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## Understanding the impact of post-disaster needs assessment on agriculture sector recovery

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### ABSTRACT

The great majority of communities affected by disasters in developing countries are directly or indirectly dependent on agriculture for their livelihood. Climate change has been linked to a significant increase in the frequency and severity of disasters in the recent past, leading to natural hazardous events that have had several negative repercussions on the agriculture sector and sub-sectors (i.e. crops, livestock, fishery and aquaculture) and on the life of the people depending on them. The paper will firstly review the commonly used methods of assessing the damages and losses to the agriculture sector and its sub-sectors, with particular emphasis on the strengths and limitations of the Post-Disaster Needs Assessment (PDNA) methodology. After that, it will consider the financial implications of disasters and discuss the necessity of developing follow-up mechanisms to assess the proportion of disbursed funds required to implement response interventions. This will involve an analysis of the extent to which agriculture assistance is usually prioritized in the formal and informal sector, and the typology of targeted and assisted beneficiaries with an emphasis on the gender dimension. The paper concludes with recommendations aiming at improving the current standardized processes of assessing the impacts and effects of disasters, in order to enhance the effectiveness of needs assessment towards resource mobilization and recovery processes.

**Keywords:** Post-Disaster Needs Assessment (PDNA), Recovery, Livelihood and Gender Sensitivity Analysis, Agriculture Assistance and Disaster Response Mechanisms.

## 1. Introduction

The agriculture sector remains the backbone of the economy for the majority of developing countries. In Central African Republic, Ethiopia, Tanzania, Malawi, Sierra Leone, Kenya and Cambodia among others, this sector contributes to as much as 30 percent of the national GDP (WB, 2014).

Recurrent and prolonged natural hazardous events and disasters, such as drought, floods, storms, spread of pests and diseases and saltwater intrusion, have severe impacts on agricultural livelihoods. Climate change exacerbates these events and their impacts. According to data from the International Disaster Database – Centre for Research on the Epidemiology of Disasters (EM-DAT CRED), between 2003 and 2013, natural hazards caused USD 1.5 trillion in economic damage worldwide, affecting 2 billion people (FAO, 2015a). However, there are no clear indications of how much of this damage affected the agriculture sector.

The increasing complexity and frequency (going from 80 to 420 events recorded per year over the past 20 years; CRED et al., 2015) of these disasters, and the consequent negative impact on vulnerable populations requires post-disaster needs assessments and related monitoring and evaluation studies to enable better assistance for the recovery of affected populations.

Specific methodologies such as Post Disaster Needs Assessment (PDNA) have been developed to estimate the financial implications of natural disasters in order to identify recovery needs defined from a human, socio-cultural, economic, and environmental perspective. Nonetheless, there are no available studies or follow-up mechanisms in place to monitor the magnitude of financial assistance provided to support country recovery, particularly relating to the agriculture sector and sub-sectors (i.e. crops, livestock, fishery and aquaculture).

In order to plan for better assistance and allocate an adequate share of humanitarian and recovery funds to the agricultural sector, as well as to enhance the visibility and accountability of funding provision, it is important to categorize the share of support provided by donor communities *vis-à-vis* the governments of affected countries. This should include the description of mechanisms used to target beneficiaries, the type of assistance received (in-kind vs cash) and the funding gaps, in order to enhance the appeal and recovery processes.

This paper describes the main methodologies used to assess damages and losses in the agriculture sector and sub-sectors, elucidating the financial gaps and implications that need to be addressed in order to better support the recovery of both the formal and informal sectors. Additionally the paper seeks to describe the intended beneficiaries and affected population, with particular attention to gender equality.

The paper concludes by making recommendations to foster the establishment of monitoring and evaluation mechanisms that should be put in place throughout the post-disaster recovery process.

## 2. Methodologies for assessing agriculture damages and losses

Over the years, assessing the effects and impacts of disasters on the agricultural sector, covering crops, livestock, fisheries and aquaculture,<sup>1</sup> has been mainly done by agronomists or agricultural economists. Institutionally, the ministry or department of agriculture assesses damages and the losses based on the initial reports prepared by first responders, local authorities, or the national disaster or emergency management agencies.

