Agriculture in National Adaptation Programmes of Action

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INTRODUCTION

As pointed out by the World Bank (2008), agriculture continues to be a fundamental instrument for sustainable development and poverty reduction. It contributes to development in many ways. The World Bank (2008) defines agriculture-based countries as those countries to which agriculture's aggregate contribution to growth over the past 20 years exceeds 20 percent *and* where most of the poor are in rural areas, using the USD2-a-day poverty line (on average 70 percent). In agriculture-based countries, agriculture generated an average 29 percent of the gross domestic product (GDP) in 2005, with 65 percent of the workforce. Importantly, in such countries, annual agricultural GDP growth out-weighted the non-agricultural GDP growth by 0.5 point, and such GDP growth benefitted the poorest half of the population substantially more. Currently, 2.5 billion people live in households that are involved in agriculture. In transforming and urbanized countries, agriculture plays an important indirect role in the economy as industries and services linked to agriculture often account for more than 30 percent of the GDP.

Climate change adds a new challenge for agricultural and rural development (Füssel, 2009; Hassan, 2010; Nzuma *et al.,* 2010; Padgham, 2009; World Bank, 2009). The poorest countries, and especially the least developed countries (LDCs), are often among the most impacted by the adverse physical impacts of climate change, and even more in economic terms, because of the importance of the agricultural sectors in their economy and in terms of employment. At the same time they have less adaptive capacity.

Recognizing these specificities, the United Nations Framework Convention on Climate Change (UNFCCC) has established National Adaptation Programmes of Action (NAPAs) as a dedicated, harmonized, but country-led process for LDCs to identify their priority activities that respond to their urgent and immediate needs to adapt to climate change.

To date, 47 NAPAs have been prepared. They include 490 priority projects, constituting a valuable picture of the landscape of high priority projects as defined by the most vulnerable countries reflecting their urgent needs in the face of climate change vulnerability today. As such, they can also give an idea of future needs in less vulnerable countries.

The aim of this summary survey of agriculture in the NAPAs is to determine the importance of agriculture (in the FAO acceptation as "agriculture, forestry and fisheries") and provide a first analysis of priority measures in NAPAs in order to highlight priority topics and areas.

1. THE NATIONAL ADAPTATION PROGRAMMES OF ACTION)

1.1 The least developed countries

The category of LDCs was officially established in 1971 by the UN General Assembly with a view to attracting special international support for the most vulnerable and disadvantaged states. The current list of LDCs includes 48 countries – 33 in Africa, 14 in Asia and the Pacific and 1 in Latin America.

The LDCs comprise more than 880 million people (about 12 percent of world population), but account for less than 2 percent of world GDP and about 1 percent of global trade in goods. They often cumulate various factors of vulnerability. Their low level of socio-economic development is characterized by weak human and institutional capacities, low and unequally distributed income and scarcity of domestic financial resources. They often suffer from governance crisis, political instability and, in some cases, internal and external conflicts.

Box 1: The definition of least developed countries

The identification of least developed countries (LDCs) is currently based on three criteria: per capita gross national income (GNI), human assets and economic vulnerability to external shocks. The latter two are measured by two indices of structural impediments, namely the human assets index and the economic vulnerability index.

1. Low-income criterion, based on a three-year average estimate of GNI per capita, based on the World Bank Atlas method (under USD992 for inclusion, above USD1 190 for graduation as applied in the 2012 triennial review).
2. Human Assets Index (HAI) based on indicators of: (a) nutrition: percentage of population undernourished; (b) health: mortality rate for children aged five years or under; (c) education: the gross secondary school enrolment ratio; and (d) adult literacy rate.
3. Economic Vulnerability Index (EVI) based on indicators of: (a) population size; (b) remoteness; (c) merchandise export concentration; (d) share of agriculture, forestry and fisheries in GDP; (e) share of population living in low elevated coastal zones; (f) instability of exports of goods and services; (g) victims of natural disasters; and (h) instability of agricultural production.

To be included in the list of LDCs, a country must satisfy all three criteria. In addition, because the fundamental meaning of the LDC category, i.e. the recognition of structural handicaps, excludes large economies, the population must not exceed 75 million.

To become eligible for graduation out of the list, a country must reach threshold levels for graduation for at least two of the aforementioned three criteria, or its GNI per capita must exceed at least twice the threshold level, and the likelihood that the level of GNI per capita is sustainable must be deemed high. To be recommended for graduation, a country must be found eligible at two successive triennial reviews by the CDP.

