meaningful contributions. Agribusinesses as well as businesses outside the sector will also require skill building as they are mandated to demonstrate triple bottom lines. At local levels, a myriad of skill building efforts put local leaders (women, men and youth) at the helm. These have proven track records for scaling up (e.g., EcoAgriculture leaders, Farmer Field Schools, First Mile, Linked Local Learners, and Landcare groups). Furthermore, youth education, certificate training and undergraduate and advanced degrees in holism will be critical in the long term. A focus should be placed on early win-win possibilities such as sustainable land management practices with a ready return on both agricultural and environmental investments, consistent production outputs and positive change, and greater stability of ecosystem processes.

1.4 Purpose, Scope, and Target Audience of this Paper

The purpose of this paper is threefold: to broadly present the current context of environmental performance of the agricultural sector in developing and transition countries; to discuss priority environmental capacity objectives for the sector; and to trace pathways from the status quo to these goals. The context of the discussion is *opportunities for capacity development leading to more sustainable food systems based on effective ecosystem processes and services that provide increased food security and enhanced livelihoods*.

Section 2 provides an overview of the state and trends associated with the agricultural sector and the environment in developing countries, highlighting the interrelationship of these. Section 3 provides insights into priority policy objectives, indicators of success, available policy instruments, and discusses sectoral actors. Section 4 outlines environmental capacity development priorities for the agricultural sector, with a focus on entry points, capacity needs of stakeholders and approaches and tools. Section 5 discusses the role of donors and development partners in catalysing and supporting environmental capacity development in the agriculture sector.

PART II. THE AGRICULTURE SECTOR AND THE ENVIRONMENT IN DEVELOPING COUNTRIES

2 Key Features of the Agriculture Sector

2.1 Agriculture Sector in Developing Countries

Agricultural sector is a key sector in developing countries. 2.5 billion people in developing countries depend directly on agriculture for their livelihood. Of these, over 1.5 billion are smallholder farmers (World Bank, 2007b) who work on family farms of less than two hectares, and provide over a third of the economic activity for the world's least developed countries (FAO, 2007). Most small-scale farmers are women.

The agricultural sector in developing countries faces very significant challenges (IFAD, 2009b)

- Food, fuel, fertiliser price volatility and the world economic crisis.
- Agricultural growth inadequate to meet demand (although other analyses focus on the effect of low incomes and skewed income distribution limiting demand).
- Climate change and environmental degradation—government responses are inadequate, causing and exacerbating land degradation, water shortages and production failure.
- Agriculture is constrained in fragile states and conflict-prone countries.

The agricultural sector is far from homogeneous. Three major "paradigms" can be identified. They describe very different agricultural sectors, with different economic and environmental performance and capacity needs:

Competitive paradigms: producing high value products largely for export, producers in competitive paradigms represent a very small minority in developing countries. Agricultural firms that are operating in this paradigm have options not available to small producers; and are subject to changes at the macroeconomic and international level. Those in traditionalist and survivalist paradigms are also affected by such factors, but have less influence.

Traditionalist paradigms are represented by a substantial number of rural households and agricultural firms in developing countries. These producers are not intentionally competitive and have significant influence at the local level. National and international linkages have reduced the influence of traditionalist producers, with significant social consequences. Local and South-to-South cooperation can greatly enhance the stability of traditionalist producers.

Survivalist paradigms (largely akin to subsistence paradigms, but 'survivalism' is not limited to an agricultural context) are experienced by micro-producers surviving with little or no savings. Food security is their main issue. Assets are poorly developed with very limited access to investment credit. Households in this category include fishermen, pastoralists and smallholders. Risk management strategies are informal and thus limited. Partly due to the fragility of the ecosystems they inhabit, many producers in this category depend on off-farm income. Survivalist scenarios see the least efficient use of resources and most inefficient economic systems because the actors involved must make very short-term decisions,

disregarding long-term viability. Despite representing the largest proportion of producers, the perspectives of these actors are often overlooked.

The agricultural sector also varies across world regions. The category *developing countries* (see tables 1 and 2) encompasses a range of nations with varied conditions, from Least Developed Countries to those with considerable wealth in certain sectors or regions. Within these diverse contexts, there will be different entry points and approaches to capacity development needs and technical, investment and policy decisions should take account of this heterogeneity. Transition countries are characterised by the conversion of communist-era apparatus into globally integrated systems largely through a process of trade liberalisation.

Table 1. Comparison of the agriculture sector in developing and transition countries.(.

	Sub-Saharan Africa	Latin America	Asia	Transition Countries
Diversity within sector	Low	Medium to high	High	Medium to High (see below)
Recent growth in the sector?	No	Yes, dramatic rise in export crops	Yes	Yes, in some countries, especially China; but loss of subsidy system has led to stagnancy in CEE and especially FSU countries
Key factors, features and trends	Women account for 60 to 80 percent of workforce. Persistent stagnation due to investment poverty, macroeconomic factors, weak institutions. World's poorest region. Agriculture is largely subsistence based.	Deforestation Feminisation of agriculture, based on short term agricultural-export employment (with regional variation) Food sovereignty movements & higher regional cooperation than other regions.	Economic growth increasing demand for agricultural products. Rapid industrialisation bringing rising inequality, slower sector job creation, shrinking farm sizes, shift in demand for high value products – meat, fish, grain. Increasing stratification *within* rapidly developing countries.	Countries categorised by replacement of communist mechanisms – esp. massively distorted incentives. Liberalisation of markets and sectoral change are intimately linked. Significant differences between CEE, FSU and China include the rate and nature of change. Increased membership in this category in recent years increases diversity.
CDE and Sectoral Growth issues	Overcoming stagnation Barriers: urban-biased policies, low rural population density, fast population growth. Runaway natural capital depletion. Growth will come from intensification.	Balancing export-heavy sector with sustainable local systems Integration of indigenous concerns - including rainforest protection.	Ecological effects associated with rapid expansion Loss of agricultural land to urbanisation Within-country food security now a concern Global economic crisis has called globalisation into question; agriculture once more a policy priority.	Pathways out of poverty can be more complex, interacting with more complex institutional scenarios. Sometimes higher risk of chemical contamination than in developing countries; although often more stable because long-established agroecosystems. Post-collective/post-communist legacy can leave enduring 'social signatures' to be negotiated.
Common to all regions	Population growth, erosion and soil loss, need to increase sustainability while increasing productivity and wealth creation, application of improved CDE frameworks, influence and potential influence of REDD, REDD+, CDM, etc.			

Note : China is represented both as an Asian country and a transition country

Sources: Scott, 1992; Beintema and di Marcantonio, 2009; World Bank, 2007a; Headey et al., 2010; Jayasuriya, 2009; FAO, 2009b; IFPRI, 2005; Deere, 2005; Lastarria-Cornhiel, 2006; Reardon and Vosti, 1995.

Table 2. Comparison of key agro-environmental indicators across regions and income groups.

Aspect	East Asia and Pacific	Latin America-Caribbean	Sub-Saharan Africa	South Asia	Low Income	Middle Income	High Income
Agricultural Land (% of land area)	51	36	44	55	39	38	38
Food Production Index[1]	120	117	109	107	112	115	102
Deforestation (av. annual percentage)	-0.1	0.5	0.6	-0.1	0.7	0.2	-0.1
CO_2 emissions per capita (metric tonnes)	3.6	2.5	0.8	1.1	0.6	3.3	12.6
Agricultural (% freshwater withdrawal)	74	71	87	89	90	76	43
Rural: Urban (% access to improved water source)	81:96	73:97	46:81	84:94	60:84	83:97	98:100
Under 5 mortality rate (per 1000 live births)	27	26	146	78	126	45	7
Education expenditure (% GNI)	2.1	4.5	3.6	3.0	3.4	4.6	4.6

Note : Low Income: 935 USD or less GNI; Middle Income: 935 – 11456 USD GNI; High Income > 11456 USD GNI

Source: World Bank, 2009

2.2 Importance of system size, local level and gender issues

The sustainability of the production system in question depends on many factors, not least the management involved. The nature of each business and its operations are at least as important as the presence or absence of private sector activity per se. Trade can provide a critical vehicle for sustainability due to the multiple effects of the private sector on other sectors of society. Environmental sustainability requires financial viability because desperately poor farmers tend to mine natural resources. Using the private sector to increase the number, breadth and speed of pathways out of poverty can offer faster reductions in agriculture-related pressures on natural capital. On the other hand wealth creation, the wealth gap, and the shift away from agrarian livelihoods bring new pressures on natural resources.

Most farmers in the developing world are self-employed small farmers. Taken as a pattern, this makes for considerable complexity at the regional and national level. The result is a mosaic of farming systems, crops, responses to needs and opportunities presented by the family unit, assets (tangible and non-tangible), market conditions, level of education, aspirations, culturally-derived opportunities and barriers to change, access to viable seed, breeding stock and sufficient water and other resources for implementation of the desired practices. Small farmers usually live on the land they work, ultimately passing this land onto and often splitting it among the next generation. Globalisation of local markets has exposed small farmers to the fluctuations of international trade. As a result, in some cases the co-operative farming model is the

[1] Food production index indicates the relative level of net food production compared with the base period 1999–2001. It covers food crops that are considered edible and that contain nutrients, excluding coffee and tea (World Bank, 2009).

only way for small farmers to cover basic expenses and remain on the land; in concert with other co-operatives, these associations are then able to lobby for change at a regional and national level (Equal Exchange, 2010).

Private sector-created wealth and employment can aid sustainability and standard capacity development goals when patterns of wealth accumulation are not skewed, providing steady new demand for products, and when businesses are according to sustainability principles. Recognising the value of enlightened self-interest (i.e., no one succeeds if society fails), businesses see the importance of engaging in responsible entrepreneurship that contributes to the sustainable development agenda. There is increasing interest in, and examples of, businesses partnering with governments and civil society to demonstrate the ways in which markets can contribute to socio-economic inclusion, quality of life, and environmental protection. The private sector requires robust frameworks—comprising incentives towards best practices, rules, guidance and regulations—so that a stable business environment exists, pitfalls can be avoided (unintended and undesirable consequences) and so that support is in place for entrepreneurs motivated to achieve triple bottom line gains.

For capacity development to be effective, local communities must be proactive participants and have a strong sense of ownership in the programme. Local resources are often best managed by local actors. The optimum scenario may be collaborations between local implementers and regional facilitators under the umbrella of a national programme. Multi-stakeholder dialogue leads to decisions and actions that are acceptable to the community in the long term; skilled facilitation of this process can bring marginalised voices to the centre, building negotiation capacity. Local agricultural knowledge is built up over decades if not centuries; this unique resource should be accessed wherever possible. Best practices can be shared by linking local learners; communications and information technologies are vital in this arena by providing producers instant and often multifaceted communication at relatively low costs, and leap-frogging less efficient technologies.

Gender is an important dimension of environmental management in the agricultural sector. Men and women are similarly efficient as farmers (Quisumbing, 1995), yet women make up the majority of the world's farmers and carry out the majority of farming those in developing countries. Education of women leads to increased technology uptake, significantly through peer-to-peer influence. An additional year of education for women can lead to yield increases of 2 to 15 percent (Quisumbing, 1995). Women's participation varies according to the prevailing type of farming system (Heaton and Junsay, 1989, citing Boserup, 1970). Men and women often perform complementary roles within the same task or project.

A key dilemma facing the success of capacity development in agriculture is that while women are key players, decision making often still resides in the hands of men (Enete and Amusa, 2010). One study classified societal constraints against women's ability to contribute to farm decisions as: **techno-institutional constraints** (lack of extension programmes and access/awareness of non-governmental organisation (NGO) programmes for women, insufficient knowledge of farm credit sources, etc.), **socio-personal constraints** (e.g., misconceptions that women farmers do not have farming ideas, women are supposed to be subordinate to men in farming, low self confidence by women, etc.), and **economic/financial constraints** (e.g., low or lack of financial contributions to farming activities and access to credit support groups such as co-operatives, unwillingness of women to invest in a male-dominated cocoa farming environment) (Enete and Amusa, 2010).

2.3 Constraints Faced by the Sector

The agricultural sector faces a number of constraints (see exhibit 3).. Many of those constraints are multi-dimensional and fall within the purview of social, environmental, finance and trade, education and economic sectors. Historically inter-agency co-ordination and multi-dimensional problem solving have

proven more challenging than following the status quo, and have been, in some cases, considered controversial. However, overarching constraints such as conflict of agricultural resources and climate change are drawing the agricultural and environmental sectors more closely together to navigate capacity development priorities. Further, surveying producers to understand their motivations and priorities will improve the ability to address local constraints through multi-sectoral approaches as well as enhance the efficiency of funds disbursed.

Table 3. Constraints Faced by the Sector and Key Features

CONSTRAINT	KEY FEATURES
Post-Harvest Losses	- Due to weather extremes, chemical and microbial contamination, spillage, lack of appropriate handling. - Represent 15 to 50 percent of production totals. - Remove crops from market, contribute to high food prices and poverty, have environmental implications.
Production Inequities	- Societal power structures often biased against poor producers and their ability to improve their economic situations. - 'Food security at any cost' mentality can result in environmental degradation and/or - resistance to change that would improve yields and/or increase long-term viability.
Desperate circumstances	- Short-term survival decisions cause environmental degradation by trumping consideration of long-term effects. - Subsistence production occurs without the infrastructure to increase yields or find a market for surplus; individual producers and communities unable to re-organise the system as a whole: opportunities for change are lost. - Education must accompany wealth creation to prevent risk of richer farmers having greater negative environmental impact.
Insecure Tenure	- Farmers with incomplete property rights or insecure tenure unlikely to invest in environmental sustainability. Even small investments are constrained.
Lack of Credit	- Small producers unable to obtain the credit needed for investments that would improve conditions. - Producers may lack access to critical knowledge and productive resources. - Domestic markets cannot develop when the rural poor have little purchasing power. - 'Investment poverty' may be the key determinant in understanding the interface between poverty and environment (Reardon and Vosti, 1995).
Conflict	- Unstable land use scenarios destabilise production at a fundamental level. - Protracted crises remove farmers' ability to be self-sufficient, and lead to long-term aid dependency.

Sources: FAO, 2009a; PHLIS, 2010; Reardon and Vosti, 1995; Kwa, 2001

Other constraints to the sustainability of the agricultural sector are in most cases reflective of the challenges to environmental mainstreaming in general—principally to improve governance. Recent IIED surveys identified the constraints to environmental mainstreaming, which were summarised as including: the prevailing development paradigm, lack of political will for change, environment as an institutional and economic externality, weak environmental initiatives and precedence to date, lack of data and information (awareness) on environment-development links, lack of skills and institutional capacity, and broader governance constraints (Dalal-Clayton and Bass, 2009). In addition to these, other factors include fragmentation of environmental responsibilities, over-complicated environmental legislation, and impediments to civil society engagement among others.

Socio-political constraints and so-called 'wicked' problems—for example those associated with tenure security—reinforce the potential for indefinite instability in agri-environmental systems; these must be directly addressed in order to reverse negative and disempowering trends.