Since the 1990s there have been efforts to agree on a standardized methodology with uniform concepts and means to measure the destruction of agricultural capital and assets and the ensuing production losses, be it through diminishing yields and returns or actual damage to crop and harvest. The best known early

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<sup>1</sup> Forest exploitation, be it for logging, collection of plants and animal hunting or the environmental services provided by natural forests, is traditionally not included in the agricultural sector evaluations but dealt with separately, either as lumber industry or forest exploitation. Environmental services are assessed separately as the effects of disasters on the natural or intervened natural habitat.

methodology (called Damage and Loss Assessment - DALA) was developed by the United Nations Economic Commission for Latin America and the Caribbean (UN-ECLAC, see ECLAC, 2003; ECLAC, 2014) with the collaboration of the United Nations Food and Agriculture Organization (FAO).<sup>2</sup> This methodology was used by sector specialists in the Latin American and Caribbean region and others, in order to differentiate the sector production losses (as the production and income flows that have been lost due to the disaster) from the damage to the sector assets and capital (infrastructures such as silos, storage facilities, stables, etc. machinery and implements such as harvesters, tractors, boats, nets and fishing gear, in addition to animal stock such as cattle, bees or fish).

In parallel to this, attention was increasingly given to livelihood losses in the sector and the effect on human capital. This path was followed by FAO alongside the United Nations International Labour Organization (ILO) leading to the jointly FAO/ILO developed Livelihood Assessment Toolkit, LAT (FAO, 2009; FAO and ILO, 2009; ILO, 2011), as a means to approach the micro-impact of disasters on agriculture and rural households.

The DALA methodology was gradually internalized by national governments and international organizations and the sector methodology was incorporated and updated in the current Post-Disaster Needs Assessment (PDNA), following the joint agreement signed by the United Nations (UN), the World Bank (WB) and the European Union (EU) in 2008, to attain a common standard for assessment of and recovery from disasters (IRP, 2013a; UNDP, 2013; GFDRR, 2014, 2016). Aside from the purely economic aspects of the DALA, the PDNA aims at also assessing the effects of a disaster on the populations' livelihoods, taking into consideration the human, socio-cultural, economic and environmental perspective. As of today, the PDNA is an internationally accepted methodology, process and tool, used in dozens of specific disasters and has proven its adaptability to specific cases (including a range of types of disaster, economic structures and national characteristics).

The sector analysis of the agricultural related primary sector, i.e. crops, plantations, animal husbandry, bee production, fishing and fish farming, is intended to assess the value chain of the sector, from the farm gate to the market, thus differentiating the loss to actual agriculture farmers and labourers from the intermediate agriculture wholesale trade and the marketing. The latter two must be seen in the context of the commerce and trade sector and require a cross cutting and interconnected analysis that goes from the local market to the international export and import trade. The differentiated impact in terms of types of agricultural producers, gender and use of non-paid labour of family members is to be specifically analysed (IRP, 2013b; UN, 2014).

