

SEED GOVERNANCE

FROM SEED AID TO SEED SYSTEM SECURITY IN FRAGILE AREAS

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ABBREVIATIONS

AGRA	Alliance for a Green Revolution in Africa
BXW	Banana Xanthomonas Wilt
CDI	Centre for Development Innovation (Netherlands)
CIAT	International Centre for Tropical Agriculture
CMDRR	Community-Managed Disaster Risk Reduction
CRS	Catholic Relief Services (USA)
DINER	Diversity and Nutrition for Enhanced Resilience
DRR	Disaster Risk Reduction
ECHO	EU Humanitarian Aid and Civil Protection department
FAO	United Nations Food and Agriculture Organization
GMO	Genetically-Modified Organisms
IFAD	International Fund for Agricultural Development
IFDC	International Fertilizer Development Centre
ISSD	Integrated Seed Sector Development
KIT	Royal Tropical Institute (Netherlands)
NGO	Non-Governmental Organization
ODI	Overseas Development Institute (United Kingdom)
OFDA	Office of the United States Foreign Disaster Assistance (USA)
PABRA	Pan-Africa Bean Research Alliance
SSSA	Seed System Security Assessment
UEA	University of East Anglia (United Kingdom)
WFP	World Food Program
WUR	Wageningen University and Research Centre (Netherlands)

PREFACE

Cordaid works on aid and development in fragile and conflict-affected areas. We support community-based organizations to cope with disasters and to build resilience. We do so in current crises (e.g. CAR, South Sudan, Syria), in chronically fragile areas (e.g. DRC, Afghanistan, Haiti), and in post-conflict areas (e.g. Burundi, Sierra Leone) where the prospects are bright for overcoming the fundamental causes of conflict and disaster. Combatting food insecurity may prevent recurrence of conflict and human disaster.

In rural areas, Cordaid supports and leverages interventions that aim for structural and sustainable improvement of the food security of communities through smallholder farming. Whereas there are many challenges to overcome, we aim for an integrated approach to food security interventions on the continuum of Relief-Rehabilitation-Recovery-Development (RRRD). Cordaid partners in this for example with the Food Security Cluster of the United Nations, the World Food Program (WFP) and the Food and Agriculture Organization (FAO) to provide food aid, seeds and tools when and where possible and appropriate; and subsequently with local governments, networks and project partners through capacity-building and education and training of communities in need.

Seeds are a key input for successful smallholder production. In fragile areas the common seed savings, acquisition and distribution systems are often distorted following conflict or disaster. Cordaid aims for the development of a coherent and conflict-sensitive approach to seed system rehabilitation; e.g. through seed provision and/or the revival of seed markets at the local, regional and national level.

This report explores the opportunities for Cordaid to specify its current approach to seeds and seed interventions on the relief and development continuum. As part of Cordaid's learning agenda, Wageningen University reviewed the recent literature

on seed aid, seed systems, seed security and seed governance, to identify the state-of-the-art and to explore opportunities for Cordaid to improve and enhance its performance. This report makes clear that seed interventions merit specific attention while they contribute to defining the agricultural production system after shocks. Well-managed seed interventions may enhance food security and communities' resilience to shocks and disaster.

A previous version of this report was submitted for comments and observations through an international Expert Consultation held in The Hague on 17 June 2014, with about 20 representatives from government, international institutions, private sector, and NGOs. The draft final report was also reviewed by two leading scholars in this area. Our special thanks go out to Louise Sperling (CRS) and Shawn McGuire (University of East Anglia) for their comments and observations, and to all presenters and participants in the Expert Consultation.

Cordaid believes that the future is in co-creation based on transparency, collaboration and leadership. Whereas we intend to strengthen our own policies in this area, we also aim to draw this debate forward with other governmental and non-governmental actors, and to develop new forms of seed interventions and seed governance mechanisms. We would therefore greatly appreciate to receive any comments, observations or ideas you might have regarding this report. We hope that the current report will also be a source of inspiration for other actors to (re-)consider their policies related to seed interventions in relief and development.