3 Key Aspects of Environmental Sustainability in the Agriculture Sector

3.1 Links Between Agriculture Sector Performance and Environmental Outcomes

Natural resources are key **productive inputs** to the agricultural sector. As a result, food security is dependent upon ecosystem health. The foundation of food and fibre supply is provided by underlying ecosystem functions—an effective water cycle, biologically diverse plant and animal communities, energy flows, and effective mineral or nutrient cycles. Soil health, water quality, and water availability are closely linked. Soils with higher soil organic matter (SOM) content, which is approximately 50 percent carbon, have higher soil water holding capacity. Soil carbon denatures pollutants, sequesters carbon, cools the soil and buffers hydrology, decreasing the risk and severity of fire and flood. Higher soil carbon and soil water levels lead to gains in productivity. Exposed soils are liable to erosion and increased water losses through evaporation and runoff; salination occurs when the water table has been severely depleted and the soil surface almost irrevocably eroded.

Agricultural production can have severe **environmental impacts**. Land degradation is endemic to every continent, with 2 billion hectares affected by desertification, salination and nutrient depletion – some 52 percent of agricultural land is by now moderately or severely affected by soil degradation. Other effects of unsustainable agriculture include water contamination through erosion and nutrient loads, contamination of soil and water through the application of pesticides, herbicides, and inappropriate waste management. Land degradation means loss of carbon stocks but also creates gaps for storing carbon; implementation of mitigation practices is imperative. Deforestation for arable purposes or as a result of unsustainable grazing of forest areas destroys a natural resource that can require decades to restore—if the process is begun at all. Although global net deforestation rates have decreased, 13 million hectares of forests are lost each year, including six million hectares of primary forest (UN, 2010). Agriculture accounts for around 70 percent of water withdrawals and over 93 percent of water use (FAO, 2010b). The current water crisis is already daunting, without considering the anticipated doubling of water requirements over the next 40 years. Agriculture is currently the largest driver of the loss of genetic resources. Agricultural intensification according to the industrial model currently threatens 4,000 plant and animal species, and that number is rising (UNEP/GRID-Arendal, 2009). Industrial-style agriculture removes biodiversity from the landscape, which is then monopolised with the desired crops, including those for biofuels, as well as increasing risks associated with food insecurity.

Agriculture has a **multifunctional** nature and can be directed to support environmental objectives. Agriculture is complex and operates within different physical and social systems. Multifunctional agriculture (MFA) draws attention to the potential benefits brought by agriculture beyond food and fibre products. Agricultural activity can also support biodiversity, provide sustainable management of renewable natural resources and socio-economic viability to rural areas. Indeed, sensitively managed agricultural landscapes harbour enormous diversity. MFA, which parallels the recognition of environmental goods and services that agriculture can provide, addresses sustainable agriculture and rural development. Related capacity development has called for consideration of factors including: rural employment, the strength of local economies, landscape beauty and the health of rural culture; clean water and air, bioenergy, and improved soils, food security, food quality, food safety, and improvements in farm animal welfare (DeVries, 2000). MFA has proven a controversial topic because of trade implications and differences among developed countries and between developed and developing countries; and running into concepts and perceptions around subsidised agriculture and exports, level trade playing fields and protectionism.

MFA reinforces the need for holistic approaches to capacity development, including both direct agricultural factors and indirect socio-economic factors.

A major challenge is to ensure that the trend towards **intensification** of agriculture is environmentally sustainable. The need to feed an additional 2.7 billion people by 2050 on approximately the same area of agricultural land highlights the need to intensify production, even without considering the effect of climate change on yields. The question is whether this can best be achieved according to industrial agriculture on massive farms, or on a myriad of biodiverse smallholdings; or a combination of both. 'Agricultural intensification' is usually taken to mean intensification according to the industrial model, with an accompanying concomitant argument that land beyond agricultural boundaries must be set aside in order to offset the environmental damage done by the production system (Perfecto and Vandermeer, 2010). In effect this externalises the ecological costs of industrial agriculture both in space and time. On the other hand there is growing discussion of the feasibility and benefits of 'sustainable intensification' (SI) (Pretty, 2009), or 'sustainable agricultural intensification' (SAI) (World Bank, 2010) as the way to meet the intermeshed needs of greater production without significantly increasing the burden placed on the environment. Exhibit 4 expands on issues of capacity development for sustainable agricultural intensification.

Box 1. Capacity Development for Sustainable Agricultural Intensification

Sustainable intensification, based upon an ecosystems approach, is characterised by sustainable densification (integrating animal and crop processes as layers that are interlaced in space and function), conservation of nutrients (which often cycle through the farm system many times before leaving it), taking advantage of use local knowledge and ecosystem peculiarities (that the smallholder farmer is uniquely positioned to observe and implement), increased economic stability (associated with the increased diversification and yields, and the decreased energy and input costs) and equitable outcomes for male and female farmers. In addition, sustainable organic and agroecological systems often yield as much as or more than conventional systems – one worldwide study of 12.6 million farmers over 37 million hectares found that the transition to sustainable systems led to an average yield increase of 79.2 percent.

The implementation of production systems that benefit ecosystem services is a knowledge-intensive process, necessitating that knowledge is owned and applied by farmers, and requiring sustained investments in capital physical and human capital formation Needed SAI capacities in terms of farming practices include education and peer-to-peer capacity sharing fora.. Recommendations for supporting SAI range from incorporating additional principles from modern sustainable systems (such as permaculture and broadacre systems such as conservation agriculture, keyline and pasture cropping); to opptimising community involvement and ownership; elicit participatory voices from the outset to ensure long-term success; to creating seed banks to preserve heirloom genetic resources.

Transitions to sustainable intensification, based on an ecosystems approach, cannot be conducted overnight. Farmers in transition from conventional systems may lose income while the agroecosystems that underpin SAI are being established. Solutions include diversification and bridge loans. In many cases the needed savoir-faire remains within or close to the community: the chain of inherited knowledge of the locally appropriate biodiverse systems is often missing only one or two generational links. Efficient capacity development would begin with detailed surveying to recapture these resources before they are lost, then resuscitating best practices within a modern systematic framework that benefits from recent innovations outside the region, including organisational and skill building formats such as Farmer Field Schools.

Sources: World Bank (2010), Perfecto and Vandermeer (2010), Badgley et al., 2007; Stanhill (1990); Uphoff, (2003); Pimentel et al. (2005); Naerstad(2007); UNCTAD-UNEP (2008), Pretty (2009), Pimentel (1980); Altieri (1999); Dalgaard et al. (2001); Regangold et al. (2001), FAO (2010e).

The environmental performance of the agricultural sector is affected by **population and social dynamics**. Hunger is caused not by rapid increases in population but by poverty and inequality. Hunger is not a corollary of cropped area per person, but occurs in those countries where the poor earn the smallest percentages of total national income (Lappé et al., 1989). Thus, where population growth rates are increasing dramatically— widening the gap between rich and poor—agriculture-related land degradation is often prevalent. The growth of the middle class can have positive effects on environmental degradation *by the smallholder agriculture subsector*; but if ex-farming families depend on food produced according to the conventional model, net effects in terms of environmental management are likely to be negative.

3.2 Climate Change and Agriculture

Processes and practices associated with agriculture production have an important impact on climate change. Agriculture accounts for some 14 percent of global emissions; if changes in land use for agriculture purposes are included, the figure rises to 31 percent (IPCC, 2007). Agricultural emissions stem predominately from use of fossil fuels, land use conversion and livestock. The data indicate that emissions from livestock—predominately enteric fermentation—account for well over half of agricultural emissions, with estimates as high as 80 percent.

Climate change is impacting and will continue to dramatically impact agriculture and productivity. On a regional basis climate change may lead to increased unpredictability, not necessarily global warming. The effect of increased unpredictability can be as damaging to yields and as significant for producers' behaviour as warming. Women and vulnerable groups will experience the negative impacts of climate change most intensely. Food production and distribution systems that have been operating relatively smoothly or close to capacity may become stretched. Climate change manifests as climate variability, greater incidence and intensity of floods, droughts, and other extreme events; climate change will dramatically shift crop production patterns and yields (Lobell et al., 2008; Cline, 2007).

Simply put, Jones and Thornton (2009) offer three key scenarios, particularly for Africa:

- crop yields decrease but can be handled through agronomic means;
- crop yields increase, particularly in highlands because temperature limitations become more relaxed; and
- crop yields decline drastically shifting emphasis from marginal crop production to livestock-keeping.

Climate change may be the ultimate catalyst for putting agroecological practices in place. There is the potential for developing win-win scenarios if those agricultural systems that reduce net GHG emissions, enhance adaptation capacity and food security, and ensure livelihoods for the poor, can be systematically promoted. Better land management and sustainable agricultural practices have the capacity to mitigate and reduce emissions by some 88 percent of the current agriculture annual emissions—with the majority of that shift expected to come from developing countries. The Intergovernmental Panel on Climate Change (IPCC, 2007) has reported that the key technical options—addressing some 90 percent of mitigation potential—include improved cropping and grazing land management, including agroforestry, the restoration of degraded lands, and rebuilding organic soils. The majority of this is associated with capturing carbon in the soil as well as aboveground biomass. Soils represent the Earth's largest carbon sink—larger even than forests—that can be controlled and improved.

It is important to distinguish between mitigation of climate change and adaptation to climate change, without decoupling these conceptually or pragmatically. Mitigation represents attempts to slow anthropogenic climate change, whereas adaptation is the attempt to buffer its effects. Some measures,

particularly land use solutions, can provide mitigation and adaptation benefits, since carbon sequestered in soils and trees both reduces the amount of carbon dioxide in the atmosphere and in general renders the system more resilient to change. Agroecological practices that increase the resilience of the natural resource base, predominately through the enhancing effective water and nutrient cycles and building biodiversity, will be critical to a sustainable agriculture and food security. The good news is that many of these practices that mitigate the effects of climate change also provide a means for adapting to climatic vagaries. Building up soil organic matter not only sequesters carbon (mitigation), but also increases productivity, water infiltration and water holding capacity, thus enhancing agricultural resilience and providing a means for farmers and pastoralists to better adapt to droughts and floods.

Local level adaptation strategies require specific attention, and these must inform higher levels of decision making—requiring effective communication strategies, institutions that support innovation and experimentation, and community-level actors' full participation to both shape and benefit from future actions and policies (OECD, 2009b).

Progress on mitigation and adaptation to climate change cannot wait on agreements through the UNFCCC negotiations, which heretofore have not led to a new and binding agreement that represents an equitable balance between North-South actors. Developing countries most assuredly do not want the burden of responsibility to shift to them, since it is understood that industrialised countries are the primary GHG emitters. Developing countries are looking for substantial finance to help them adapt as well as mechanisms to speed up technology transfer.

Developing countries are calling for hundreds of billions of dollars each year for mitigation. A number of studies, including one by the World Bank, suggest that in the region of a further 100 billion USD per year will be needed to help poorer countries adapt. This amount is comparable to the amount of overseas aid currently given each year by rich countries. While agricultural mitigation and sequestration are not formally being traded, it will be necessary to include capacity development resources for needed practice changes as a component of remuneration funds (e.g. per ton of carbon) made available.

Proactive solutions must be employed, and building ecosystem resilience is fundamental. Even if all carbon emissions were to stop immediately, global warming will continue for at least 30 years. Emissions reductions and adaptation strategies must be in place—with or without UNFCCC agreements.

Agricultural systems that include livestock have come under specific scrutiny for their contribution to greenhouse gas emissions (some 80 percent of agricultural emissions). This perspective has the potential to further marginalise smallholder farmers and pastoralists whose livelihood strategies depend on livestock. Integrated farming systems and pastoral systems should be recognised for their untapped potential for climate change mitigation and adaptation associated with improved carbon sequestration in biomass and soil, coupled with economic and environmental co-benefits (FAO, 2006; Neely et al., 2009).

Farmers and pastoralists need information and tools to address the challenges of adapting to increased instability. Use of sustainable agriculture is key to tackling climate change because integrated multi-crop systems represent buffers against the unpredicted stressors that can decimate mono-crops. While climate change will not be treated throughout this document, it plays a critical to the mainstreaming environmental management in the agricultural sector and as such capacity development strategies must be employed.

Implications for Capacity Development

- Synthesise current capacity development and CDE principles into an up-to-date comprehensively holistic approach that bridges environment and agriculture with all relevant sectors.
- Use an inclusive and endogenous approach in programme development, ensuring multi-stakeholder and multi-institutional engagement from the beginning.
- Rigorously avoid perverse incentives in programme design; be prepared to tackle institutional change where necessary.
- Create strong incentives for actors at all levels to overcome entrenched, specialised approaches.
- Facilitate local ownership and capacity development for long-term success.
- Make systems and programmes 'self-learning', so that lessons can be learnt and quickly fed back into system improvement.
- Develop sustainable value chains through more equitable distribution of assets and improved ecological footprints.

PART III. MANAGING THE ENVIRONMENTAL PERFORMANCE OF THE AGRICULTURAL SECTOR

4 Agriculture Sector Governance and Environmental Performance

4.1 Agriculture Sector Stakeholders and Roles

The agricultural sector is highly complex and engages multiple and diverse actors from within government, the private sector and civil society; each with a valuable, but not always distinct, role and contribution to sectoral development. Power dynamics vary according to the state of economic development and governance dimensions, among other attributes.

National level ministries hold key decision-making power on agricultural sector development. Different countries place agriculture-related purviews in different ministry schemes. Key actors within the national government ministries will include those related to agriculture, livestock, fisheries, water, and finance. Further related ministries include those that address environment, natural resources, land, forestry, transport, education, planning and *health*. Included at the national level would be those agency representatives that make up the national agricultural research systems (national universities and agricultural research units) and extension services. Across national level government, the roles include: building a policy environment that supports agricultural growth, providing priority guidance to national development plans, ensuring a regulatory framework (e.g., to address environmental and food safety issues), providing incentives, market and trade development, infrastructure, awareness, research and education (very important); as well as inputs to price regulation, land use planning, policy frameworks on land tenure, monitoring of resource state, management and use, and negotiating with non-government actors. National governments can also play a direct role in agricultural production and processing through para-statal structures. Lastly, the Office of the President and Parliament play defining roles in the agricultural sector.

Sub-national government representatives related to the agriculture sector can include decentralised government bodies (from various ministries) as above, as well as local authorities and municipal leaders. Key roles at this level are: i) to promote local sustainable development, ii) design and implement land use plans, iii) provide agricultural services such as extending agricultural technologies, iv) ensure local infrastructure (roads, markets, water development), v) oversee territorial or watershed level initiatives (river basin authorities), and vi) facilitate among different stakeholders. Municipal leaders are also engaged in advancing agriculture and rural development at the urban-rural interface.

The **private sector** can include agribusiness, food industry actors, market developers, traders, financial institutions, supermarkets and other retailers, including international markets, and land developers. (For this discussion, farmers are considered within civil society.) These actors provide productive inputs (seed, fertiliser, information), manage major components of the food chain (processing, storage, distribution, markets), promote production technologies, drive production type, quantity and quality (promoting demand for high quality products ensuring availability and safety), and provide credit for inputs and agricultural investments and financing for trade. *Land developers* lease and buy land and influence the availability of resources (often deterring incentives for sustainable production).