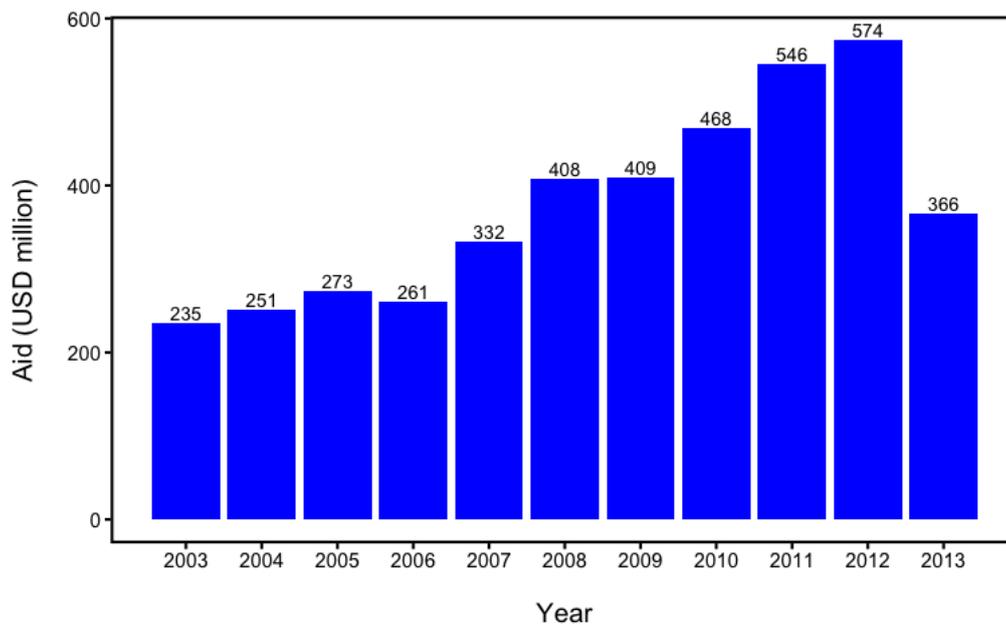
A cross cutting, integrated, holistic approach is part of the sector analysis in so far as food production and income losses in the sector may lead to malnutrition and food insecurity, with economic, social and health implications.

### **3. Financial Implication of disasters**

When considering only climate-related disasters – i.e. floods, droughts, hurricanes, typhoons and cyclones (excluding geological hazards such as earthquakes, tsunamis and volcanic eruptions) – damages and losses recorded in the agriculture sector represent 25 percent of the overall economic impact (FAO, 2015a). In most cases of post-disaster recovery and reconstruction, international aid agencies provide technical and financial assistance for the disaster affected populations (Chang *et al.*, 2010). Hence, disbursement of funds and prioritization of resource allocation among the sectors affected by disasters is an important precondition to ensure a well targeted and sustainable reconstruction phase. Between 2003 and 2013, according to a FAO study (FAO, 2015b), about USD 4 billion was spent on humanitarian assistance to the agriculture sector, averaging nearly USD 375 million annually as indicated in Figure 1 below.

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<sup>2</sup> At the time there was a joint ECLAC / FAO Agriculture Division that linked the ECLAC headquarters with the FAO Regional Office for Latin America, both located in Santiago, Chile.



**Figure 1:** Total humanitarian aid to the agriculture sector, by year (USD million)

Considering that during this decade (2003-2013), roughly USD 121 billion was spent on humanitarian assistance for all types of disasters and crises, the proportion of funds allocated to the agriculture sector corresponds to only 3.4 percent of the total humanitarian funds (FAO, 2015a).

Despite this available data, there is no official and disaggregated information reporting allocation of rehabilitation / reconstruction funds to each of the agriculture sub-sectors usually affected by disasters. In fact, most of the available literature focuses on information related to the agriculture sector as whole.

Besides, there are no mechanisms in place to assess the proportion of disbursed funds required to implement response interventions, against emergency appeals and pledges. For example, most of the PDNA processes are nowadays ending with the preparation of the Disaster Recovery Framework (DRF), which helps in articulating the recovery vision, defining the recovery strategy, prioritizing actions, fine-tuning planning, and providing guidance on financing, implementing and monitoring the recovery (GFDRR, 2016). However, it is very important to establish follow-up mechanisms that will allow monitoring, evaluating and recording the size and type of investments made to support the recovery of the agriculture sector and sub-sectors. This will enhance the availability of information necessary to communicate the results of the joint efforts and thus ensure a successful and transparent recovery process after the implementation of post-disaster assessments such as PDNA. Establishing monitoring mechanisms should also help in indicating and recording how financial resources were allocated, from which sources and disbursement mechanisms they were obtained (i.e. emergency funds from national budget, grant / credits from financial institution or donors, bi- or multilateral funds, etc.), in addition to type of beneficiaries assisted (i.e. gender groups), with possible identification of financial shortfalls required to provide the entire appealed support.