Edith Boekraad

Director Food Security
Cordaid

October 2014.

EXECUTIVE SUMMARY

Intergovernmental agencies and development organizations, including Cordaid, consider interventions directed at seed security of utmost importance to support smallholders recovering from conflict situations and disasters, and to contribute to revitalisation of local agricultural production and food security. There is, however, considerable debate about the most appropriate type and strategic level of intervention to enhance smallholders' seed security in conflict and post-conflict areas. Given the co-existence of different types of interventions and agencies directed at providing seed security, the governance of seed security has become very relevant, questioning what collaborative arrangements between government, business and civil society can help to effectively address seed insecurity.

Cordaid aims to contribute to structural improvement of the food security of communities by supporting smallholder farming, especially in conflict and post-conflict regions and countries. Cordaid considers seed security as critical for smallholder production and food security. To facilitate learning and possibly concerted action of key players in the field of seed security and to better define its own distinctive role and added value in this field, Cordaid has assigned Wageningen University to conduct a research, with the following main objectives:

- a. To provide insight into the debates on seed governance and seed aid and seed security for smallholders in conflict and post-conflict areas
- b. To identify seed governance that is adapted to the fragility of conflict and post-conflict areas and can improve seed security for smallholders in such areas.

The two key questions of the research are:

- a. What are best practices and arrangements to secure access of smallholders to seeds that are fit for local growing conditions in areas characterized by fragility and/or limited statehood in conflict or post-conflict areas?
- b. What are pitfalls in seed interventions and governance in areas characterized by fragility and/or limited statehood, which might permanently disturb local, regional and/or national seed systems and negatively affect access of smallholders to critical means of production (i.e. planting materials)?

To realize the objectives and to answer the research questions, a desk study, expert interviews and an expert consultation were organized, together providing critical input for the present report, that consists of the following chapters:

Chapter 2 presents an integrative conceptual framework on seed security and seed systems in fragile areas. Fragile areas, characterized by limited statehood and continuous or intermittent occurrence of acute or chronic stresses of political, ecological, economic or social nature, provide the contexts in which the seed systems function. To function well in such

contexts, seed systems should be resilient (that is, withstand or absorb shocks, and/or transform in response to them) and adaptive. Seed system resilience “emerges as a property of germplasm, institutions and interactive information systems” (McGuire and Sperling, 2013). Seed systems fulfill three seed security functions: availability, access and quality. Governance is defined as collaborative problem-solving arrangements between government, business or civil society actors. The division of power and decision making between actors is central to the concept of governance.

Chapter 3 provides a review of the literature on seed systems and seed security in fragile contexts and a reflection on it. Seed systems are defined as “all the practices and institutions involved in plant breeding and seed provision, as well as the related legislation” (McGuire, 2008). Seed systems consist of formal and informal components. Farmers obtain the majority of seed through the informal system, which may reflect both farmers' preferences and lack of access to formal sourcing channels. Networks and social relations play important roles in shaping farmers' access to seeds.

Donors and development practitioners often prefer certified or improved seed to seed from the informal sector. However, farmers' evaluation criteria can differ from criteria developed by breeders or those setting seed certification standards, and the agro-ecological conditions under which varieties are selected may differ from those on-farm, thus affecting crop performance.

Seed systems are often remarkably resilient following disaster: varieties are often still available, however, access is hampered due to poverty, increased seed prices, and disruption of social networks and social relations.

Resilient socio-ecological systems can be sustained through adaptive governance. Specifically, informal networks and brokering and leadership roles are “social sources of resilience for adaptability and transformation” (Folke et al., 2005). Three important features of adapting institutions are buffering, feedback and self-organization.

There is a lack of reports and articles on the governance of seed aid and governance for seed security in fragile areas. Very little is known about the ways in which to realize a shift towards adaptive seed governance. Finally, accountability of agencies and organizations intervening in seed systems in fragile areas has been hardly addressed in scholarly and policy debate. We suggest three governance-related issues that merit greater attention in seed system security assessments: first, the involvement of farmers; second, existing institutional and governance arrangements within the seed system, shifting attention to best arrangements rather than best practices, and third, the roles of different stakeholders involved in the intervention and the type of partnerships between them.