Private sector actors include the range from small entrepreneurs to international businesses. Indeed, food industries have developed Good Agricultural Practice (GAP) codes and standards for agricultural practices aimed to fulfil trade and government regulatory requirements that address environmental, economic and social sustainability, and ensure safety and quality of produce in the food chain, in the process often creating new market opportunities for farmers and exporters in developing countries (FAO, 2003). Efforts such as these (see Box 2), taken together, represent a sea change in food systems leadership, helping global business develop its capacity to address social, environmental and economic concerns simultaneously.

Box 2. Examples of Pre-Competitive Agribusiness Collaboration Incentives

GLOBALGAP is a private sector-driven voluntary standard to assure consumers that farm production has minimised environmental impacts related to chemicals, and that associated worker health and safety are being approached responsibly.

The **Sustainable Agriculture Initiative** (SAI), initiated in 2002, is a consortium of 22 corporate entities that recognise sustainability as critical to ensuring a safe supply of agricultural raw materials (SAI, 2010). The SAI Platform, with some 350 billion USD in sales, promotes sustainable agriculture and specifies criteria related to sustainable farming systems, social sustainability, economic sustainability, and environmental sustainability including food safety and animal welfare.

The **Sustainable Food Laboratory** is a consortium of business, non-profit and public organisations that uses collaborative learning and facilitates innovative market-based solutions towards a healthy and sustainable food system. The SFL call to action states, "We, leaders of global food and agriculture, recognise that we influence the way one quarter of the world's population earns a living, half the world's habitable land is cared for, and two-thirds of the world's fresh water is used. With such influence comes both opportunity and responsibility."

Civil society represents a broad spectrum of actors related to agriculture. These include *farmers*, *pastoralists*, *fishers and labourers*; whose roles centres upon managing the natural resource base and environmental services in support of agricultural production, producing consistently for diverse markets, and assisting in securing the livelihoods of local people in farming communities. These actors vary tremendously in their wealth and political capital. *Farmers organisations*, *cooperatives*, *community-based organisations*, and *social movements* can provide farmer inputs and credit, extend agricultural technologies, enhance communications, advocate for decision-making input, and advocate for a variety of different agricultural approaches (food sovereignty, large-scale industrial agriculture and commodity lobbying, etc.). These might also include members of soil, water, land, biodiversity, and forestry management committees. Other civil society partners include *development NGOs* that provide services and inputs to assist limited resource farmers and *environmental NGOs* that promote environmental management in agriculture and promote regulations related to ecosystem protection.

A key role of farmer organisations and NGOs is to advocate for farmers and civil society within production and consumption, and to serve as a watchdog over government. Lastly, *consumers* are key stakeholders in agriculture—both as individuals and as *institutional consumers* (schools, hospitals, prisons, etc.), and can use demand as a currency in shaping food production systems. Media play a substantial role in agricultural communications as well as messaging. Civil society actors are increasingly playing a substantial role in the new aid architecture (GDPRD, 2008).

Sustainable agricultural development relies on the relationship (e.g. collaborative, parallel or oppositional) between these actors within a given country. In the next sections, the environmental capacity development needs of these actors are discussed in detail.

4.2 National Development Plans and Sustainable Agriculture

National development plans could be critical entry points for increasing the environmental sustainability of the agricultural sector. But in many countries, agricultural policies and programs operate independently of national development plans. Very often legacy agricultural policies continue in effect without critical review. The effects and real consequences of agricultural policies are embedded within the organisational structures of Ministries of Agriculture (MofA); they are inculcated in the specialised skills sets and work programs of MofA employees, whose work tenure continues irrespective of the appropriateness of the services that they deliver or competitiveness enhancement impact of their activities on farmers. The role of modernising the agribusiness sector of developing countries is often detached from the role of enhancing livelihoods of farmers and of the rural poor, which is more generally delegated in national development planning processes to Ministries of Commerce and Trade. In this way, farm-to-market value chains are bifurcated between on-farm and off-farm elements, issues of efficiency and adaptability are transformed into issues of equity, and fairness between the farm and private sectors and overall development is arrested.

Agriculture sector development plans are most often carried out by third parties (e.g. donors and aid agencies) rather than by Ministries of Agriculture. It is still more rare for agricultural development plans to be integrated effectively into overall national development plans, even in countries where most of the GDP still comes from traditional agricultural production. The result is that a divisive dynamic emerges among policy makers with development objectives (e.g., sources of dynamism are urban-, manufacturing- and high tech-oriented), counter-posed against ones with agriculture productivity enhancement as their objective. The implicit assumption is that the functional role in the economy for agriculture is to produce sufficient food to keep the dynamic population well fed at low prices and also to warehouse off less productive agricultural workers who need to be absorbed ultimately into the separate dynamic economy. Little policy concern focuses on finding ways to actually integrate the two economies.

Another limitation in the development of agricultural policies is the prevalent separation of policy domains and policy tools for agriculture and environmental protection. Once more, a bifurcated policy perspective has effectively become permanent in many developing countries by virtue of the bureaucratic separation of agricultural issues from environmental issues. Examples abound of countries where the failure to effect trade-offs in each and every agricultural investment decision has resulted in step-by-step environmental degradation.

Much policy planning in developing countries is based on the fundamental fallacy that the resource base supporting agricultural activities is perpetually renewable. In a low-density agricultural production environment this assumption may not have had the perverse consequences that have occurred in the current high-density environment, in which both opportunity costs and full life cycle costs need to be factored into each and every decision regarding the commitment of resources for agricultural development, including commitments of resources to create public good assets as well as private good assets.

Most recently, the African Union through the New Partnership on Africa's Development (NEPAD) has initiated a process for reviewing National Agriculture and Food Security Investment plans that are based on Comprehensive African Agriculture Development Plan (CAADP) principles. Recommendations in the development of investment plans have included those related to bolstering sustainable land and water management pillar and the need to include the environmental ministries as well as other sectors and stakeholders at both the national and local levels in their implementation. However, within the five rapid win-win strategies toward food security put forward by the African Union, environmental aspects are not addressed.

4.3 National Budgets and Sustainable Agriculture

The national budget could also be a key entry point for sustainable agriculture. For that, the national budget should be judged against the objective function specified in the national agricultural strategy. Individual items included in the budget should be ranked periodically in terms of their value for money in achieving objectives included in the overall strategy. The process of zero basing or of frequently reviewing deeply the effectiveness of individual budget elements against the objectives that are embraced by the strategy will over time force the strategy and the budget to be appropriately aligned. The key is not to be able to see clearly into the future—no budget director can do that—but rather to be in a position to change budget priorities quickly and adaptably.

Investment needs in the agricultural sector are high but often pay off. World Food Day 2009, FAO showed that 30 billion USD per year is needed in agricultural investments to help farmers in developing countries. It was further noted that this level of investment would generate an overall annual benefit of 120 billion USD in: improved agricultural productivity, development and conservation of resources natural resources, expansion and improvement of rural infrastructure and broadening of market access, strengthening capacity for knowledge generation and dissemination, and ensuring access to food for the most needy (FAO, 2009e).

There is scope for improve the quality of sectoral budgets. Over time, agricultural budget directors should try to make their budgets more objectively adaptable by decreasing allocations to overhead costs (including existing staff, buildings and maintenance, ongoing contractual commitments, etc), short-lived assets that require perpetual reinvestment or ongoing subsidy and long-lived assets that have the effect of creating private goods, and increasing them for long-lived assets that have the effect of creating public goods, and short-lived assets that demonstrate new crops/new business models and hence create information (also public goods). The particular instruments used should include forms of public-private partnerships that subject specific programs to market tests, share risks with private enterprises, and assure that expenditures and future liabilities become progressively more variable in regard to policy outcomes.

Claims on the national budget for agro-environmental interventions should be better argued. They can be based on estimates for the net loss in GDP due to degradation of the natural resource base. For example, a 2008 EC study estimated that the loss of biodiversity and associated ecosystem services between 2000 and 2050 cost an estimated 14 trillion Euro (or seven percent of global GDP) (EC, 2008).

Budgetary submission should include capacity development interventions. Costing of interventions will be best borne through capacity needs assessments within the context of national development plans that fully bridge food security and national resources management (linking multiple sectors), and allocate resources accordingly. Capacity development must be based on long-term planning horizons. Short-term capacity development responses within countries can be achieved through activity-based budgeting, while long-range capacity development costs will need to be projected.

Box 3. Examples of project-based estimates to make changes at the landscape level

A Global Environmental Facility (GEF) project focused on catchments and landscape management in Ethiopia to be executed by the Ministry of Agriculture estimates overall financing needs at over 26 million USD for a short-term project. The finances come from GEF, IFAD, the Government of Ethiopia, and project beneficiaries. The effort will focus on promoting a sustainable land management approach at the national, regional, and local level through adaptive participatory approaches and investments in alternative energy. This is not specific to capacity building but does give an indication of resources needed to promote participatory 'win-win' solutions in a community of 16,000 households (IFAD, 2009a).

Another example from Costa Rica (spelled out in more detail in the next section) is building social capacity for collaborative management of a territory by all of the stakeholders through a course of 10 modules over 1.5 years at a cost of 300,000 USD, and expected to benefit some 85,000 community members (Robin Marsh, personal communication, 28 April 2010).

Recent estimates of capacity needs for rainforest nations for interventions related to governance and participation in Reducing Emissions from Deforestation and Degradation (REDD) were considered to range from 14 to 92 million USD per country, over 5 years (Hoare et al., 2008).

Source : Hoare et al., 2008

5 Setting and Achieving Environment Goals for the Agricultural Sector

Improving the environmental performance of the agricultural sector is a common goal for many countries. The OECD Environmental Strategy for the First Decade of the 21st Century (OECD, 2001) made a case for environmentally sustainable policies on the part of OECD member countries. In that context, the critical goal for agriculture was defined as the "provision of sufficient and safe food and other agricultural products to meet the needs of the growing world population, while reducing degradation from agricultural production and enhancing environmental benefits provided by agriculture in the overall context of greater trade liberalisation." The challenges articulated in this strategy are still highly relevant and can be further underscored as the decade concludes, particularly in the wake of recent crises. For the purposes of this document, capacity development for environmental management and governance within the agricultural sector is based upon the following goal: "A fundamental shift towards the sustainable production and provision of sufficient, safe and nutritious food that simultaneously builds and reinforces ecosystem resilience, leading to equitable and economically viable livelihoods."

Sustainable agriculture should be a fundamental component of green growth in developing countries. With climate change representing perhaps the greatest catalyst, along with recent economic upheavals, policies intended to create green economies are becoming more widespread. An interagency statement of the UN System states, "investing stimulus funds in such sectors as energy efficient technologies, renewable energy, public transport, sustainable agriculture, environmentally friendly tourism, and the sustainable management of natural resources including ecosystems and biodiversity, reflects the conviction that a green economy can create dynamic new industries, quality jobs, and income growth while mitigating and adapting to climate change and arresting biodiversity decline" (UN, 2009). As countries move in the direction of Green Planning, there will no doubt be greater incentives to build environmental management into the food system.

Improving the environmental performance of the agricultural sector requires broad policy changes. According to the OECD Environmental Strategy, national action by OECD countries was to focus on internalisation of environmental externalities in agriculture, to make the transition towards full-cost resource pricing (including environmental and social costs); and to encourage the implementation of market-based and other policy instruments, both to enhance the provision of environmental benefits and to

reduce the environmental damage from agriculture (OECD, 2001). The menu of policy recommendations included in the OECD Environmental Strategy can also be useful for developing countries. Operational recommendations specific to agriculture for national action include: greater adoption of sustainable agriculture farming systems; integration of biodiversity and ecosystem concerns into agricultural policies and practices' reform of policies and subsidies that have environmentally damaging effects; setting time bound targets to both increase water use efficiency and reduce associated risks of nitrate leaching, nutrient run-off, soil erosion and pesticides. Clearly efforts cannot be limited to just adding environmental dimensions to agriculture, however critical this path appears. Rather, the paradigm must be shifted such that sustainable ecosystem processes are considered foundational to agriculture and sustainable development; and so that the sustainable management of agricultural lands is understood as fundamental to ecosystem management.

More attention can be paid to the opportunities for innovation in the sector in order to improve its environmental performance. Across multiple policy committees under the OECD umbrella, it is recognised that innovation is critical to addressing economic productivity as well as other demands of sustainable development. General support for innovations can be given greater focus in order to address environmental and agricultural concerns. Indeed, the general characteristics of innovation (see OECD, 2010a) can readily be applied to expanding innovations for integrating environmental management in the agricultural sector. In order to overcome "environmental management as add-on" scenarios, environmental management and agriculture objectives need to be integrated over the near- and long-term to meet the intermeshed goals of sustainable food security, nutrition, ecosystem health and sustainable livelihoods. Recent innovations have been aimed at realising an integrated and productive agriculture based on ecosystem resilience in light of the current theory of change. Some approaches that are based upon the synergy of agriculture and environment (see exhibit 4) towards jointly held outcomes (production, conservation and livelihoods) include: a) landscape scale approaches, ecoagriculture and agroecology; b) local food systems and urban rural linkages; and c) multi-stakeholder innovation platforms.

Box 4. Approaches for building synergy across environmental and agricultural priorities

Landscape scale approaches.

Landscapes are territories that include the physical and biological features of an area, provide goods and services, and are shaped by the institutions and stakeholders that influence the area (IUCN, 2008; McNeely and Scherr, 2003). Landscapes are best delineated functionally, and thus provide a focal point for stakeholder planning and managing resources in an integrated way, based on local ecological (land, water and biodiversity) and socio-economic conditions (Buck et al., 2006; FAO, 2010a). Productive landscapes that provide biodiversity, food, water and other forms of livelihood are inherently complex systems (Buck and Scherr, 2009). Ecoagriculture emphasises landscape ecosystem resilience where landscape management is composed both of agroecological practices and modified conventional practices that make agricultural production more ecosystem friendly; and of ecosystem management practices that are more beneficial for agricultural producers within the same landscape mosaic (Buck et al., 2006; UNDP, 1995). To achieve efficiency, land use planning should be conducted using landscape scale approaches, and integrated within local development plans.

Sustainable local food systems

Dissolving traditional rural and urban boundaries, and emphasising integration and linkage across a foodshed, a sustainable food systems approach addresses relational aspects among the relevant actors that can simultaneously address food security, resilience, reciprocal market relationships, and environmental services. Locally-oriented sustainable food systems perspectives can be characterised as a "collaborative effort to build more locally based, self-reliant food economies—one in which sustainable food production, processing, distribution, and consumption is integrated to enhance the economic, environmental and social health of a particular place." (A. Getz-Escudero, personal communication, 19 October 2009) These approaches can identify, bridge, and in some cases create new value chain dimensions and empower additional stakeholders, tapping under-utilised and potent tools such as public procurement (in particular, for food purchases to public institutions, such as schools, hospitals and prisons). Innovations in food system governance take the form of food policy councils at local and regional levels, stimulated from both top-down, and bottom-up cases (Harper et al., 2009).

Multi-stakeholder innovation platforms

Multi-stakeholder approaches and platforms that bring together government, private sector and civil society create conditions for all stakeholders to engage in processes that address immediate, medium-term and long-term complexity and demands. They build upon shared values, seek to reduce power inequities, take advantage of available insights and perspectives, co-ordinate action and foster informed problem solving based on mutually identified synergies and adequately negotiated trade-offs. Participatory processes and problem solving that include relevant stakeholders in a meaningful way have proven to overcome significant obstacles to sustainable development. Innovation platforms and communities of practice focus on generating goods and services, by bringing together a network of partners and stakeholders to advance efforts along a common path

Source: DFID, 2009; Buck and Scherr, 2009.