#### **4. The implication of disasters on the formal and informal sector**

Commercial agriculture, or the formal agricultural sector, is the main contributor to the agriculture GDP of a country; going from almost 100 percent in the industrialized nations, to 73 percent in Botswana, 46 percent in Sri Lanka, 20 percent in Iran and none in Burkina Faso (UN, 2004). This sector mainly consists of large scale farms or plantations, with a high level of mechanization, having access to credit and insurance schemes, often in line with and / or supported by agriculture policies of the country. Production is mainly directed to internal markets or to export.

On the other hand, the informal agriculture sector consists mainly of smallholding farmers that include agriculture casual labourers or kind of multiple job holders in rural areas. Farmers are producing mainly for their own consumption, and surplus is sold on the local markets. There are an estimated 500 million smallholder farmers in the world, supporting almost 2 billion people (IFAD, 2013). Even when smallholding

farmers represent a significant share – even the majority – of the rural population, they are still considered part of the informal sector, since they are not fully included into the national accounts system through paying taxes. As a result they are not comprised into the GDP calculations.

For example, in Mali the entire agriculture sector is considered informal, whereas in Kazakhstan, Belarus and Chile, informal agriculture represents 75, 56 and 37 percent of the agricultural sector respectively. On the other hand, the informal sector is almost absent in the industrialized countries (UN, 2004).

Disasters have negative implications in both the formal and informal sectors. In the formal sector, and to less extent in the informal one, disasters decrease national revenues to the GDP, leading to reduced internal food production levels and increased prices of food commodities, in addition to lowering countries' capacity of exporting agriculture products. Whilst in the informal sector, the effects of a disaster on the livelihoods of subsistence or smallholding farmers are usually devastating. In fact, they contribute to loss of and damage to agricultural production, in addition to losses of animals and stocks or damages to assets and infrastructures. Aside from the material losses, disasters increase the level of food insecurity and malnutrition, and diminish the casual and wage labour opportunities to generate income.

Indeed, the capacity to recover from disasters differs in the two sectors. The high level of mechanization, and the possibility to access savings and credits, makes the formal sector more resilient and enables a quicker recovery. In contrast, in the informal sector, the situation is completely the opposite since the people affected, mainly smallholders, are less resilient to disasters and usually require more time and efforts to reconstitute their livelihoods.

In addition, after a disaster, governments are generally more keen to assist in a rapid recovery of the formal agriculture sector in order to restore production and re-establish the contribution to the GDP and national food security, leaving the recovery of the informal sector in the hands of international humanitarian actors (NGOs and UN agencies) as well as faith-based or civil organizations, especially during the relief phase.

Despite this, the type of support provided by international donors or funding institutions depends mainly on their institutional mandate or political interest towards the affected countries. For example, the WB usually focuses in funding the rehabilitation of infrastructures and assets of the commercial agriculture sector (NDRRMC, 2015), whereas the EU plays a major role as a donor when the countries affected are in Europe or where the EU is supporting the implementation of large programmes such as the African Caribbean Pacific – European Union Disaster Risk Reduction Program (ACP *et al.*, 2016).

Overall, in the formal sector, the labour force is mostly provided by casual labourers, which are also largely constituting the informal sector (ILO, 1994; ILO *et al.*, 2007), with the share of female casual labourers ranging from 20 – 30 percent and child labour up to 30 percent (ILO, 1996). In contrast, in the informal economy, women play a much bigger role, together with the working poor and most low-income households (ILO, 2002). In general, rural women are the main producers of the world's staple crops - maize, rice, and wheat - which provide up to 90 percent of the rural poor's food intake. Studies have shown that rural women in particular are responsible for half of the world's food production and produce between 60 and 80 percent of the food in most developing countries (FAO-WB-IFAD, 2009).

Nonetheless, both men and women in the informal agriculture sector suffer increased vulnerability to disasters because they typically lack legal, land or labour rights. However, women suffer more from this deficiency, mainly due to cultural, social, religious or political / economic reasons. For example, women rarely have the same land tenure rights as men or access to the same resources. Animal ownership and use of animal products also differ, alongside cultural gender differences between women and men, including roles, capacities, responsibilities and freedom of speech (FAO, 2010).