Photo David Rivas

Distribution of seeds by Cordaid and Caritas to victims of conflict in the Central African Republic

In chapter 4, best practices and pitfalls of interventions in seed systems are described. We distinguish three levels of intervention: first, direct interventions aiming at realizing seed security; second, interventions aimed at seed system development; and third, interventions striving for seed system resilience. At each of these levels, there is debate over the most appropriate interventions (“doing the right things”), but increasing consensus over the most appropriate way to implement them (“doing things right”). The chapter includes a description of six cases in which seed-related interventions were either well adapted to the local context or not adapted at all.

Whilst direct distribution of seeds is the most dominant form of seed-related interventions in fragile contexts, experts do not consider it the most appropriate intervention. Especially when poorly implemented or repetitively conducted, direct seed distribution can do harm to farming systems and distort markets. The critical insight is that availability of seed is not the major problem in conflict and post-conflict situations but lack of access to seed. This means that direct distribution of seed should only be performed in exceptional cases.

Seed vouchers and fairs have developed in response to critique on direct seed distributions and aim to enhance access to seed rather than availability of seed. They facilitate farmers’ access to seed, provide farmers with choice, are an investment in local seed systems and seeds available are well-adapted to the local circumstances. However, they are still supply-side driven interventions, may distort social relations between buyers and sellers, and often fail to contribute to seed system development, especially when poorly executed and conducted repetitively. Direct interventions also include interventions targeting seed

quality (purity, physiological and phytosanitary quality). Such interventions have been focused on raising farmers awareness for instance through positive selection and building seed storage facilities. Direct interventions targeting varietal quality (seed genetic properties and suitability for a specific environment) have focused on introducing new varieties to farmers. Quite unintentionally, distribution of seed has been a significant source of new varieties for farmers in emergency situations. Minimizing risks of using a new variety, enhancing varieties’ access and providing information about the varieties properties were considered crucial aspects of such introduction. Therefore, selling small packages of new varieties and providing information about these varieties was seen as a best practice.

The choice for an intervention should be guided by a seed security assessment prior to any intervention, also in case of emergencies. This should lead to the identification of the component of seed security (availability, access, quality) that is under pressure as well as insights on the immediate and more structural causes. Conducting or requiring a seed security assessment should be standard procedure for any agency aiming to contribute to seed security.

A key challenge for intervening in fragile areas as experienced by Cordaid is to combine short-term-oriented emergency assistance with long-term-oriented development aid. Integrating relief and development activities in one programme was proposed as a best practice. An innovative approach that could help to overcome the very often unclear distinction between relief and development and the rhetoric ‘to go from relief to development could be to adopt and elaborate a resilience perspective’.

We identified three major approaches to interventions aimed at seed system development. The mainstream approach is promoting product-oriented development, advocating the use of certified seed and hybrid and improved varieties. Alternative approaches include the food sovereignty movement and practitioners who stress the need to provide farmers with choice to strategize. In a third approach, emphasis lies on the strategic integration of formal and informal seed systems, for example in the integrated seed sector approach.

The discussion over seed quality and hybrid and certified seeds is tied to debates over seed system development, and those debates are as much about agronomic appropriateness as about modernization and desirable paths for development. When sufficient inputs are available, yields of hybrid varieties often outperform open-pollinated varieties. However, farmers, particularly those in fragile and conflict-affected contexts, may have limited access to hybrid varieties and related inputs due to the poor development of the formal sector and the high price of such seeds.