Source: United Nations Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and the Small Island Developing States (UN-OHRLLS) http://www.unohrlls.org/en/about/.

Agriculture represents an important part of the economy, often more than 30 percent of GDP, and employs the majority of the population, often more than 75 percent. It provides an important part of fiscal earnings and often contributes significantly to exports (cash crops). At the same time, they are often importers of staple crops. This makes them highly vulnerable to external terms-of-trade shocks and, also, in the case of cash crops, to climatic shocks. Insufficient domestic resource mobilization, chronic external deficits, high debt burdens and heavy dependence on external financing make them particularly vulnerable to shocks. They are, for example, particularly impacted by price volatility (HLPE, 2011).

1.2 Development of the NAPAs

Article 4.9 of the UNFCCC recognizes the specific needs and special situations of the LDCs: "*The Parties shall take full account of the specific needs and special situations of the least developed countries in their actions with regard to funding and transfer of technology.*"

In Marrakech in 2001, the 7th Conference of the Parties (COP) also acknowledged the specific situations of LDCs, in that they do not have the means to deal with problems associated with adaptation to climate change, and established an LDC work programme (Decision 5/CP.7) including NAPAs as well as other supporting activities. It was completed by Decision 28/CP.7, which set the guidelines for NAPAs, and by Decision 29/CP.7, which set up an LDC Expert Group (LEG) to provide guidance and advice on the preparation and implementation strategy for NAPAs.

"*The rationale for developing NAPAs rests on the low adaptive capacity of LDCs, which renders them in need of immediate and urgent support to start adapting to current and projected adverse effects of climate change. Activities proposed through NAPAs would be those whose further delay could increase vulnerability, or lead to increased costs at a later stage*." (Decision 28/CP.7)

The NAPAs focus on urgent and immediate needs – those for which further delay could increase vulnerability or lead to increased costs at a later stage. They use existing information; no new research is needed. They are action-oriented, country-driven, flexible and based on national circumstances. In order to address urgent and immediate adaptation needs effectively, NAPA documents should be presented in a simple format, easily understandable both by policy-level decision-makers and by the public.

The steps for the preparation of the NAPAs include synthesis of available information, participatory assessment of vulnerability to current climate variability and extreme events and of areas where risks would increase owing to climate change and identification of key adaptation measures. It then includes selecting country-driven criteria for prioritizing activities using those provided (see Box 2) and then, using these criteria, a selection of a prioritized short list of activities.

The NAPAs also include short profiles of activities and related projects intended to address urgent and immediate adaptation needs of the country[1].

[1] For more information see UNFCCC (2009a, b; 2011).

Box 2: Criteria for selecting priority activities

A set of locally-driven criteria will be used to select priority adaptation activities. These criteria should include, *inter alia*:

(a) level or degree of adverse effects of climate change;
(b) poverty reduction to enhance adaptive capacity;
(c) synergy with other multilateral environmental agreements;
(d) cost-effectiveness.

These criteria for prioritization will be applied *inter alia* to (this second list is considered as further detailing the first one):

(a) loss of life and livelihood;
(b) human health;
(c) food security and agriculture;
(d) water availability, quality and accessibility;
(e) essential infrastructure;
(f) cultural heritage;
(g) biological diversity;
(h) land-use management and forestry;
(i) other environmental amenities;
(j) coastal zones, and associated loss of land.

Source: Decision 28/CP.7.

2. AGRICULTURE, SEEMINGLY HIDDEN, IS IN FACT THE DOMINANT SECTOR WITHIN NAPAS' PRIORITY MEASURES

The 47 NAPAs[2] prepared by the LDCs provide a rich panorama of adaptation priority measures. These 490 projects are of special interest and relevance because they have been designed and prioritized by the countries themselves, in an harmonized procedure, which starts by the analysis of potential effects of climate change on each sector, and related vulnerabilities. Key adaptation needs are then derived, *inter alia,* through multistakeholder consultations, and a list of adaptation activities and projects is developed (UNFCCC, 2002). Criteria to rank priority areas included the identification of the most urgent needs, taking into account the vulnerability of sectors, vulnerability of groups, the contribution to food security and to poverty reduction, and economic cost. Such criteria, and the way they have been used, made food security, agriculture and natural resources management issues particularly prominent within the NAPAs. This is an honest mirroring of the fact that LDCs are very dependent on agriculture and natural resources for poverty reduction and food security, both through food production for direct consumption and as a means to provide incomes for the majority of the population, and that these are also the main challenges that are going to be even more difficult to overcome due to climate change.