Implementing the agri-environmental priorities above is the purview of government, the private sector and civil society working together. Before delving into the associated capacity development requirements (Part IV of this chapter), it will be useful to review incentive structures and agri-environmental performance measurements.

6 Policy Tools and Instruments for Sustainable Agriculture

6.1 Policy Instruments for Sustainable Agriculture

There is growing evidence of the economic value of ecological services – for example, a recent analysis of 100 different crops for human consumption estimated the would-be impact on production levels of a total loss of pollination services at 190 billion USD (WRI, 2010a). Recognising the true costs of externalities is key to ensuring that ecosystem processes are accepted as the foundation of agricultural

activities. Resource degradation has been driven by faulty cost-benefit analyses, which have placed almost zero value on precious natural capital. It is important to differentiate 'valuation' of ecosystem services, which is usually an economic analysis of benefits (for setting policy priorities), from financial/market analyses that show that environmental services produce flows of financial benefits that could be remunerated by those who benefit. It is not always possible for economic benefits to be realised but in the case of large agricultural landscapes, most of the costs will need to be borne by the direct land managers and landowners, who will need different incentives.

Such recognition is only a first step, and a critical development is to fix the incentive framework faced by agricultural producers. Indeed, the 2007 State of Food and Agriculture Report (FAO, 2007), focused on Paying Farmers for Environmental Services, found that current policies and incentives favour the production of conventional agricultural outputs at the expense of non-marketed services such as climate change mitigation, improved water quality and quantity, and biodiversity.

There are numerous policy instruments designed with the intention of improving environmental management within the agricultural sector. They include environmental certification, agro-environmental payments (including payments for environmental services), regulations, and disincentives including taxes for unsustainable practices. These instruments are being actively developed and implemented by international and national NGOs, business, industry, and governments and there are already in place a number of associated capacity development projects in place.

For the most part, these incentives have not taken the form of public demand creation—supporting and investing in shorter supply chains and markets for locally produced goods, using geographic preference specifications, designing zoning, transport, energy management, and water infrastructure that is more conducive to local and regional agriculture. Further, perverse subsidies that support activities that degrade ecosystems need a thorough assessment.

Some specific examples of policy instruments that are developing a track record for improving farm level environmental management and maintenance and regeneration of ecosystem services are described below. These are presented here to highlight areas where different stakeholders need to develop capacities – whether the capacity of governments to issue regulations or the capacity of farmers to certify their productive activities.

Regulations are a core mechanism for addressing environmental issues, particularly in agriculture in developed countries. All OECD countries utilise a complex set of regulations to prevent negative impacts on the environment, including those pertaining to storage and application of chemicals and pesticides, prohibitions and requirements on waste and nutrient management, limits on production intensity, and green area requirements. Regulatory requirements have both broadened in scope and become more stringent, particularly when associated with conservation areas. Top-down regulations have in large part been a detriment to agriculture and ecosystem management, which needs to be highly specific. Local by-laws and regulations focused on specific outcomes will promote greater innovation and synergies across potentially divergent land use interests, and can produce the least-cost ways of achieving environmental goals. It is essential to place farmers and farming communities in a substantive role in the development of rules; and to do the same for environmental groups.

Environmental Impact Assessments (EIAs) is a regulatory instrument used to assess the potential impact of any given activity on the environment and can be applied to projects and programs. Within the context of agriculture, EIAs can provide insights on water quality, soil erosion, and agricultural biodiversity, among others. For example, the Ministry of Agriculture and Finance in Lao PDR has developed technical guidelines for addressing agricultural biodiversity, to ensure basic food and nutrition needs, while also ensuring conservation and use of genetics and essential ecosystem services. In this case,

sector specific inquiries were developed around crop, livestock, aquatic, and non-timber forest products (FAO, 2007).

Certification and labelling of products are largely driven by green-principled investments, in which a premium is placed on agri-environmental and sustainable production practices. These practices are assessed by independent agencies that test and verify that indicator standards are being met. The Sustainable Agriculture Network and Rainforest Alliance have been instrumental in scaling up such premium and trademarked products. Since 1992, under this system more than 31,000 farmers associated with co-operatives and plantations in 24 countries have met standards for 22 types of crop. As an example, Kraft Foods has launched a commitment to sustainable cocoa farming, which will lead to a ten-fold increase in purchases from Rainforest Alliance Certified farms (an increase of 30,000 tons) by 2012.

While eco-certification is considered an important strategy for improving environmental performance in agriculture, there have been few assessments of the impacts of these instruments. A 2003 audit of banana production in Ecuador showed that certified farms significantly outperformed non-certified farms on all environmental criteria. However another study (Blackman and Rivera, 2010) reviewing 37 studies concluded that only 14 of these generated credible results, and of these only six showed benefits. While the emergence of certification standards for export markets has addressed consumer concerns, farmers have often not been able to meet the standards required, subsequently diminishing market access for smallholder farmers. Since 2002, capacity development for farmers to meet these standards has become a priority through technical assistance from FAO, the private sector and non-governmental organisations.

Payment for Environmental Services (PES) is a policy instrument that uses market forces to remunerate providers of environmental services for more efficient environmental outcomes. Environmental services are classified as serving regulation (air, water, carbon sequestration), habitat, production (pollination), and information functions (Lipper et al., 2009). The demand for environmental services comes from (Lipper et al. 2009): local, national and international governments and utilities (stricter standards on water quality, land use); industry, in order to ensure quality production inputs; consumers (ecological products, park preservation); and NGOs focused on the environment, sustainable development and the public good.

It is anticipated that PES could play a major role in improving environmental conditions at local and global levels while improving the livelihoods of the poor as the managers of ecosystem services and those who gain from the co-benefits. A recent example is provided through the work of CARE International and the World Wildlife Fund (WWF), which will provide payments for watershed services to smallholder farmers in the Uluguru Mountains of Tanzania. The Equitable Payments for Watershed Services has enrolled 450 farmers, the Dar es Salaam Water and Sewage Corporation, and Coca Cola Kwanza Limited, which will be paying between 30 and 280 USD per hectare for soil conservation and reforestation practices (Ecoagriculture Partners, 2010). While agriculture is not yet formally recognised in the Clean Development Mechanisms (CDM), voluntary carbon markets are moving to the forefront of the payment for environmental services agenda. The CDM needs to be re-examined for its complicated application process that has so far limited the distribution of CDM projects to a few countries with the necessary capacity. Nonetheless, voluntary markets that allow offset purchases based on carbon sequestration in agricultural and forested areas are evolving at a rapid pace. Rewards for environmental services will continue to need revisiting to ensure that farmers in developing countries can benefit.

6.2 Tools to Inform Sustainable Policies

A number of tools are available to better assess environmental impacts of agricultural system policies and practices both ex-post and ex-ante. With increased awareness of the importance of environmental

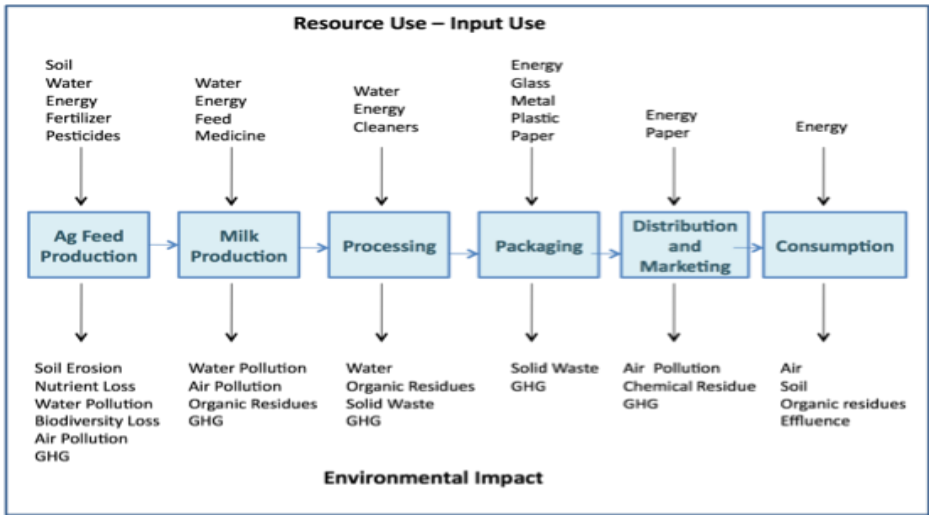
sustainability, the development of approaches to assess the environmental impacts of agricultural decisions are becoming more prevalent Of particular importance is the capacity to assess projects, policies and programmes (including development proposals) to ensure effective investment and management of agriculture. Capacities are needed also to make use of these tools.

Strategic Environmental Assessments (SEA) includes analytical and participatory approaches to decision-making that integrate environmental considerations into policies, plans and programs. The tool is applied to early project, programme or policy formulation to assess the potential effectiveness and sustainability of decisions (OECD, 2006a). This ex-ante tool, into which ecosystem services can be incorporated, includes four stages including: establishing the context; undertaking the needed analysis with appropriate stakeholders; informing and influencing decision-making; and monitoring and evaluating. SEAs can be used for integrating environmental services into development processes (WRI, 2010a).

Lifecycle assessments or analyses (LCAs) provide a means for understanding and evaluating the full environmental impacts (water, soil, biodiversity, GHG, energy, etc.) of a product or service. Life cycle assessments in agriculture are typically carried out across a commodity value chain (see exhibit 6) or on farm, but can also be used on a basin or landscape level. The process entails identifying a goal or scope of the activity, taking inventory and assessing impacts and interpreting the data. LCAs can be useful in contrasting different agricultural system practices and solutions, and provide a tool for ensuring that the entire system is improved rather than simply seeing the problem shift from one region to another or from one environmental component to another (UNEP, 2004).

Agri-environmental performance indicators can be used to assess the environmental performance in agricultural systems. For instance, the OECD has carried out such an assessment within and across member countries making use of biophysical indicators of the state of agriculture and land, nutrient, pesticides, energy, soil, water, biodiversity, and farm management (OECD, 2008). While it is critical that the indicators monitored address environmental performance of agriculture (soil, water, biodiversity, pollution reduction, etc.), there is a growing trend to broaden methods, in order a) to look at overall landscape condition, b) to understand life-cycle implications and impacts (e.g., farm to fork greenhouse gas emissions), c) to monitor additional aspects related to socio-economic considerations (e.g., issues related to fair trade including labour dimensions, or food safety for export), and, d) to layer data in order to better understand spatial relationships (WRI et al., 2007; see exhibit 8). Agri-environmental monitoring can also assist in moving toward sub-national monitoring and reporting that allows more management-relevant indicators. In addition, monitoring must be able to balance ‘reporting up’ to allow aggregation of local information for state and national policymakers, and monitoring within landscapes where initiatives are ongoing, and which are aimed at adaptive management.

Figure 1. Life cycle approach resource use and environmental impacts in the dairy sector



Source: Adapted from UNDP and Lake, 1999

Box 5. Kenyan Natural Resource and Poverty Mapping Project

In 2007 the World Resources Institute (WRI) in collaboration with the Government of Kenya and other partners conducted a unique mapping project that could serve as a model for similar endeavours. An atlas was created with layers for different aspects of poverty and natural resource distribution and degradation. Layers provided visual distribution information for environmental resources such as soil, water, forest, rangeland, livestock, and wildlife; other layers included tourism and human well-being.

Data from multiple different stakeholder perspectives can thus be synthesised and understood in the round. This 'bird's eye view' of the issues provides insights that would otherwise remain hidden; useful in addressing hunger and environmental degradation in an integrated way. The overlaying of visual data representations provides a picture of the interrelation of land, people, and prosperity; and also reveals areas of causal overlap, highlighting key hotspots and areas with synergistic potential—opportunities for win-win scenarios.

Developers of the project realised that combining existing maps could lead to new ecosystem-development indicators, and that spatial relationships between different ecosystem services can be examined to reveal tradeoffs and synergies among different ecosystem services. This method, applied elsewhere, would allow the targeting of funds to key areas, improving efficiency of resources used. This approach could be adopted at low cost by using existing datasets to reveal new or confirm existing insights.

Source : WRI et al., 2007

Implications for Capacity Development

- Enhance awareness and understanding of the contribution of sustainable agriculture to food security and the environmental, social and economic co-benefits (triple bottom line) including adaptation and mitigation of climate change.
- Promote national capacity for drafting and implementing development plans that encompass cross-sectoral aspects resulting in investments in gains in food nutrition and security while ensuring economic and environmental resilience.
- Provide results-based incentives for sustainable agricultural initiatives that are based on inter-institutional and inter-disciplinary collaboration and innovative linkages among research, extension, education and development professionals.
- Enlist full accounting for ecological, economic, and sociological costs and benefits associated with agricultural production and ecosystem services and shift toward bundled agricultural products with ecosystem services (EcoAgriculture Partners, 2010).
- Reward farmers, pastoralists and direct agricultural and natural resource managers for ecosystem stewardship and provision of safe and nutritious food to meet local and consumer needs (UNEP, 2009).
- Take advantage of existing tools and approaches that assist in dealing with complex contexts. Build on relational mapping of poverty, environment and agriculture in the collaborative management of landscapes and territories.
- Develop core ‘soft’ and ‘hard’ capacities related to ecosystem processes, sustainable food systems, equitable multi-stakeholder approaches, and holistic decision making at every level.
- Develop capacities for people-centred and adaptive collaborative land use planning, negotiation, management and monitoring that build upon spatial relationships of the economic, social and environmental dimensions in the landscape.
- Scale up successful sustainable land management and capacity development approaches associated with ecological intensification and integration.

PART IV. DEVELOPING ENVIRONMENTAL CAPACITY IN THE AGRICULTURAL SECTOR

7 Environmental Capacity Development Needs

7.1 Framework for Capacity Development

Capacity development is understood as the process whereby people, organisations and society as a whole unleash, strengthen, create, adapt and maintain capacity over time. (OECD, 2006b).

The above description reflects the evolution of thinking around capacity development investments and an appreciation of the importance of collaborative learning, freedom of innovation and empowerment, for long-term positive change. Capacity development is considered to be a continuous cycle that includes accepting the need for change, diagnosing capacity needs, setting targets, designing and implementing capacity development strategies, and monitoring and evaluating outcomes to adjust the strategy (OECD, 2009). This cycle requires the fostering of collaboration, teamwork, and consensus among stakeholders, and ongoing assessments to glean learning from experiences to more rapidly achieve learning outcomes.

Successful capacity development depends upon a foundational understanding of the situational context, clarity in regard to "capacity development for what?" and then informed and participatory suggestions as to "what might work here?" - thus allowing for flexibility in solutions. There are three dimensions or levels of institutional capacity development identified, which build directly from the context (OECD, 2006b; OECD, 2009) (see also exhibit 9):

- **The enabling environment** (or condition) describes the system within which organisations and individuals function, and refers to legal and policy frameworks, and the work approaches that are needed for the manifestation of capacities at the organisational and individual levels. Capacity development is related to changes needed in national policy, international regimes, rule of law, accountability, transparency, information flows, and communication.