Due to this situation, a main focus should be given to the integration of gender equality aspects in the formal and informal sector during the implementation of needs assessments and the response framework process after a disaster. For example, the Philippines' government under the Republic Act 10121 Section 9, item (m) emphasizes the need of institutionalizing gender analysis during the processes of post-disaster needs assessment and early recovery (NDRRMC, 2015).

## 5. Intended Beneficiaries and affected population.

The intended beneficiaries of the post-disaster recovery processes in the agricultural sector are usually the people relying on the sub-sectors of crops, livestock, fishery and aquaculture, as their main source of livelihood. They are generally included in the needs assessments through Household Surveys and Focus Group Discussions although not uniformly in different assessment methods. Livelihood-focused assessments engage beneficiaries more effectively both in the implementation and recovery processes compared to more macro-economic level assessment conducted through PDNA. Table 1 illustrates some typical groups of intended beneficiaries and the kinds of support that is usually required for each group.

**Table 1:** *Type of support and intended beneficiaries in livelihood-based needs assessment*

| Beneficiaries                        | Immediate Relief  | Early Recovery Support  | Sustainable Livelihood Interventions   |
|--------------------------------------|---|---|--|
| <b>Crop farmers</b>                  | <ul style="list-style-type: none"> <li>- Provide seeds, fertilizers, pesticides, as well as tools and temporary storage facilities (in-kind or cash or voucher).</li> <li>- Construct temporary wells also using cash for work initiative.</li> </ul> | <ul style="list-style-type: none"> <li>- Rehabilitate storage and processing facilities.</li> <li>- Support farmers and agro-suppliers with credit facilities to improve access to inputs.</li> <li>- Repair equipment and machineries.</li> <li>- Rehabilitate irrigation infrastructure.</li> </ul> | <ul style="list-style-type: none"> <li>- Introduce crop insurance schemes.</li> <li>- Promote alternative crops and more diversified cropping systems and soil conservation practices.</li> <li>- Improve extension services.</li> <li>- Review relevant agricultural policies.</li> <li>- Expand advanced irrigation systems and introduce fees for water usage.</li> <li>- Improve/diversify market access.</li> </ul> |
| <b>Livestock Producers</b>           | <ul style="list-style-type: none"> <li>- Support animal restocking and destocking.</li> <li>- Provide feed and vaccine.</li> <li>- Establish temporary shelters.</li> <li>- Provide emergency vet services.</li> </ul>                                | <ul style="list-style-type: none"> <li>- Rehabilitate animal shelters by distributing building materials or using cash or voucher schemes.</li> <li>- Provide subsidized feeds or feed-mills.</li> <li>- Expansion of vet services.</li> </ul>  | <ul style="list-style-type: none"> <li>- Introduce livestock insurance.</li> <li>- Expand artificial insemination to increase productivity.</li> <li>- Regularize vet services.</li> <li>- Provide credit facilities.</li> <li>- Improve/diversify market access.</li> <li>- Improve extension services.</li> <li>- Revise relevant livestock policies.</li> </ul>   |
| <b>Fishery/Aquaculture producers</b> | <ul style="list-style-type: none"> <li>- Support for restocking existing ponds.</li> <li>- Provide fish feed and meds.</li> <li>- Establish cash for work initiatives to rehabilitate ponds/hatcheries.</li> </ul>                                    | <ul style="list-style-type: none"> <li>- Rehabilitation of ponds/hatcheries through voucher schemes and cash for work.</li> <li>- Provide subsidized animals.</li> </ul>  | <ul style="list-style-type: none"> <li>- Provide credit facilities for aquaculture expansion.</li> <li>- Introduce effective extension services.</li> <li>- Improve/diversify market access.</li> </ul>  |

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beneficiaries in livelihood assessments typically report needs for immediate relief or early recovery, while development agencies tend to introduce ideas for longer term planning, and sustainable development.

In each of the groups of beneficiaries listed in Table 1 above, particular attention is usually given to gender balance to ensure women get the kind of support they need (UNDP, 2010). Nonetheless, there are few efforts to disaggregate male and female needs during post-disaster assessments and recovery process.

Other vulnerable groups such as youth, the aged, people with disabilities, and the landless will hopefully get special attention especially with the increased human impact focus (EU-GFDRR-UN, 2013).