[2] http://unfccc.int/cooperation_support/least_developed_countries_portal/submitted_napas/items/4585.php

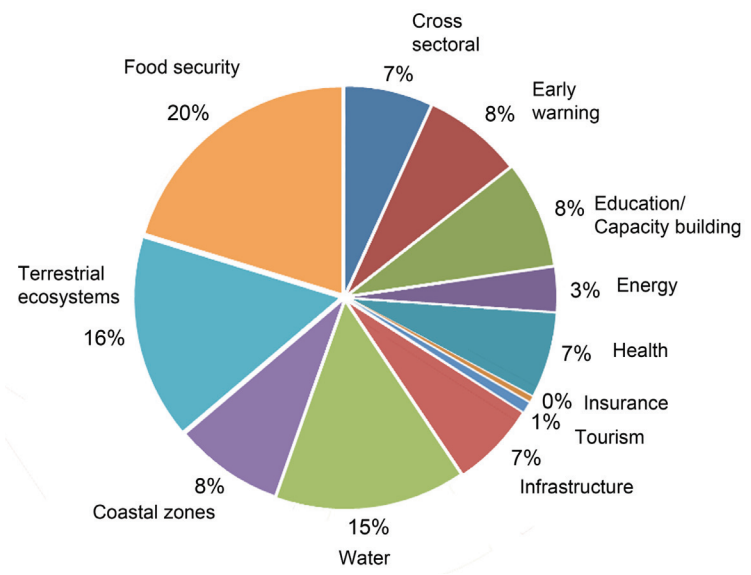

Figure 1. Distribution of projects by sector
Source : UNFCCC (2011).

Projects are classified according to 12 "categories" defined by the UNFCCC (Figure 1). According to this categorization, food security is the first category, with 20 percent of the projects, followed by terrestrial ecosystems (16 percent) and water (15 percent).

A closer analysis of what falls within such categories shows that, in fact, most the underlying projects (even outside the "food security" category) are "*mainly related to agriculture*", in the sense that they either take place within, are directly linked to, or have their main component in the agriculture, including forestry and fisheries, sector.

This is the case for most of the projects classified within the "terrestrial ecosystems" and "coastal zones" categories. The majority of the projects classified as "water" are related to irrigation, and some of them to water quality and drinking water supply. The projects classified as "cross-sectoral", "early warning" and "education/capacity building" generally cover agriculture. In the "infrastructure" category, 40 percent of the projects are linked to water management and irrigation. The two projects on "insurance" cover agriculture. Some of the "energy" projects are *de facto* in the agriculture sector (including forestry). In the "health" category, the projects for prevention of water-borne diseases, especially for monitoring and control of vector diseases and human diseases related to the risks associated with climate change, have links with animal diseases and agriculture. However, we decided that these links, though sometime very concrete, were too indirect to label these projects as mainly relevant to agriculture.

We compile in Figure 2 the distribution of projects as per the 12 UNFCCC categories, further distinguishing those that are "*mainly related to agriculture*" from those that are not (as per the methodology described above, with concrete examples further provided in section 3).

3. MAPPING OF NAPA PROJECTS MAINLY RELATED TO AGRICULTURE

It derives from the analysis above that the current UNFCCC categorization used in the NAPAs does neither really reflect the share of agriculture-related measures within priority