Important areas for action for resilient seed systems include identification of germplasm, ensuring availability of germplasm, enhancing access for vulnerable groups, fostering information systems and enabling systems evolution. Communication technology such as radios, websites and text messaging could play an important role in information provision to farmers through resilience-linked information systems. To start building resilience prior to acute emergencies, for instance with the help of scenarios, was identified as a best practice. Another best practice is acknowledging and developing the potential role of merchants in integrating informal and formal systems and providing information. Seed system resilience could be enhanced by fostering relations that could be mobilized in times of need among farmers, and between farmers and merchants, covering relatively large areas and being located at relatively distant places. Lack of learning and evaluation was identified as a major pitfall hampering systems evolution and the development of adaptive institutions and resilient seed systems.

On the one hand, the debate on interventions in seed systems, whether in fragile contexts or not, is characterized by controversy. Much of the controversy reflects different assumptions of the role and capacities of farmers and other actors within the seed system, perceptions on what agricultural development should look like, and institutional preferences and capacities. On the other hand, this debate is characterized by an evolution in the thinking about seed system interventions, shifting from seed relief and direct seed distribution via market-based approaches to interventions targeting seed system functioning and aiming for resilience. Despite this evolution in concepts and approaches, the gap between knowledge gained and the implementation of interventions on the ground remains, largely sustained by lack of institutional learning by donors and intervening organizations.

Chapter 5 presents best practices and pitfalls for different levels of interventions in table form. This chapter also offers some recommendations for each level to Cordaid. In the field of direct seed distribution and vouchers and fairs, there seems to be limited space for new players. Contributing to the development of integrated seed system development in fragile areas could, however, be a niche and promising avenue for Cordaid. Finally, adopting and elaborating seed system resilience as a key concept and aim could provide Cordaid with opportunities for leadership in developing innovative interventions especially suitable for fragile areas.

Finally, chapter 5 puts together knowledge gaps. The concepts of seed governance and seed system resilience only recently emerged in the literature. While a promising start has been made with respect to their theoretical and conceptual development, there is an urgent need to link those concepts to real-life situations and empirical data, in order to understand the relations between governance of seed systems, seed system resilience and seed security.

1. INTRODUCTION

Seeds¹ are a key input for successful smallholder production. Smallholders in developing countries generally obtain seeds from a variety of sourcing channels, including seed savings and informal markets (Sperling et al., 2008; Sperling and McGuire, 2010). In fragile areas the common seed savings, purchase and distribution systems and social networks may be distorted following conflict or disaster (Richards et al., 1997). Smallholders' own seed reserves may have largely disappeared or may have been consumed. They may be able to re-gain access to locally-adapted seeds at a community level, yet availability may be limited and price prohibitive (Sperling, 2001).

In order to support smallholders' agricultural production to recover from disaster, intergovernmental agencies and development organizations provide emergency seed aid. Such emergency seed aid interventions are ubiquitous (Sperling and McGuire, 2010), and often come in to provide seeds and farm implements. However, also other types of interventions, and, linked to those, conceptualizations of interventions and seed systems are possible. Which types of interventions are being practiced in fragile areas? To what extent do they contribute to seed security? What are different entry-points for intervening in seed systems? These questions are crucial for organizations aiming to contribute to seed security in conflict or post-conflict areas. Fragile areas provide a special context for such interventions: those areas are characterized by limited statehood and a high occurrence of acute stress events and chronic stress. In such areas, it is a challenge to design context-specific interventions sensitive to local circumstances.



Farmer in Central African Republic receives seed aid

Interventions in seed systems can be characterized by different modes of collaboration between actors and by the role of smallholders therein. The way in which such interventions are organized and by which processes and mechanisms decision making about them takes place relate to the governance of those interventions. Similarly, the modes of collaboration between actors in seed systems and the distribution of decision

¹ "Seeds" here comprise any planting material; whether seeds, fruits, cuttings, bulbs, tubers etc.

making power between them relate to the governance of those systems. The crucial question is which governance arrangements could best support seed security in fragile contexts.