The targeted numbers of intended beneficiaries (people affected) of course depends on the scale and intensity of the hazard and the vulnerability of the people affected.

Some people affected by disasters are able to recover on their own through existing insurance coverage, as members of church groups or other benevolent organizations, or through kinships and family networks. Others not directly affected might also benefit from post-disaster recovery efforts especially through Disaster Risk Reduction (DRR) and resilience building initiatives also called Building Back Better (BBB). In fact, these result in new and better infrastructures, economic investments, as well as livelihoods and job opportunities for communities at large.

The literature on actual people who benefited as a result of the conduct of a PDNA which led to a recovery plan is scarce. A statistical analysis of those who have actually benefited from related PDNAs in the agriculture sector is therefore not possible at this time, but it is strongly recommended that pertinent assessments which could provide such data are carried out. Nevertheless some beneficiary relevant lessons can be extracted from recovery programs as presented below.

### **5.1. Lessons learned from Case Studies**

The revival of household and local economy has an important multiplier impact, which strengthens recovery and puts it on an upward trajectory. In many recovery programmes, the allocation of resources is largely for infrastructure reconstruction, and it tends to ignore the economic needs at the household and community levels. An emphasis on a more balanced recovery programme, which also empowers the affected households and communities through direct transfer of resources for restoration of livelihoods and other assets, would result in a more sustainable and equitable recovery.

A report published 3 years after the Pakistan 2005 earthquake noted that the agencies helping with recovery – the Pakistan Government, the Army, the international Financial Institutions and relief agencies – were not familiar with livelihood restoration and so major challenges were still present (Ahmad and Suleri, 2008). The report emphasised the need for a multidimensional livelihood assessment, a greater focus on assets recovery (livestock, crops, soil, etc.) as most attention was put on income regeneration, and for the livelihood strategies to be gendered. In addition, it stressed the need for strengthening capabilities to allow people to better utilise their assets.

In the PDNA of the Kenya drought (2008-2011) the inclusion of the Human Development Recovery Needs Assessment (HRNA) allowed a detailed assessment of the impact of the disaster on the livelihoods of the poor and showed the greater impact on those with lower Human Development Index (HDI). Nonetheless, this assessment did not lead to integrated livelihood recovery recommendations which remained largely macro-economic and sectorial in nature (Government of Kenya et al., 2012).

## **6. Conclusion and recommendations**

Despite the existence of globally recognized methodologies such as PDNA, additional efforts are required to ensure a more transparent and well-coordinated recovery process in the aftermath of a disaster.

Post-Disaster Needs Assessments, should be constituted by follow-up mechanisms to verify the amount of funds pledged and disbursed to support the recovery process, possibly disaggregated by sector and sub-sectors, and indicating the source of funds (i.e. donors, government, etc.). In addition, a clear indication on the type of beneficiaries assisted or requiring assistance (divided by gender groups), should be also available, with potential identification of financial shortfalls required to provide the entire appealed support. The establishment and enforcement of these mechanisms should be discussed among the WB, EU and UN, which constitute the tripartite agreement of the PDNA methodology. All actors providing assistance during the recovery process, including the government of the country affected, should be informed in advance about the necessity of gathering specific information so that they can share whatever is required as part of their support efforts.

Due to the existing differences in the vulnerability and exposure to the disasters occurred in the formal and informal agriculture sector, it is generally recognized that this latter sector is usually considered the most affected. Nonetheless, there is no reliable information on the extent of support which is usually received by

the two sectors. As a result more studies need to be conducted in these areas in order to ensure that both sectors are equally supported in the aftermath of a disaster, with particular attention on the informal sector where millions of smallholder farmers make their living and where most of the vulnerable people are recognized.

Finally, the PDNA methodology needs to be much more inclusive and accountable to the affected population by becoming more faithful to a people-centred approach. In this line, affected communities should be engaged more often during the assessment process in order to better understand how they were affected by the disaster and what they need most to recover and enhance their resilience capacities. This could be done through the use of more systematic primary data collection techniques such as surveys, to be included as part of the assessment methodology.

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