- **Organisational capacity** is associated with organisational structure and stakeholder interactions, and intra-organisational processes. It also refers to the interaction between relevant public and private actors; and includes mission, planning, procedures, decision-making, resources, and organisational culture. It is the framework within which individuals and their competencies are brought together and utilised.

- **Individual capacity** refers to the competencies, knowledge, skills and experience of individuals (gained through formal, informal or participatory training activities) and their ability to set objectives and to achieve those objectives. While focus is often on the 'hard' competencies such as technical, logistical and managerial skills, the 'soft' competencies such as leadership, relationship building and facilitation are equally important.

Gender aspects are applicable within each of these dimensions. Improving environmental and governance aspects of agriculture requires that these three dimensions be addressed, each of which is pertinent to government, the private sector and civil society. Donors and development partners should also take all dimensions into account.

Table 4. Summary of Key Issues for Different Dimensions of Environmental Capacity Development

Level	Components
Enabling Environment the policy, legal, regulatory and social support systems within which organisations and individuals operate	• Policy, legal and regulatory frameworks • National management and accountability frameworks • Financial flows for environmental sustainability • Environmental governance: including the rule of law, accountability and participation, transparency and responsiveness • Communication and collaboration mechanisms
Organisations government institutions and civil society organisations, including the private sector, NGOs, CBOs and academia	• Organisational mandates, structures and functions • Accountability and reporting relationships • Administrative, management, and budgetary frameworks • Staffing and Human Resource development • International and external communications and collaboration mechanisms • Information systems, infrastructure, facilities and equipment
Individuals in their roles within government and civil society organisations, and acting as citizens and members of families and communities.	• Awareness and attitudes: e.g., motivation, commitment, values and beliefs. • Knowledge related to environment and natural resources management: information and communications technology and sustainable development (integration of environment, economic and social issues) • Skills, e.g., specialised scientific and technical skills; interdisciplinary skills and communication and collaboration skills.

Source: OECD, 2008

As countries acknowledge capacity needs and work to integrate agri-environmental capacity into development strategies, each of the above levels and the inter-relationships between them must be attended to. The organisation and enabling environment are elaborated on in the related change process capacity factors of the Capacity Development Results Framework (WBI, 2009) that affect the achievement of an identified development goal and associated learning outcomes. These (along with their indicators), include:

Effectiveness of organisational arrangements; including the systems, rules of action, processes, personnel and other resources **that GO and NGO stakeholders bring together to achieve development goals**. Indicators are: clarity of mission with respect to the development goal, achievement of outcomes that lead directly to attainment of the development goal, operational efficiency in producing development goal-related outputs, financial availability and probity, supportiveness of stakeholders, and adaptability in anticipating and responding to change.

Efficiency of policy instruments or formal mechanisms to be used to guide stakeholder actions toward achievement of the development goal, include administrative rules, laws, regulations, and standards. Associated indicators are: clarity of policy instruments defining development goals and the related rights and responsibilities of stakeholders, consistency of the policy instruments that define the development goal with policy instruments for other development goals, legitimacy of the policy instrument, incentives for compliance provided by the policy instrument, administrative ease of implementing the policy instrument, freedom of policy instrument from unintended negative

consequences, flexibility of the policy instrument in addressing varying development goal situations, and resistance of policy instruments to corruption, rent seeking, and regulatory capture.

Conduciveness of the **socio-political environment that is** made up of the political and social forces that determine the priority given to the development goal by government, the private sector and civil society. Associated indicators are: commitment of leaders, compatibility with social norms and values, stakeholder participation in decisions, stakeholder voice in decisions about the goal, accountability of public services as providers for achieving the goal, transparency of information to stakeholders about the development goal. Policy groups must know how to align with, co-ordinate or integrate actions in different sectors. Thus, to these skills should be added enhanced negotiation skills related to trade-offs and synergies.

Additional principles within the methodological approach highlight the importance of national ownership, motivation as a driver of change (of a long-term and endogenous nature), staying with the process through difficulties, the use of national systems, adaptation to local conditions, linkages to broader reforms, utilisation of unplanned consequences, and systematic measurement of quantitative and qualitative data. Exhibit 10 highlights FAO capacity development recommendations based on a survey of case studies.

Box 6. Capacity development – FAO recommendations

Effective capacity development (CD) does not simply lead to the imparting of knowledge or experience but results from the interrelation of factors that optimise synergies in the three dimensions of capacity development; and the willingness and readiness of national/sub-national institutions or actors combined with the technical competency of the implementing organisation (FAO, n.d.). Analysing critical success factors from its case studies, FAO makes the following recommendations, inter alia:

Needs Assessment

- Identify opportunities in which *international and/or global initiatives* derive from countries having signed or adhered to international or global commitments.
- Encourage *early involvement of national actors* in the identification of CD needs, and the definition of methodologies and approaches.
- Identification of a *local or national champion* is a key element for success.

Formulation and implementation

- CD should include a combination of modalities of intervention, selected on the basis of goals, feedback from prior experience and sector relevance.
- Advocate the use of training methodologies with an appropriate pedagogy, including adequate duration, focused content, practical experience, and a mix of techniques for knowledge transfer.
- Ensure a medium to long-term horizon for CD interventions in order to foster deep-level changes.

Finalisation and sustainability

The following factors contribute towards increased sustainability of CD efforts:

- Support national actors in order to *internalise changes*.
- Advocate for national *stable/strategic allocations of resources* beyond the duration of supported projects.
- Support institutional learning and *use of incremental approaches*, using phased approaches and ensuring that each phase feeds into the next.
- Monitor the impact of changes.

Source : FAO, n.d.

7.2 Capacity Building for What?

The global community strives to accelerate the achievement of the Millennium Development Goals. Within this context, the integration of agriculture and environment need to be part of a larger transformational change associated with the sustainable development model. It is important this model is advanced to embrace the complexity associated with intertwined economic, social, and environmental dimensions, and to ensure long-term planning and implementation horizons. Problem-solving too often defaults to that which is simple, specialised, symptom-oriented and short term, to the long-term detriment. Neither 'business as usual' nor even 'advances as usual' will be enough to bring about the changes required, and agreed upon.

Capacity development for environmental management and governance within the agricultural sector is based on the following goal:

A fundamental shift towards the sustainable production and provision of sufficient, safe and nutritious food that simultaneously builds and reinforces ecosystem resilience, leading to equitable and economically viable livelihoods.

In practice, this requires both governance and technical approaches by government, civil society and the private sector including the following:

- Developing an appreciation and foundational awareness of, and competency in, agri-environmental approaches and win-win opportunities.
- Recognising the full value of and accounting for the ecological, economic, and sociological costs and benefits associated with agricultural production and ecosystem services; and of the shift towards bundling agricultural products with ecosystem services (EcoAgriculture Partners, 2010).
- Implementing a systematic integration of the agricultural and environmental sectors in concert with other sectors, to ensure jointly developed and consistent policies, programmes and plans that address root causes and reduce risks and vulnerability to shocks, while supporting ecosystem resilience and long-term sustainable agricultural (or agro-ecological) production.
- Developing people-centred, and concentric, household-, foodshed-, and landscape-scale perspectives, as well as urban-rural linkages, for the planning, monitoring and management of environmental services and sustainable food systems with a view to sustainable management of value chains.
- Promoting inter-level multi-stakeholder innovation or learning platforms for debate, problem solving and decision-making that recognise and include the pivotal role of direct natural resource managers, farmers and pastoralists—particularly women, youth, and elders.
- Scaling up good practices related to sustainable land, water and biodiversity management associated with ecological intensification and integration.
- Rewarding women and men farmers, pastoralists and direct agricultural and natural resource managers for ecosystem stewardship and provision of safe and nutritious food that meets local and consumer needs (UNEP/GRID-Arendal, 2009).

In terms of implementing these principles in context, recommendations arising from the UN Commission on Sustainable Development (UNCSD 17-18) processes that focused on agriculture during 2008-2009 are featured in Box 7.

Box 7. Capacity Development and Sustainable Development

Farmers, especially small farmers, need to be central actors in a sustainable, home-grown green revolution, with a sound balance and mutually beneficial linkages between small-scale and large-scale agriculture. Such a green revolution needs to be adapted to local agroecosystems and climate, building on local knowledge and experience while availing of the best available science, technology and know-how.

United Nations Committee on Sustainable Development, 2009

Recommendations from the UNCSD 2009 process include:

a) Provide secure access to food and social safety nets - by developing and implementing national food security strategies, encouraging local food systems, and linking food aid with the development of local sustainable agricultural production and marketing capacities.

b) Create a strong enabling environment for agriculture

i) Establish favourable conditions for rural entrepreneurship (e.g., by secure tenure rights, investing in infrastructure, building rural institutions).

ii) Raise the share of government budgets devoted to agriculture, and mobilise additional resources.

iii) Encourage greater direct investment (including foreign direct investment) in the sector in developing countries to support efforts to boost production.

iv) Increase investment in agriculture and livestock research and development and allocate resources for research on climate change.

v) Establish and strengthen links between research institutions, extension services and farmers.

vi) Provide increased technical and financial assistance to developing countries to strengthen national innovation capacity, and training and extension services.

c) Enhance capacity-building efforts and transfer of technologies

i) Implement targeted capacity-building programmes in areas relevant to thematic cluster, their inter-linkages and cross-cutting issues.

ii) Strengthen South-South, North-South and triangular cooperation, including in areas of sustainable land management and land planning.

iii) Increase investments in research and development in sustainable agricultural technologies; accelerate transfer and diffusion of these to all farmers; also in order to combat drought and desertification.

d) Develop sustainable agricultural value chains and improve the market access of farmers

i) Sustainably develop the production and marketing of high-value crops and the processing of high-value agricultural products.

ii) Diffuse more widely pre- and post-harvest technologies to enable farmers to realise greater value from their crops.

iii) Develop food-testing facilities, processing equipment and improved storage techniques, to enhance quality and safety.

iv) Build efficient and effective agricultural marketing institutions, including small-scale market infrastructure, and distribution networks, and enhance the availability of market information to farmers and their organisations information and communications technologies.

v) Assist developing countries through aid-for-trade initiatives to diversify their agriculture and rural economic base and build competitive export supply capacities.

vi) Improve market access for the agricultural exports of developing countries, including processed agricultural exports.

vii) Promote a multilateral trading system, as well as regional trading arrangements, that are more supportive of agriculture, including through the elimination of trade-distorting subsidies in developed countries.

Source : UNCSD, 2009

8. Entry Points for Environmental Management Capacity Development

There are numerous entry points for environmental management capacity based on related core functions for government, the private sector or civil society at the national, sub-national, landscape and household/farm/community level. Integrating environmental considerations into agriculture can be carried out through direct interventions within the agriculture sector and driven or reinforced through national development plans (both technical dimensions and political dimensions), and through public financial management–the country budget process (OECD, 2010b). It is one thing for plans to be developed, another for them to actually be implemented in an integrated and sustained fashion. To be effective, national plans also need to be fully integrated at the local level, through district plans.

When addressing the capacity needs of different stakeholder groups, it is critical to recognise the diversity within stakeholder groups but also—as or more important—the capacity needs related to improving the working *relationships and transparency* among different stakeholder groups, including dynamics and opinions that are often not expressed out loud and are invisible to outsiders, especially the newly-arrived. This section highlights general key functions and capacity development needs by stakeholder group and among stakeholder groups, as well as country system approaches.

8.1 Stakeholder Groups

While each stakeholder group has specific roles and capacity needs, there is far more overlap in the agricultural sector (e.g. growers can be government, private sector, farmers) than in others; and it is the formalising of multi-stakeholder and holistic approaches that will achieve development goals. (The following is an indicative rather than exhaustive treatment of this topic.) Table 5 provides examples of national level government environmental capacity development according to the three standard dimensions of capacity.

Table 5. Indicative capacity objectives and interventions for enabling environment, organisation, and individual levels

	Enabling Environment	Organisation	Individual
Capacity Objective	Developing legislative, policy and regulatory frameworks for agri-environmental governance	Develop an organisational culture of participatory, cross-sectoral, inter-institutional and multi-stakeholder engagement for agri-environmental leadership leading to sustainable food systems and ecosystem resilience. Increase agri-environmental performance related for planning, management, and evaluation.	Change attitudes and behaviours, enhancing the understanding and importance of environment in agriculture. Develop technical and process skills in agri-environmental approaches. Support long-term motivation (prestige, remuneration, etc.) and commitment to make a difference.
Examples of Specific Interventions	Legislative, policy & regulatory reforms that foster & incentivise agri-environmental approaches to sustainable food systems & ecosystems resilience. Guidelines for cross-sectoral agri-environmental approaches to food systems & value chains. Monitoring & reviews of agri-environmental performance in food systems.	Internal guidelines on developing innovation & learning teams for integrating agriculture & environment. Provide results-based incentives for inter-institutional & inter-disciplinary collaboration & innovation for research, extension & education, and development professionals. Participatory monitoring and evaluative reviews.	Professional development, on-the-job/learn-by-doing training, and core capacities training in ecosystem processes & services, landscape literacy, landscape planning, management & monitoring, sustainable food systems, Holistic Decision Making; and facilitation of multi-stakeholder processes, including negotiation & conflict management skills.

8.1.1 Government

8.1.1.1 National government

As highlighted earlier, the national government actors that play a role in agriculture represent multiple ministries, line agencies, legislative bodies, as well as the Office of the President, inter alia. Core functions related to environmental management of sectoral ministries have been identified by OECD (2009), and include: 1) policy formulation and provision of finance, 2) environmental policy integration, 3) policy (and programme) implementation, 4) compliance assurance, and 5) activity support (or overall management) (see Table 6).