Cordaid has made a strategic corporate decision to concentrate its development interventions in fragile countries and regions (conflict and post-conflict countries). In the area of food security and agriculture, Cordaid supports and leverages interventions that aim for structural and sustainable improvement of the food security of communities by supporting smallholder farming at the local, regional, national and international level (see Annex 1). Cordaid Food Security has two major aims regarding interventions in fragile areas. First, Cordaid aims for the development of a coherent and conflict-sensitive approach to (seed system) rehabilitation through seed provision and the revival of markets at the local, regional and national level. Second, Cordaid seeks to gain insight which activities can support the transition from a phase of emergency aid to a phase of rehabilitation and economic development.

1.1 Objectives and outline

There is considerable debate about the most appropriate way to enhance smallholders' seed security in fragile areas. Insight into the debates surrounding interventions in seed systems and seed governance can help Cordaid to identify its potential and distinctive role in this area.

The main objectives of this research are:

- To provide insight into the debates on seed governance and seed aid and seed security for smallholders in conflict and post-conflict areas
- To identify seed governance that is adapted to the fragility of conflict and post-conflict areas and can improve seed security for smallholders in such areas.

The two key questions of the research are:

- What are best practices and arrangements to secure access of smallholders to seeds that are fit for local growing conditions in areas characterized by fragility and/or limited statehood in conflict or post-conflict areas?
- What are pitfalls in seed interventions and governance in areas characterized by fragility and/or limited statehood, which might permanently disturb local, regional and/or national seed systems and negatively affect access of smallholders to critical means of production (i.e. planting materials)?

To realize the objectives and to answer the questions of the research, a desk study was conducted consisting of a literature review and expert interviews.

In chapter 2, we present and develop the concepts of seed security, governance in limited statehood and adaptive (seed) governance, which we combined in an integrative framework on seed security governance. The scientific literature was systematically reviewed on the relationship between seed

relief, seed governance and seed security for smallholders in contexts of fragility. The findings of this review are presented in chapter 3: Seed system functioning in relation to seed security. This chapter also describes insights from the literature on seed system resilience and adaptive food governance and reflects on the possibility of adaptive seed governance.

Chapter 4 gives an overview of best practices and pitfalls in organizing seed security in fragile areas. Insights that emerged from the literature in best practices and pitfalls of programs of intergovernmental agencies (e.g. FAO, IFAD) and initiatives (e.g. AGRA, IFDC) and development organizations (e.g. Cordaid, CRS, ZOA, CIAT/PABRA) who aim to provide seed security in contexts of fragility, were complemented with in-depth interviews with experts from intergovernmental agencies, initiatives and development organizations. Six (6) cases were described in which seed provision and seed governance in fragile areas were either well adapted or not adapted at all to local conditions.

The second section of each of the chapters 2, 3 and 4 is dedicated to our reflections on the findings. Our main conclusions and insights will be presented in chapter 5 of this report.

1.2 Methods and scope

1.2.1 Literature search

For the selection of literature, a two-stage approach has been used. The first stage consisted of systematic literature review using search engines. The first searches focused on food security and the countries that form the focus of the Cordaid Food Security programme, mainly those surrounding the Great Lakes area. A combination of search terms has been used as input for Google and academic search engines, such as Scopus and Google Scholar (see row 1 of Table 1). For each search query, the number of hits has been recorded. Out of the top twenty results, titles of interest have been selected that were addressing the central questions of our study. Results beyond the top twenty have been screened but proved not to present additional titles of interest. The articles that appeared most in our searches and those that

were cited the most provided us with twenty-five (25) articles which formed the initial basis for our literature review. The second series for selecting literature through the same search engines was focused on governance of seed (see rows 2-5 of Table 1). Also, relevant articles and reports from the references of selected articles on seed security, were included.

Second, key informants (see 1.2.2), including Cordaid staff, were asked to suggest relevant literature. If not already part of our selection, their recommended titles were included for literature review.

The articles found via the search engines and via the informants were scanned and included or discarded, depending on their relevance to the research questions. Moreover, as the timeframe for publication was set to 'published in the last fifteen years' only articles published between 1999 and 2014 were taken into account.