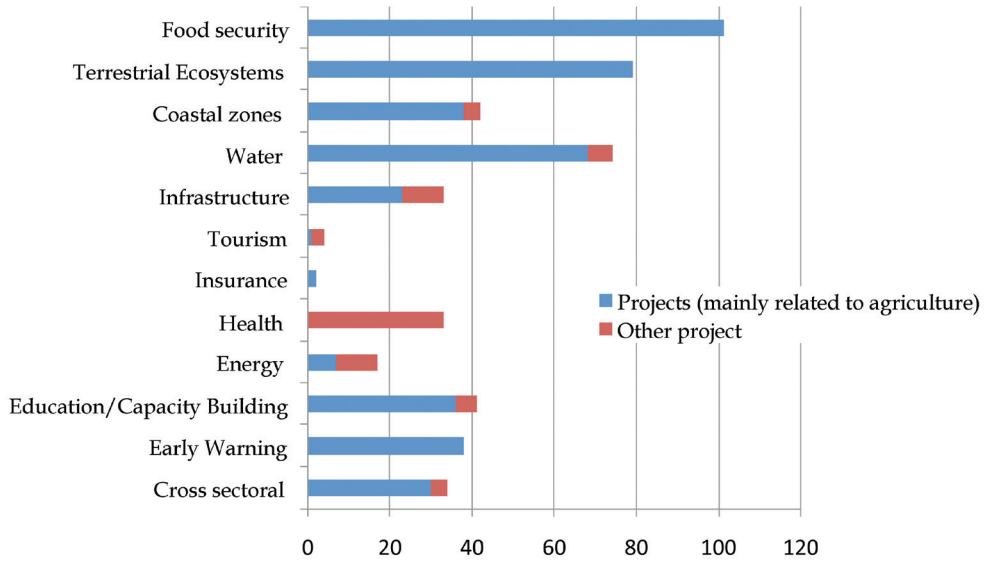

Figure 2. NAPAs priority projects *mainly related to agriculture* in each of the 12 UNFCCC categories

adaptation measures, or their main orientation or main aim. Here we propose a more relevant grouping of measures and grid of lecture of NAPAs actions, identifying five main areas of relevance for agriculture-related actions in NAPAs, adapted from the 12 UNFCCC categories.

3.1 Cross-sectoral resilience projects

In this category, we have gathered the projects classified within the UNFCCC categories "cross sectoral", "early warning systems and disaster management" and "education and capacity building". They have in common the aim to build resilience at community level by improving risk management especially by better information, monitoring, early warning and prevention. Most of them are highly relevant to agriculture.

Many projects are aiming to improve meteorological and hydrological information for both forecasting (generally in the "cross-sectoral category") and early warning. They include early warning systems on climate, drought, floods, natural disasters and food security.

Others are aiming to adaptation at community and/or landscape level by developing community-based management and integrated management of natural resources, especially of land. In that respect, there is a particular attention in the education and capacity-building measures towards local authorities, aimed at better integrated climate change issues in policies and development planning, including for planning and zoning in order to prevent impacts of climate change and particularly of natural disasters (floods). There is also a focus on vulnerable communities, households and farmers.

Less often are included projects specifically to build disaster management preparedness, strategy and response capacity.

3.2 Management of ecosystems

Most of the "terrestrial ecosystems" and "coastal zones and marine ecosystems" concern either integrated management for building resilience at ecosystem or landscape level or management of a particular resource in order to improve resilience of ecosystems and landscape. Again, most of them are highly relevant to agriculture.

For terrestrial ecosystems, projects include: watershed management and restoration; landslide and flood prevention; restoration and management of wetlands and lakes; erosion control; soil conservation; and restoration of degraded land. Forestry plays an important role, as an object for dedicated projects, for instance in projects such as assistance to the implementation of community-based forest management plans or community-based forest fire management and prevention. It is also very often called upon in integrated projects to improve watershed management, prevent soil erosion, landslides and flood. Sustainable management of forests appears thus both as an objective in itself – a way to improve resilience of livelihoods – and also an essential tool to improve resilience of ecosystems and landscapes.

The projects for coastal zones and marine ecosystems include restoration and integrated management of coastal areas, and measures aimed specifically at threatened ecosystems such as mangroves, coral reefs and dunes, which also play a fundamental role in the protection of coastal areas. Some projects aim to improve marine ecosystems management and productivity. There are also projects to improve fisheries management[3] and increase fish production, which are included in the UNFCCC food security category.

3.3 Water management

The majority of the projects on water resources are either integrated or specifically linked to water management and efficiency for agriculture and/or hydrological management. A number of projects concern better hydrological management, including for prevention of floods. The majority of the projects in the "infrastructure" category are concerned with water (irrigation, dams, canals).

Irrigation is an important issue with projects on improvement of irrigation systems, dams and reservoirs and better management of groundwater for irrigation (including wells). Some projects on irrigation or supplemental irrigation are classified in the "food security" category. Some projects, particularly in arid areas in small island states (SIDS), concern rainwater harvesting and retention for cultures and livestock.

There are also projects about water quality and drinking water supply, especially SIDS and in some areas to protect water quality against agricultural pollution. Water quality is also the object of several projects classified in the health category.

3.4 Plant production and livestock

With respect to plant production, the food security category includes projects on irrigation and supplemental irrigation and on soil conservation.