Table 6. Core Environmental Function and Indicative Capacity Needs for Public Authorities

Core Function Category	Core Function	Indicative Capacity Needs for Agri-Environmental Approach
I. Policy & law formulation, and provision of finance	Formulating environmental policies Designing regulatory frameworks Creating the evidence base for decision-making & monitoring implementation Conducting economic analysis Analysing and addressing social effects of environmental policies Applying strategic financial planning Managing public environmental expenditure	Capacity for creation of legislative, policy and regulatory reforms that foster and incentivise agri-environmental approaches (including procurement) to sustainable food systems and ecosystem resilience. Create capacity to address land insecurity issues that lead to unsustainable practices.
II. Environmental policy integration	Promoting sustainable land tenure and rights policies and territorial development approaches Advancing sustainable food system and food chain approaches Integrating environmental and security policies Promoting environmentally sound product policies Ensuring preparedness and response to disasters and accidents Applying strategic environmental assessment – a tool for policy integration	Capacity to create policies & incentives that support participatory landscape scale and territorial development processes, resulting in sustainable agriculture, food systems and natural resource conservation and ecosystems services; and that guide the sustainable management of natural resources and production of agricultural products. Reward women and men farmers, pastoralists and direct agricultural and natural resource managers for ecosystem stewardship and provision of safe and nutritious food to meet local and consumer needs.
III. Policy and programme implementation	Establishing environmental standards Conducting environmental assessments at project level Setting company-specific requirements Correcting market failures via economic instruments Creating markets to achieve environmental goals Promote behavioural change via “information” regulation Facilitating corporate initiatives to improve environmental performance Managing assets and enabling the provision of environmental services	Capacity for programme, research, education and services delivery for agri-environmental approaches. Capacity to capitalise upon appropriate policy instruments for bundling agricultural products with ecosystem services. Capacity to integrate agri-environmental interventions to address desertification, water issues, biodiversity loss, and climate change while enhancing sustainable agriculture production.
IV. Compliance assurance	Conducting identification and profiling of regulated community Facilitating compliance assistance to the regulated community Detecting non-compliance Ensuring non-compliance response	Capacity to facilitate compliance training for limited resource farmers & processors and develop participatory monitoring of agri-environmental performance across the value chain. Create capacity for equitable regulations & compliance.
V. Activity support and overall Management	Defining organisational structures and providing leadership Ensuring intra-agency activity and budget planning Organising effective interaction, internally and externally Managing human resources and performance	Develop organisational culture of cross-sectoral, inter-institutional & multi-stakeholder engagement for agri-environmental leadership, leading to sustainable food systems and ecosystem resilience. Capacity to change attitudes and behaviours enhancing the understanding and importance of environment in agriculture
VI. Cross-cutting interventions	Recognising the full value of and accounting for ecological, economic, and sociological costs and benefits associated with agricultural production and ecosystem services. Appreciation and foundational awareness, understanding and competency in agri-environmental approaches and win-win solutions. Development of platforms for information exchange, debate, policy dialogue, planning and evaluating through cross-sectoral, inter-institutional Innovation Platforms of relevant ministries and key agency personnel, university representation, National Focal Points for local government and municipal authorities, international conventions and committees; environmental, agricultural, and development NGO leaders; farmer and pastoralist leaders; trade unions, consumers, private sector, media. Ensure that professionals (both women and men) have opportunities to become agri-environmental leaders.	

8.1.1.2 Sub-National Government

Sub-national government plays an important role as the interface between direct management of agriculture and natural resources and national-level decision-making. Actors here will play a key role in integrating agriculture and environment in a way that provides for sustainable food systems, environmental services and sustainable livelihoods. Where existing, agencies that provide coaching support and provide technical advice to local governments should be used, or at least considered. Along with relevant functions noted at national levels, capacity development needs are expressed in Table 7.

Table 7. Core Functions and Indicative Capacity Needs of Local Authorities

Sub-National Government Actors	Core Environmental Function	Indicative Capacity Needs
Decentralised line agencies	Deliver technical capacity for agriculture and natural resources management.	Create capacity for facilitating the implementation of sustainable agriculture and landscape scale approaches.
Local Authorities	Manage local food systems (infrastructure, markets, water utilities) and environmental attributes.	Create the capacity to facilitate landscape assessments, build upon synergies and oversee multi-stakeholder innovation platforms for planning, implementation and management of ecosystem services and agricultural production at the foodshed/landscape/watershed or territory level. Create the capacity to better bridge farmers and pastoralists to local urban markets for sustainable foodsheds through sustainable value chains. Facilitate farmers' engagement in policy incentives for maintaining environmental services.
Local planners	Plan for integration among landscape elements in land use and management plans	Create capacity for integrating social, economic, and biophysical data for territory and landscape planning. Create capacity to work within multi-stakeholder and innovation learning teams to work with shared values in resource use planning.

8.1.2 The private sector

The private sector community ranges from small- and medium-sized entrepreneurs to international agribusiness. The role of the private sector is associated with key components of the food chain, and thus they are host to opportunities for building core environmental functions (see Table 8). The private sector, particularly actors at national and international levels, provide powerful influence in agricultural production, which means that positive change from here that integrates environmental management can ripple throughout the sector. The World Business Council for Sustainable Development recognises key success factors that can guide capacity development priorities, including: innovation, eco-efficiency, stakeholder partnerships for progress, providing and informing consumer choice, improved market framework conditions, establishing the worth of the Earth, and a concerted effort to make markets work for everyone (Holliday and Paper, n.d.)

Table 8. Private Sector Core Environmental Functions and Capacity Needs

Private Sector Actors	Core Environmental Function	Indicative Capacity Needs
Input Suppliers and Processors and local markets	Promote the sustainable use of external inputs, transport, processing & marketing	Create the capacity to: - Work with public and civil society partners to assess environmental footprint of value chain and make changes. - Participate in transparent and accountable decision-making processes across food chains. - Source locally & raise awareness of sustainable production among consumers. Create capacity in triple bottom line approaches. Create opportunities to reduce risks for farmers trying agri-environmental practices (e.g., Campbell Soup ensuring crop sales for farmers using IPM).
International markets	Setting guidelines for products to be produced & processed sustainably.	Assist in building capacity for farmers and pastoralists and small and medium enterprises to meet requirements.

8.1.3 Civil society

The civil society stakeholder group is by far the most numerous and diverse in its actors and roles. These provide a critical function in advancing agri-environmental approaches. Their capacities exist at all points of the spectrum, from those with minimal access to capacity to those providing the highest calibre technical training; from those who are marginalised to those providing guidance to government on decision-making. While it would be difficult to fully cover the many roles and capacity needs in this paper, Table 9 provides indicative opportunities for capacity development.

Table 9. Core Functions and Indicative Capacity Needs of Civil Society

Civil Society Actors	Core Environmental Function	Indicative Capacity Needs
Farmers, Fishers, Pastoralists, Indigenous Groups, Labourers	Sustainably manage the land, water and biodiversity in pursuit of sustainable agricultural production and livelihoods.	Create capacity for women, men and youth in sustainable agriculture approaches.
Farmers organisations, co-operatives, community-based groups and social movements	Organise farmers, fishers, pastoralists, and labourers. Provide technical Information & inputs based on experience and good science Advocate for sustainable agriculture and natural resource management. Advocate for the role of farmers, fishers, pastoralists, indigenous populations, women and others in local and national decision-making. Serve as watchdog on private sector & GO.	Create capacity to facilitate farmer-to-farmer experience sharing. Create awareness and capacity to manage ecosystem processes and ecosystem services, landscape literacy, and sustainable value chains that promote ecosystem health and agricultural production at foodshed / landscape / watershed / territory level. Create the capacity to better bridge farmers and pastoralists to local urban markets for sustainable food sheds through sustainable value chains. Develop capacity for jointly identifying key research questions with national and international scientists
International and national NGOs	Provide technical and information inputs drawing upon relevant research results Link local, national and international processes for sustainable agriculture and natural resources management	Create capacity to build farmer capacity to practice work within multi-stakeholder and innovation learning teams.
Consumers (individuals and institutional)	Purchase of food	Create awareness of sustainable food systems and ecosystem services in purchase choices. Raise awareness related to the Voluntary Guidelines to Adequate Food Create opportunities for farmer-consumer relationships. Create capacity to source locally for sustainable agricultural products.

8.1.4 Cross-cutting – government, civil society and the private sector

Transitioning to a fully integrated agri-environmental approach requires capacity development from the household to the national and international levels, and places responsibility on government, civil society and the private sector to work together in partnership. At the heart of integrating environmental management and agriculture is a full appreciation for the ecosystem processes that ensure healthy land, clean water in adequate supply, and biodiversity. These underpin sustainable agriculture and environmental functioning. A capacity development strategy must address the current lack of integration among sectors and institutions while also overcoming on-the-ground obstacles to achieving sustainable, functional food-producing landscapes. Key obstacles include those related to lack of knowledge and technology exchange along with those born of political, institutional, and governance barriers.

While what the different stakeholders accomplish separately through capacity development varies, the key is what they can accomplish together. Governments increasingly work from multi-stakeholder approaches but these differ in the amount of input from these actors into decision-making. To take up the challenge of integrating agriculture and environmental management, it is necessary to build multi-stakeholder, inter-institutional, and inter-disciplinary innovation/learning platforms focused on constellations around landscapes and territories, food systems and value chains.

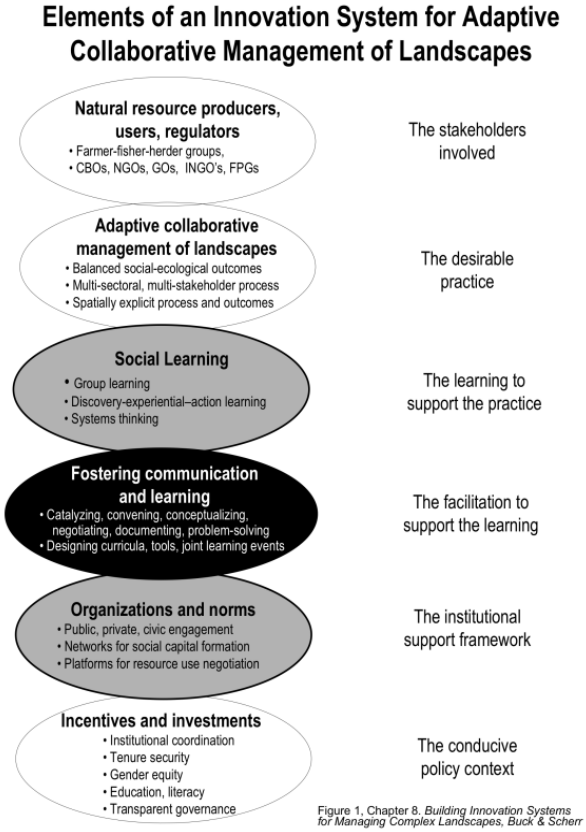
Capacity is needed to:

- Ensure appreciation and foundational awareness in the relationship between agriculture and environment and understanding and competency in agri-environmental approaches and win-win solutions. Key competencies include environmental leadership, landscape literacy, ecosystem processes and services, holistic decision-making and food systems.

- Build leadership for facilitation and meaningful participation in platforms for information exchange, debate, policy dialogue, planning, and evaluating agri-environmental approaches. The innovation platforms should include actors from relevant ministries and key agency personnel, university representation, National Focal Points for local government and municipal authorities, international conventions and committees; environmental, agricultural, and development NGO leaders; farmer and pastoralist leaders; trade unions, consumers, private sector, and media. Skills building in facilitation, conflict management and negotiation skills are critical.

- Towards this end, Buck and Scherr (2009) provide an informative framework for innovation systems to address the collaborative management of landscapes, characterising key elements including stakeholders, practice, learning support, facilitation, institutional support and policy context (see exhibit 17). This framework ensures that the necessary learning support and institutional support are included at various landscape level changes. An example of where this is being put into practice, with multi-stakeholder capacity development at the centre, is the territorial development effort in Costa Rica (exhibit 18).

Figure 2. Elements of an Innovative System for Adaptive Collaborative Management of Landscapes



Source: Buck and Scherr, 2009

Box 8. Inclusive Territorial Development in Central America

The ECADERT Project (Estrategia CentroAmericana de Desarrollo Rural Territorial) is a response to a need by Central Americans to establish national sustainable development through rural territories. The strategy is focused on building creative capacity and innovation among rural populations, public institutions and civil society. Agreed among seven Central American governments, the strategy has a timeline of 20 years. The project will build upon the participation of more than 900 representatives of different organisations and entities, many of which represent traditional indigenous organisations. It also includes the private sector, research institutions and NGOs, alongside government agency representatives at the national and local level. In Costa Rica, the programme is mandated by the President and, with resources provided by European donors, the Inter American Institute for Cooperation on Agriculture will implement a 10 module training effort over 18 months for territorial participants from all stakeholder groups. This capacity development is intended to capitalise on the multiple intelligences that influence the territory and enhance individual and organisational capacity and the enabling environment to achieve social change and operationalise the sustainable livelihoods approaches. Modules focus on process level skills designed to build trust, enhance negotiation capacities, and implement collaborative management for livelihoods and ecosystems management of the rural territory (Robin Marsh, personal communication, April 28 2010).

Source : www.territorioscentroamericanos.org/instituciones/escadert

8.2 Countrywide Programming

A key entry point is through strengthening countries' capacities to implement policies and manage financial resources within the core country system approach.

8.2.1 Strategic planning

There are numerous entry points for integrating environmental capacity for agriculture into various national strategies that address the sectoral dimensions, governance and economy dimensions, and issues-related dimensions. A significant challenge however is the alignment of these dimensions, since environmental management is usually viewed through its own sectoral approach and not recognised as integral to other sectors; as such, disparate planning exercises exist. For environment to be successfully integrated there has to be a comprehensive understanding of its relationship to all aspects of the agricultural production and market chains. A particular emphasis should be placed on procurement policies. Sector wide planning has proven an important exercise yet there are many lessons learned for these to be further enhanced, particularly in support of building environmental performance into assessing agricultural performance (ODI, 2010). An important and ready entry point is also related to national action plans associated with various environmental conventions, which are relevant to both agriculture and environment and are in essence fully interconnected.

Governments can join planning strategies to meet the needs of the UNFCCC, UNCCD, UNCBD, Global Water Partnerships and various Commissions. Because of the strong relationship in terms of ecosystem function, the detailed plans that are currently being developed for climate change adaptation and mitigation should also reflect practices that simultaneously address land and water degradation and loss of biodiversity. Since agriculture is a heavy contributor of GHGs and can play a role in the mitigation and adaptation of climate change, these plans should be integrated with other national action and sector plans.

Joint planning and harmonised approaches among strategic plans will favour effective environmental management practices, policies and programmes within the multiple dimensions of agriculture. The development of national and sub-national strategies can provide important entry points to enhance both organisational and enabling environment dimensions, if they can be viewed in a coherent fashion as well as directly related to public financial management. And as countries develop countrywide capacity development plans, these too should consistently support integration efforts.

8.2.2 Financial resource management

Capacity development for environmental management can benefit from approaches to setting national and sub-national budgets that are aligned to coherent and integrative strategies. As the greening of economies and payment for environmental services come of age, well-integrated plans among agriculture, environment, finance, trade, and poverty reduction will become of critical importance; this underscores the role of donors' harmonisation for environmental management resources to be allocated through national budgets.

9 Tools, Practices, and Approaches

There are many successful practices, tools, processes and approaches already in place and available as a basis for capacity development, and to support the enabling environment, organisational and individual dimensions required. This section provides a few examples of tools, processes and approaches that can be drawn upon, and then highlights these in greater detail according to specific capacity development objectives.

9.1 Examples of Approaches

Solutions are available but need to be scaled up alongside more profound shifts in paradigm within institutions and policy dimensions. Among others, there are a number of readily accessible 'low hanging fruit' that can be incorporated. Several key approaches have been discussed in earlier sections including Sustainable Agricultural Intensification (addressing individual and organisational capacity needs), Innovation Platforms (enabling environment and organisational), Landscape Approaches (individual and organisational), and Geospatial Relational Data (Organisational). Several additional examples of other approaches are also very worthy of consideration.

9.1.1 Social, environmental and economic decision-making

Holistic Management Decision Making Framework (individual, organisational and enabling environment): Holistic Management (HM) is a framework for decision-making used in the development and implementation of land management plans, policies or organisational management. HM provides a ready means to recognise ecosystem inter-relatedness, allows practitioners to manage towards desired outcomes, and simultaneously to integrate social, financial and ecological benefits. How decisions are taken is often more important than the specific choices made.