1.2.2 Selection of key informants

Next to literature review, structured interviews have been held with fourteen (14) representatives of academic, governmental or non-governmental agencies working in the field of seed provision and seed security. For selecting these persons, the websites and secretariats of relevant agencies and development organizations were consulted (see Terms of Reference, Annex 2). In addition, leading scholars in the field of seed security were contacted. Finally, persons recommended by other interviewees were approached. A list of interviewees can be found in Annex 3.

The list of questions for interviewing were specifications of the research questions (see Terms of References, Annex 2), that were enriched by insights from the literature review.

A draft of this report was presented and discussed at an expert meeting (see Annex 4), and reviewed by two leading scholars in this area. Main comments and critical insights have been incorporated in the final report.

1.2.3 Scope

This report mainly focuses on the countries in which Cordaid strategically focuses its food security interventions: South Sudan, Uganda, DR Congo, Burundi, Rwanda, Sierra Leone, and, to a lesser extent, Syria, Afghanistan and Haiti.

The primary focus of the study is seed system functioning and interventions in seed systems in fragile contexts, characterized by limited statehood and the frequent occurrence of stress factors, as will be explained in chapter 2. We will refer to research findings and experiences from less fragile areas when relevant lessons for intervening in fragile areas can be learnt from those.

Although the debates on the development and possible introduction of genetically modified organisms (GMO) are linked to seed system development, for this report the topic of GMOs was left out of consideration. First, this topic was not extensively discussed in the literature found through the procedures described above. Second, the subject is already discussed extensively in other fora. Third, GMOs do not figure in seed aid or other forms of seed assistance in fragile areas.

TABLE 1: LIST OF SEARCH QUERIES USED

1. Seed security	AND	Africa DR Congo "South Sudan", Southern Sudan, Sudan Burundi "Sierra Leone" Uganda Rwanda
2. Seed OR Seed system Seed aid Seed security	AND	Governance Adaptive governance Limited statehood Seed sovereignty Conflict Fragility
3. Adaptive governance	AND	- "seed systems"
4. Adaptive seed governance		
5. Food system governance	AND	- resilience fragility

2. AN INTEGRATIVE FRAMEWORK ON SEED SECURITY IN FRAGILE AREAS

This chapter presents an integrative conceptual framework on seed security and seed systems in fragile areas. First, we will focus on the building blocks of this framework, drawing from literature on seed security, governance in areas of limited statehood, and adaptive governance and resilience. Second, we will present the links between these concepts in an integrative framework.

2.1 Key concepts

2.1.1 Seed security

The following definition of seed security is commonly used: “access by farming households (men and women) to adequate quantities of good quality seed and plant materials of adapted crop varieties at all times both good and bad” (FAO 2010).

Availability, access and utilization are three key aspects of seed security. Availability refers to the physical presence of seed “within reasonable proximity to people (spatial availability)” as well as “in time for critical sowing periods (temporal availability)” (Remington et al., 2002, p. 319). Access entails the possibilities that people have to obtain seed, by producing it themselves or by purchasing or bartering it, or obtaining it as a gift. Access is thus closely related to the resources people have at their disposal, including fertile land, labor, financial means or bartering goods. Moreover, it is related to social relations and networks. Quality characteristics such as seed health and the extent to which seed is adapted to local agro-ecological conditions and meets farmers’ preferences are captured by ‘utilization’ (Remington et al., 2002; McGuire & Sperling, 2011). These three concepts are interrelated: for example, availability of seed is enhanced when one has the means to obtain it from distant areas (Sperling et al., 2008). The question ‘For whom is (high-quality) seed available?’ is thus crucial in this respect.

The concept of seed security shows similarity with the concept of food security, although there are some subtle differences between them, as discussed by McGuire & Sperling (2011). Availability, access and quality are three pillars important to both food and seed security. For food security, availability of food is important year-round, whereas availability of seed is crucial during specific periods of the year. Access to both seed and food relates to the means people have to obtain seed or food (such as financial means, social networks, own production facilities), although the means and mechanisms via which access is obtained may be different for seed and for food. Also, access to seed is only effective if farmers also have access to relevant information about the seed’s properties. Quality concerns physical quality and suitability for use as seed or food, and suitability for use under specific circumstances or for specific target groups. Moreover, quality of seed refers to seed quality and varietal quality. However, more important than subtle conceptual differences is their argument that there is no one-on-one relationship between food security and seed security. They discuss similarities in and differences between drivers of food security and seed security (McGuire & Sperling, 2011).