Numerous projects concern the use of genetic resources to adapt cultures to changing conditions: short-cycle crops, drought-, flood- and salinity-tolerant crops. They cover all

[3] For more information on the Fisheries and Aquaculture sector in NAPAs, see Vadacchino, De Young and Brown (2011).

the stages of genetic resources management, from conservation and research to transfer (see Box 3), multiplication of improved seeds and access for farmers.

Numerous projects aim to improve agricultural management and practices for sustainable intensification and increased resilience to variability, drought or salinity. They often take the form of integrated projects aiming also for increased and more resilient incomes, in particular through diversification of production (see 3.5).

The projects on livestock mainly cover two types of issues: increasing resilience of livestock systems and especially pastoral systems; and the use of livestock to increase the resilience of farming systems and associated livelihoods.

Adaptation of livestock systems covers issues such as pastoral area management, livestock mobility, improvement of fodder crop species in pastoral areas and on natural routes, improvement of the digestibility of fodder, fodder production and stocks, livestock feed banks, and genetic improvement of local breeds.

Promotion of livestock production and especially of small livestock is often part of integrated projects to better use resources, provide additional income and increase resilience of farming systems and households.

3.5 Diversification and income

Various projects, scattered among the various categories, aim to increase resilience of farms and households through diversification. Some of these are included in the food security category such as those related to agricultural diversification, integration of crop and livestock systems, integration of aquaculture, diversification and intensification of production. Some projects have the objective of increasing the value added through processing, marketing and promotion. Others go further, to the promotion of secondary professions and income-generating activities different from agriculture.

The energy category includes projects to improve energy efficiency, promote the development of renewable energy to protect forests and as a way of diversifying production and also reduce costs and dependence on external energy.

Among the projects aiming to increase economic resilience at farm and household level figure the insurance projects, both of which include agriculture.

Box 3: Introduction of salt-tolerant pulaka species in Tuvalu

In the Pacific islands of Tuvalu, domestically grown food remains the main source of nutrition, with pulaka, (a root similar to taro) playing an important role as staple crop. However, increasing saltwater intrusion has destroyed more than 60 percent of pulaka pit plantations in Tuvalu, and the remaining 40 percent remain highly sensitive to saltwater intrusion. It is assumed that an absolute destruction of pulaka crops is imminent in the near future for all islands of Tuvalu – possibly in the next decade – which would increase dependence on imports and have important nutritional consequences. To avoid it, the National Adaptation Plan of Tuvalu plans to introduce a salt-tolerant pulaka species in the region.

4. CONCLUSIONS

We have shown that agriculture, intended as agriculture, forestry and fisheries, is very prominent in the NAPAs. Most of the measures are, in fact, directly related to the agriculture sectors. As these are the priority measures selected by the countries themselves, after an evidence-based process involving stakeholders, it shows without doubt that adaptation to climate change in LDCs is first and foremost adaptation of agriculture.

Although country-specific, these projects, taken all together, cover the broad range and various ways to increase the resilience of agriculture (see other papers in the proceedings of this FAO workshop). As such, they constitute an extremely valuable base to identify priority areas of work and of research in order to better answer the needs of the most vulnerable. They also provide, when taken together, a database of measures, to be used for the preparation of the National Adaptation Plans as decided in Cancun. Being the priority projects of the most vulnerable countries, they can help design some of the measures that will be needed in the medium term in less vulnerable countries.

And, even more importantly, such priority projects of the more vulnerable countries can more generally be relevant for the prioritization of the investments to be realized for food security and agricultural development in the context of climate change. As underlined by numerous studies and reports, there are huge needs for investments in agriculture and developing countries, particularly when climate change adaptation has to be figured in (Moorhead, 2009; Nelson *et al.,* 2009; 2010; FAO, 2010). These reports and others (Vermeulen *et al.,* 2010) also describe ways for adaptation. The NAPA priority projects can help prioritize action.

This summary review of the sum of projects related to agriculture in the NAPAs shows a great variety of measures aiming at increasing resilience by various angles, at different scales (landscape, community, farm, household) and in different domains. Although they are priority projects, aiming to answer the most immediate needs of the most vulnerable countries, most of them are also very relevant in the medium to long term. Even if each of these projects is contextualized and has been designed to answer specific needs and vulnerabilities, to a great extent their sum, and the fact that they have been designed in country-led processes, with the involvement of stakeholders, forms a unique illustration of the very idea of "how to understand and build resilience for adaptation to climate change", covering various ways and constituting a valuable base and tool box.

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