Holistic Management builds upon i) a holistic goal that integrates deeply held values, ii) what must be created to realise those values, and iii) what the resource base must be to ensure these factors into the future. Decisions are tested against the fundamental or holistic goal, to ensure that decisions are sound from a social, ecological and economic standpoint; and to assist in meeting both long- and short-term objectives. Critical to holistic decision-making is the capacity to identify the causal motivational factors determining success or failure. Decisions taken are subsequently monitored to ensure progress as well as recognition of unintended consequences. The HM framework can be applied at all levels of the decision making process, from household to landscape, to national policy. By helping participants find differences and commonalities at a core level, HM offers root cause analysis that is often invaluable in overcoming institutional barriers and recurring limitations (www.holisticmanagement.org;www.savoryinstitute.com; www.managingwholes.com).

Capacity Development that is also targeted at women professionals in agriculture can build leadership skills and ensure the provision of different insights and perspectives for addressing challenges of both female and male farmers in the region. For example, the Africa Women in Agricultural Research and

Development (AWARD) project associated with the Gender and Development programme within the Consultative Group on International Agricultural Research (CGIAR)—piloted through resources from the Rockefeller Foundation and expanded with Gates Foundation funding—provides research and leadership skills to women scientists working closely with the rural poor on tackling poverty and hunger. The programme focuses on career development, adds value to academic programmes and nourishes talent for agricultural R&D through tailored fellowship packages for women at different degree levels. The programme further engages with African leaders of agricultural R&D, both men and women, to raise awareness and build networks (awardfellowships.org). Women Organizing for Change in Agriculture and Natural Resources (WOCAN) offers opportunities for women ministers to mentor women farmers (www.wocan.org). These models allow for traditional barriers to be permeated, benefiting the individuals as well as relevant organisations and agencies.

9.1.2 Sustainable resource management

Upstream-downstream relationships can be capitalised on in an intentional way, using water as an integrator (and indicator), and applying sustainable land management approaches, such as that within the *TerrAfrica* (2010) programme. These can bring about win-win solutions in terms of ecosystem health and agricultural productivity while advancing cross-sectoral collaboration. Such approaches are 'landscape ready' and should also translate into healthier communities, while providing practices that provide climate change mitigation and adaptation.

TerrAfrica (individual, organisational and enabling environment) is a partnership initiative formed to combat desertification and land degradation in Sub-Saharan Africa by promoting sustainable land management (SLM) techniques. TerrAfrica works to unblock critical bottlenecks in order to achieve significant upscaling of the financing and mainstreaming of effective and efficient country-driven SLM practices, by enabling the region's governments, the development community, and other stakeholders to work together more effectively. Goals and areas of focus for the partnership include building African-owned coalitions and strategic partnerships for SLM at regional and global levels, developing inclusive regional dialogue and advocacy on strategic priorities, supporting high quality regional knowledge based mechanisms, identifying and generating stronger analytical underpinnings, and harmonising monitoring and evaluation systems (D. Lantieri, personal communication, 5 April 2010).

9.1.3 Community action and farmer training

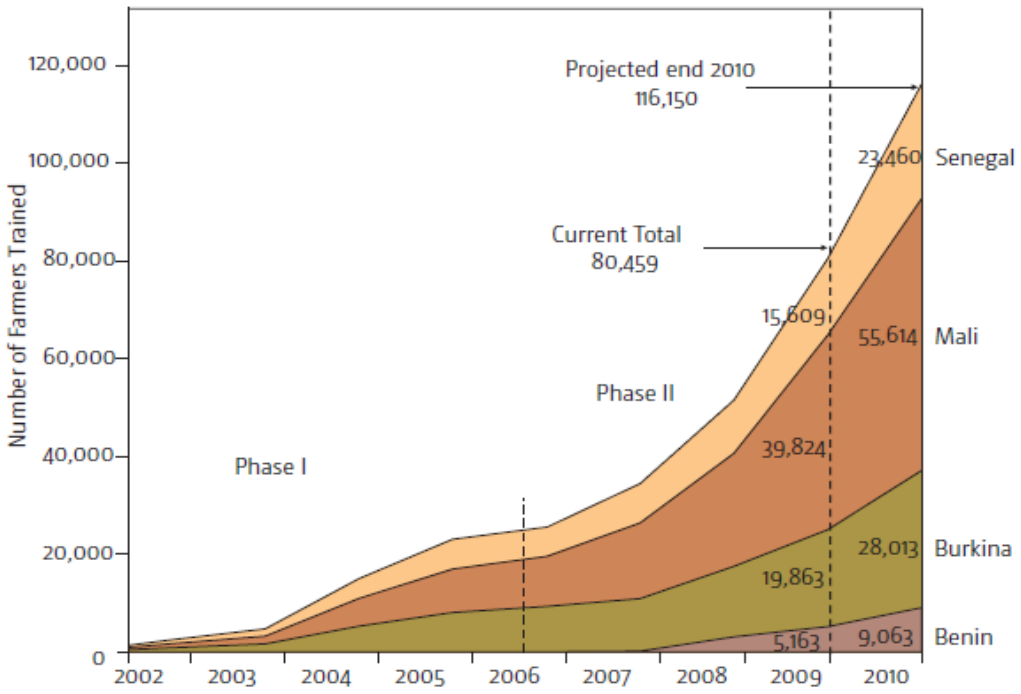
Landcare addresses the triple bottom line of economic, environmental, and community benefits. It is a community-wide approach to natural resource management that brings citizens, landowners, land managers and conservation biologists together to develop integrated local networks and systems that link economic, social and conservation actions across entire landscapes. Landcare initiatives vary according to local habitats and agricultural traditions but reflect common themes of self-help and sustainability. Landcare has three cornerstones: appropriate technology, institutional strengthening or organisational development, and partnership building (Stevens and Jefferson, 2008; Lowe et al., 2008; Haas, 2008; Robertson, 2008; Dano et al., 2009.) Even in the face of extreme isolation and difficult working conditions, an evaluation of Landcare in the Southern Philippines found that farmers rapidly formed Landcare groups and associations; those who had undergone the farmer-based training provided adopted conservation measures at higher rates (Cramb, 2004).

Farmer Field Schools (Box 9) are facilitated workshops whereby farmers meet regularly to teach each other and solve problems on a collaborative basis. Farmers meet in groups of 25 throughout the growing season. Small groups monitor observation plots in the farmers' own fields and report their findings to the broader group. Farmer Field Schools (FFS) began in Indonesia in 1989 as an FAO project in order to develop Integrated Pest Management (IPM) field training methods, before spreading rapidly through Asia,

Africa and Latin America. A global survey estimated that 10-20 million farmers have graduated from Farmer Field Schools by (Braun and Duveskog, 2008). FFS can be organised around many different crops and diseases, yet remain most popular around IPM because of the extent to which farmer knowledge informs the discipline. Farmer Life Schools and Pastoral Field Schools are two spin-off programmes that have resulted as a response to community demand.

Box 9. West Africa Regional Integrated Production and Pest Management (IPPM) Programme

The West Africa Regional Integrated Production and Pest Management Programme is a capacity development effort that was established to reduce use of pesticides in vegetable, staple and commodity crops in 2001. By the end of 2010, it is estimated that some 2000 Farmer Field Schools facilitators and over 116,000 farmers will have been trained. The programme builds upon over 20 years experience in the Philippines, now spread to some 90 countries, and takes a community-based approach to capacity development, including: building farmer skills in agricultural management through non-formal and discovery-based learning; the involvement of all relevant actors at multiple levels (community, district, national, regional); emphasises adaptive management approach to agricultural research extension systems; and helps farmers understand the mechanisms of ecological processes leading to higher resilience in terms of productivity and profit. The programme has lead to dramatic reductions in pesticide use (as high as 94 percent) and fertiliser (over 60 per cent), while promoting literacy, community health, and gender equity. The programme has built-in mechanisms for ensuring FFS networks are sustainable in the long term.



Source : FAO, 2010d

As discussed earlier, one constraint to capacity development comes from the fact that human nature is difficult to overcome. More often than not it requires a system crash (environment, market, poor policy, etc.) to motivate change. One example of this is the case of the Shinyanga region of Tanzania where, because of poor policies that did not address root causes, the natural resource base and the social institutions became degraded beyond the capacity to function; at that point the government, civil society and farmers—along with international institutions—fully reversed the system (Box 10).

Box 10. Regenerating social, ecological and economic systems in Shinyanga, Tanzania

A century ago in Tanzania, the Shinyanga region was covered with woodlands that the Sukuma agro-pastoralists made good use of as a source of livestock fodder, and for food and fuel. The woodlands also harboured tsetse fly, the vector for the parasitic disease, trypanosomiasis. In the 1920s, the colonial authorities embarked on a programme to eradicate the pest and paid local people to cut down large areas of woodland. The programme resulted in an environmental catastrophe over time, as population and demand expanded and large areas of land went under cash crops. Traditional soil conservation practices were abandoned and both institutional and environmental capital were destroyed. In 1984, then President Nyerere gave instructions for a land rehabilitation programme. The Hifadhi Ardhi Shinyanga (HASHI) project launched in 1986 has seen the transformation of this "Tanzanian Desert" into the restoration of the Ngitili traditional conservation systems, and the rehabilitation of some 500,000 hectares. This has largely come about through devolved decision-making and multi-stakeholder capacity development. The programme has also contributed to the economic well-being of community stakeholders, and research has shown that the average annual value of 16 major products harvested was some 89.6 million USD for the district. While the programme ended in 2004, local government staff continues to promote agroforestry and sustainable land management, and capacity continues through champion farmers and the training of teachers. This landmark success, made possible by local, district and national actors and in collaboration with international centres, took advantage of a "system crash" to build back environmentally sustainable agriculture

Source : Pye-Smith, 2010

Good Practices (individual, organisational): a valuable aspect of addressing ecosystem processes is found in the co-benefits of increased soil organic matter, clean and plentiful water, and diversity of the flora and fauna that enhance ecosystem, and ultimately societal, resilience. The IAASTD (2008) identifies many options including improving nutrient, energy, water and land use efficiency; improving the understanding of soil-plant-water dynamics; increasing farm diversification; supporting agroecological systems; enhancing biodiversity conservation and its use at both field and landscape scales; promoting the sustainable management of livestock, forest and fisheries; improving understanding of the agroecological functioning of mosaics of crop production areas and natural habitats; countering the effects of agriculture on climate change and mitigating the negative impacts of climate change on agriculture.

The World Agroforestry Centre (ICRAF) is leading an alliance of government, donors, research and development partners in promoting Evergreen Agriculture in Africa. Evergreen Agriculture capitalises on the above practices by integrating tree species into food systems (crop and livestock) systems, resulting in a sustained green cover on the land, higher biomass production and enhanced soil fertility. This enables farmers by providing them with practical ways of reducing soil tillage, improving rainwater-use efficiency, increasing soil carbon accumulation and improving soil health. Evergreen Agriculture is practiced in a number of countries in Eastern, Southern and West Africa; in Malawi alone some 500,000 farmers have integrated fertiliser trees into their production systems. Currently the Ministers of Agriculture and Environment across Africa have endorsed a recommendation to scale these practices up; COMESA will be investing 50 million USD in these systems over the next 5 years (Garrity et al., 2010 in press).

9.2 Tools, Processes and Approaches to meet Environmental Capacity Development Objectives

Capacity development for environmental management of the agricultural sector is dependent on understanding and working with the interface between agriculture and the environment. There exists an abundance of knowledge, know-how, tools and processes in existence for achieving the desired results. These can readily be brought together to build cohesive efforts that can be planned for, managed, and monitored collaboratively from the local to global level. Tables 10-12 provide more detail on those actors involved in capacity development along with key tools, approaches, and practices that outline the suggested key objectives, desired learning outcomes, possible learning teams and agents of change; and the

tools, processes, and approaches that are in place or which can be established to meet learning outcomes at the national, landscape and farm/household level. Within and across levels, formal education from primary to specialized university courses must build upon a sustainability framework that advances capacity for addressing agri-environmental issues.

9.2.1 Agri-environmental capacity development needs at the national level

Table 10. Agri-Environmental Capacity Development Needs at the National Level

Desired Learning Outcome	Learning Teams / Agents of Change	Tools, Processes, Approaches	Potential Donor Role
Appreciation of cross-sectoral, cross-disciplinary and participatory approaches to addressing Millennium Development Goals Transparency in decision making	Head of State/Cabinet level mandate Neutral Sustainable Development Facilitation Formation of national cross-sectoral and inter-institutional agri-environmental Task Force/Innovation Team. Cross-sectoral, inter-institutional Innovation Team: relevant ministries and key agency personnel, university representation, National Focal Points for local government and municipal authorities, international conventions and committees; environmental, agricultural, and development NGO leaders; farmer and pastoralist leaders; trade unions, consumers, private sector, media.	Innovation Platform Development (Buck and Scherr, 2008) Sustainable Development Councils	Multi-donor alignment to reduce fragmentation of environment among sectors. Support the development of Task Force formation and leadership capacity development. Support capacity development aimed at women professionals.
Building appreciation and foundational awareness, understanding and competency in agri-environmental approaches and win-win opportunities Needed awareness includes: Participatory approaches, Landscape Literacy, Landscape Approaches, food systems, Holistic Management, ecosystem valuation	Cross-sectoral, inter-institutional Innovation Team; Additional resource persons as needed from: NARS, CGIAR, IGOs, NGOs, ICLEI (2009), national and regional farmers programmes, others	Core curriculum on (e.g. participatory approaches (IIED, 2010; Gonsalves, 2005), ecosystem processes, ecosystem services, landscape literacy, Landscape planning, management, monitoring, Holistic Decision Making, EcoAgriculture leadership programme, gender and development, the AWARD programme, environmental leadership, negotiation, conflict management, facilitation, collaboration, collaborative adaptive management skills, root cause problem-solving and policy analysis TerrAfrica framework Sustainable food systems (food system councils) Value, Footprint, and incentives: Lifecycle Analysis, full cost accounting; state of policy instruments. Regulations and incentives Monitoring: review of agri-environmental indicators Incentives for integration learning and outcomes, time allocated and on-the-job training, use of dialogue and exposure tours.	Facilitating creation of demand for green outcomes, gender mainstreaming and stakeholder engagement and the role of ecosystem services. Support countrywide long-term pilot efforts for integrated curriculum development and capacity development.

Desired Learning Outcome	Learning Teams / Agents of Change	Tools, Processes, Approaches	Potential Donor Role
Characterisation of inter-relationships between environment, agriculture, health, poverty and food security data including gender disaggregated data. Understanding of spatial relationships (biophysical, socio-economic) across sectors to identify geographic high-risk areas for priority work and data needs.	Cross-sectoral, inter-institutional Innovation Team Additional resource persons as needed from NARS, universities, CGIAR, IGOs, NGOs, others	Existing data sets, Geographic Information Systems, visual scenario techniques (see exhibit 8: WRI-Kenya; Evans et al., 2006; and Rhoades, 2002).	Support to environmental information systems across sectors to support planning and budgeting processes.
Integration across International Conventions and Commissions (CBD, CSD, CCD, UNFCCC, World Water Partnership, etc.) and Global Technical Committees (CoAG, CoFI, CoFo, CFS), associated National Action Plans, National Development Plan and associated action plans. Understanding diverse planning frameworks. Understanding and mapping the inter-relationships of intergovernmental processes and mapping of cross-sectoral responses including action plans (e.g. Sustainable Land Management, biodiversity, food security). Clarity of commitments and focus.	Cross-sectoral, inter-institutional Innovation Team, Focal Points, CSO/NGO Focal Points including private sector *Additional Resource Persons* as needed from NARS, Universities, CGIAR, IGOs, NGOs, others	Agro-ecosystem Analysis Root Cause Policy Analysis	Support to joint Agriculture and environment national plans for achieving outcomes of various conventions and commissions.
Inter-disciplinary and Participatory Research to address agri-environmental gaps Cross-disciplinary and cross-sectoral understanding of agri-environmental approaches and food systems, and articulating priority participatory research areas.	NARS and University Personnel and Local Resource Persons *Additional Resource Persons* as needed from Innovation Task Force, Farmers Organisations, NARS, Universities, CGIAR, IGOs, NGOs, ecological and natural resource economists, and others.	Core capacities (as above) Drawing on IAASTD recommendations Existing data sets Analyses using: Diagnosis and Design; Value Chain Assessments; Lifecycle Analysis	Support to integrate CGIAR and NARS approaches including the use of CGIAR MegaProgrammes as an entry point.
Required Core Programme agro-environmental education for primary, secondary, and university level students to enhance understanding of ecosystems and food systems	NARS and university personnel, Department of Education; regional and local education actors	Core capacities (as above) AgBridge Core curricula developed for primary, secondary schools, and universities.	Support to capacity development of in-country educators for integrated agri-environmental approaches.

9.2.2 Agri-environmental capacity development needs at the landscape, watershed and foodshed level

Table 11. Agri-Environmental Capacity Development Needs at the Landscape, Watershed and Foodshed Level

Desired Learning Outcome	Learning Teams / Agents of Change	Tools, Processes, Approaches	Potential Donor Role
Accelerate the transition to sustainable communities in multi-functional landscapes and enhanced urban-rural linkages. Innovative participatory platforms planning, managing and monitoring functional food producing landscapes. Understanding of ecosystem processes as the base for agriculture and natural resource management and appreciation of the role of agricultural lands in providing ecosystem services (water, biodiversity, etc.) Understanding the nature of complexity Participatory planning, management and monitoring of landscapes and local food systems Knowledge-sharing opportunities	Platform including district, local government, community leaders, agricultural, environmental and development-community based organisations, networks of farmers, fishers, pastoralists, agricultural farm workers, value chain actors, district agency personnel, extension, youth, women, business and industry, regional and local education institutions, and others. *Resource persons* as needed from National Innovation Team and others including a neutral Sustainable Development Facilitator	Core curriculum on ecosystem processes, ecosystem services, landscape literacy, landscape planning and regulatory development, management, monitoring, sustainable food systems, Holistic Decision Making Participatory Learning and Action (IIED, 2010); Participatory Research and Development Source Book (Gonsalves et al. 2005) Building learning alliances and participatory decision making processes Eco-Agriculture landscape leadership Participatory Assessment and Planning; GIS and alternative future visioning tools, maps, spatial approaches Inquiry based learning, diagnosis and design ecological accounting, footprint; Landscape Measures Learning/implementing groups (see exhibit 4): Landcare groups; Waterwatch; Farmer Field Schools for Ecological/Sustainable Intensification; Linked Local Learning (First Mile) Application of place-based eco-labeling and PES instruments; bundled PES with Agricultural Products.	Support for establishing a joint inter-agency local co-ordination group for Landscape planning. Support to advocacy efforts and advocacy training that ensure marginalised voices in local, national and international fora.
Promoting sustainable input and output supply chains Design of sustainable value chains that ensure effective and sustainable ecosystem processes; with social and economic dimensions including transparency in decision making. Ecological, social and economic accounting of value chain (Lifecycle analysis) linked with overall farming systems assessments Technical expertise and knowledge sharing	Development of value chain platforms across value chains of specific commodities including meat, grains, forest products; actor categories include natural resource managers-growers-pastoralists, agricultural labourers, input suppliers, transporters, processors, buyers, markets, and consumers. Sustainable Development Facilitator	Innovation Platforms (Buck and Scherr, 2008; DFID, 2009) Good Agriculture Practice; Fair Trade, Corporate Social Responsibility Peer-to-peer learning exchanges, study tours (e.g., Kenya Livestock Working Group) Marketing (First Mile) Triple-bottom line; holistic decision making	Support to public-private-partnerships for the application of place-based eco-labelling, certification and PES instruments; bundled PES with Agricultural Products. Support to value chain initiatives that address lifecycle efficiencies and equitable distribution of benefits.

9.2.3 Agri-environmental capacity development needs at the farm-household level

Table 12. Agri-Environmental Capacity Development Needs at the Farm-Household Level

Desired Learning Outcome	Learning Teams / Agents of Change	Tools, Processes, Approaches	Potential Donor Role
Accelerate sustainable livelihoods based on effective ecosystem processes Household and farming system sustainability Ecosystem processes, whole farm approaches, farming systems assessment and incentives, Sustainable Agriculture Practices	Women and men farmers, pastoralists, extensionists, agricultural labourers, agricultural and environmental community-based organisations, locally based facilitators.	Whole-farm design and planning (triple bottom line) and integration within farm and across landscapes. Various marketing and incentive opportunities and regulation development (eco-certification, etc.) Agro-ecological and sustainable Integrated farming systems technologies for soil, water and biodiversity management, food production and sustainable livelihoods; SLM and sustainable intensification practices including Evergreen Agriculture (Africa), conservation agriculture, organic agriculture, integrated crop-livestock-tree systems, pasture and rangeland improvement, sustainable forest management, agroforestry, ground cover, manure and residue management. Involvement in Farmer Field Schools, Landcare groups, Communities of Practice, Waterwatch Groups, exchange tours and peer-to-peer learning; Literacy Bridge.	Support to in-country, south-south and regional knowledge exchange and capacity development processes. Support to local authorities to incorporate agroecological farmers into food-shed and urban and peri-urban markets. Support for local rights through local institutions.

PART V. THE ROLE OF DONORS IN SUPPORTING ENVIRONMENTAL CAPACITY DEVELOPMENT IN THE AGRICULTURAL SECTOR

10 The Role of Donors: Conclusions and Recommendations

Most economic and environment ministries are still at an early stage of learning to speak each other's languages. The World Bank could play a crucial role in bridging this divide.

– Robert Zoellick (WRI, 2010b)

10.1 Effective Agricultural Development

10.1.1 Donor principles

The donor landscape has been reshaped over recent years to take advantage of lessons learned and to realise greater outcome per development dollar; most recently financial and economic crises have reduced the flow of donor dollars, at least from traditional channels. Philanthropic donors have become more prevalent and influential with ample resources at their disposal, and, at least until recently, have been able to leverage these to dramatically direct or re-direct programmes and project development. Non-OECD donor government partners also come to the table from the Middle East and Asia with various and sometimes conflicting agricultural development aims. For example, China has invested in land, water and input technologies, agri-processing and infrastructure but also in their own access to the natural resources in a number of countries in Africa. Often, these non-traditional country donors focus on trade related aid and market access and in some cases do not make use of economic or political conditionalities (Krageland, 2010).

Agreed upon principles that ensure a greater degree of harmonisation, synergy, partner country ownership, and accountability, may have great merit when applied to common objectives in this newly configured landscape. However, they been questioned as taking too much time and resources – scattering national efforts – and are considered overly donor-driven. The potential exists for principled and co-ordinated action to be parlayed into the transformation and capacity development necessary for better integration of agricultural and environmental challenges and in order to ensure long-term solutions.

Across its development efforts OECD (1996) stresses the importance of support for locally-owned strategies, adequate resources, enhanced co-ordination in international fora, and on-the-ground monitoring and evaluation of capacity and impact. A key objective is to create incentives for effective in-country co-ordination by strengthening local capacity to lead co-ordination processes.

The Donor Platform for Agriculture and Rural Development (GDPRD, 2009) recognises the wide range of stakeholders in the agricultural sector and the need for their participation in designing and implementing tailored agricultural policies and programmes at local to national levels. The Donor Platform emphasises the need "to focus on capacity development among stakeholders, including their institutions, in order to foster the inclusion of the private sector and civil society in the planning, financing and execution of co-ordinated programmes [because] they are the drivers of economic growth." When proof of concept projects meet the necessary criteria, it is important they receive donor support.

The Agriculture and Rural Development (ARD) donor principles related to ownership entail: a) supporting government leadership and ownership in ARD that is based on inclusive processes, promoting effective participation of key agricultural stakeholders (including remote farming communities and women farmers), and b) supporting capacity development of key stakeholders and their institutions to participate more effectively in the design, delivery and monitoring of ARD-specific country strategies. The platform members have agreed upon the drivers of rural development, which include people-centred development, local governance, economic drivers, natural resources, rural infrastructure, rural service systems, and economic governance at all levels. They also specify that approaches to rural development assistance delivery must be practical, multi-sectoral, participatory, committed to the long term, and results-oriented. These tenets are precisely those that will guide the development of a coherent approach to sustainable agri-environmental outcomes.

10.1.2 Capacity development for economic development

An International Food Policy Research Institute review (IFPRI, 2008) suggests that capacity development in developing countries can improve economy-wide learning outcomes and influence innovation performance. The report emphasises that for recipient country capacity to be maintained in the long term, there is a critical percentage of donor resources that needs to be devoted to strengthening capacity. A key message is that "increasing learning capabilities in an economy raises the human capital stock and unambiguously increases the rates of growth of output, technology, capital and capacity." (IFPRI, 2008)

10.1.3 Capitalising on inter-sectoral and inter-institutional approaches in knowledge, science, and technology for agriculture and environment

The International Assessment of Agriculture Science and Technology Development (IAASTD, 2008) highlighted the importance of increasing and strengthening agricultural knowledge, science and technology within agroecological sciences in an effort to help address environmental issues, while maintaining and increasing productivity. The recognition of the multiple contributions of agriculture led to a strategy for integrated planning and programming among multiple ministries (e.g., health, agriculture, livestock and fisheries) that "would provide opportunities for joint funding of, and better synergies among, programmes." Starting points for integration around the agricultural sciences are not straightforward and certainly more complex than traditional commodity-based approaches. For example, the Consultative Group on International Agricultural Research (CGIAR) spawned debate recently at the Global Conference for Agricultural Research Development (GCARD) regarding the design of its "mega-programmes" (Science and Development Network, 2010). The mega-programmes have been designed to focus major research efforts across the CGIAR to make a major difference in global development goals (e.g., food security and environment). The strategic 'how to' of these 'partnership rich' research programmes will be their test, but they can be viewed as a leap forward in approach, with a great opportunity to increase innovations and effectiveness (CGIAR, 2009). Again, the IAASTD (2008) stresses that a shift toward more multifunctional and localised approaches requires political will among policy makers, agribusiness and donors, in order to advance community-centred decision-making around the investment of limited resources.

10.1.4 Banking on the environment

Recent meetings held in Malawi on aid effectiveness with regard to environment and poverty demonstrated important elements for supporting environment capacity development such as greening the national development plan and pro-poor incentives for ecosystem stewardship that are well related to agriculture. Recognising that ecosystem degradation jeopardises development goals, ecosystem services

are coming clearly into site for donors, specifically the development banks, in terms of using ecosystem services to strengthen development (WRI, 2010a).

10.2 What can donors do to catalyse the integration of agriculture and environment?

Donors have made a commitment to ensuring the linkages between environment and poverty. These same linkages are associated with the sustainable development of the agricultural sector. Throughout this chapter and with a specific contributions in Part IV, a number of areas have been identified in which donor support could catalyse the integration of agriculture and environment, while embarking on more effective implementation of multi-objective development strategies.

10.2.1 Enhancing the enabling environment

Support process towards outcomes. While less tangible, long term social change and local ownership cannot take place without the participatory multi-stakeholder processes that advance progressive discovery of mutual benefit, areas of commitment and sacrifice for deferred reward, and strategies to amortise costs and spread benefits. Equitable partnerships among government, civil society, and the private sector require facilitation and enlightened self-interest. Donors are also recognising the importance of funding advocacy to support social change and 'give voice' to evidence-based arguments and policy positions—particularly those of more marginalised communities (NCRP, 2008).

Support the integration of agri-environmental aspects into national planning and national capacity development approaches. Intentional coordination, and as importantly awareness-raising and capacity development related to the interface of agriculture and environment and the role of environmental services is needed for integrating environment within the agricultural sector as well as other sectors that are relevant to both.

Support transparent decision-making around the nexus of food systems and the environment. Ensuring social and environmental responsibility among civil society, private sector, and government within and across the elements in the value chains will necessarily address inequities and waste and ensure that those managing the resource base are recognised and remunerated for their role in stewarding the environmental processes that support the food system.

Build out effective investment strategies based on long-term horizons. Funding for five-year increments is essential and should be housed within 20-year finance horizons; with clear targets around social, economic, and environmental resilience.

10.2.2 Organisational capacity

Support to cross-sectoral collaboration. Cross-sectoral collaboration requires incentives to move beyond current sectoral perspectives and structures at the ministry level within countries, as well as within the intergovernmental organisations and other agencies that provide technical support. While history indicates that sectoral specialisation is easier to manage, it will take cross-sectoral and inter-institutional collaborations to advance towards the multiple objectives (MDGs) that must be realised with limited resources. Climate change resources can be channelled in such a way as to catalyse these processes while building sustainable food-producing landscapes.

Advance ownership and sustainability through strengthening local institutional capacity. Funds should be targeted to local government units and urban authorities and joint local co-ordination groups that serve to strengthen and elaborate urban-rural linkages and promote more collaborative relationships between food system stakeholders, while generating sustainable food and environmental services producing landscapes. Donors can help dismantle false boundaries.

Apply results-based planning and evaluation measures to innovate rather than constrain. Results frameworks are a critical way to ensure that programmes and projects are as effective as possible. However, a results orientation must also allow for flexibility for innovation and responsiveness. Process-based outcomes should be inherently included in a results framework.

10.2.3 Individual capacity

Promote and invest in women and girls. Rural women are responsible for between 60 and 80 percent of the food production in most developing countries. Increasing the leadership skills of women and girls will further contribute to sustainable food security and serve to focus the use of resources.

Enhance knowledge systems based on agri-environmental approaches. Research and knowledge-sharing is needed on technologies that increase or maintain productivity and enhance the natural resource base; and on ecological services provided by agriculture systems. This can be done for example by investing in the increased use of spatial data that improve understanding of relationships between environment and agriculture, for informed decision-making and social dimensions; and by promoting agroecological education at all levels.

Start with what is working. There are many options for increasing environmental sustainability in agriculture through both process and technical approaches. It is important to build upon the many micro-scale successes to ultimately overcome the macro-scale issues. Sustainable intensification based upon an ecosystems approach and sustainable land management are immediate "win-wins", particularly when developed as part of landscape-scale approaches and successful farmer organisation and capacity development efforts.

> *Agencies and charitable foundations that support research and development of sustainable agriculture in developing countries should ensure that funded programs emphasize a systems approach that reflects the need for adaptability of management strategies and technologies to dynamic local socioeconomic and biophysical conditions, and support efforts to increase market access.*
>
> (NRC, 2010)

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