Based on the described conceptualization of seed security, several authors (like Longley et al., 2002, Sperling et al., 2008, and SeedSystem.org, as will be discussed in chapter 3) developed assessment tools to identify problems to be addressed by interventions and impacts of a disaster on seed system functioning.

Longley et al. (2002) distinguish three levels of household seed security, based on wealth groups: seed-secure households, crisis-prone households and chronically seed-insecure households. Seed secure households have sufficient resources at their disposal to grow and access seed, and to experiment with new varieties. Crisis-prone households may become seed insecure in case of stress events such as droughts. Chronically seed insecure households are less endowed farmers continuously facing difficulties of accessing good quality seed. Following crisis, chronically seed insecure households tend to suffer most from reduced access to seed (Longley et al., 1998; in Longley et al., 2002).

This relates to the distinction in acute and chronic stress (Sperling et al., 2008; McGuire & Sperling, 2013). Acute stress refers to temporal events affecting the whole population, such as drought or civil unrest, whereas chronic stress indicates more fundamental challenges such as declining soil productivity or limited economic opportunities. Both acute and chronic stress can be of ecological, economic, political and/or social nature. Acute and chronic stress can occur simultaneously, and effects of acute stress may be exacerbated by chronic stress and vice versa (Sperling et al., 2008).

Though a full discussion of the complex relationships between different forms and sources of stress is beyond the scope of this report, we propose the following elements and framework for understanding and analyzing fragile contexts and how these affect seed systems and seed security. To start with, fragile contexts are characterized by frequent occurrence of stress events. Moreover, statehood is often limited in fragile contexts, which has important implications for governance. This will be addressed in the following paragraph.

2.1.2 Governance in limited statehood

Limited statehood is defined by Risse (2011, p. 4) as: “those parts of a country in which central authorities (governments) lack the ability to implement and enforce rules and decisions and/or in which the legitimate monopoly over the means of violence is lacking”. Importantly, the inability to implement rules and decisions not only refers to the inability to maintain order but also to provide collective goods and basic services, such as public health and food security (Risse 2010, p.8-9). Statehood can be limited in parts of the territory, certain policy areas, regarding parts of the population. Moreover this limitation can be temporal. According to this definition, the majority of contemporary states faces areas of limited statehood, and neither classifies as fully consolidated states nor as failed states.



Photo David Rivas

Weighing of seeds for distribution to victims of violent conflict in the Central African Republic

In areas of limited statehood, governance is problematic. Risse (2010) describes this as the “apparent governance paradox”. In areas of limited statehood the state’s capacity to enforce and implement decisions is limited, thus spurring the need for new modes of governance by non-state actors or public-private partnerships. At the same time, however, the effectiveness of those new modes is hampered by the lack of back-up from the state.

Governance refers to cooperative problem-solving arrangements that (inter)governmental, civil society and/or business actors have put into place to deal with common, societal or developmental problems. Actors (who governs?) and processes (by which modes of coordination?) are central to the concept of governance. In areas of limited statehood, the state’s capacity to govern is limited, thus spurring the need for other actors to govern, like multinational companies, NGOs, public-private-partnerships and local non-state actors such as traditional institutions. “Governance by government” is then replaced by governance by various combinations of local, national and international state and non-state actors. The state is thus not absent, but in a negotiation relationship with those other actors (Risse, 2011). The question of allocation of power and decision-making among different actors is even more crucial in such a context. The mechanisms and processes by which this allocation takes place is precisely what governance is about (Wiber & Bull, 2009).

The concept of governance has not often been explicitly applied to seed or seed systems. To our knowledge, Galiè (2013) is one of the few authors (another being Okry et al., 2011) using the concept of seed governance, and the only one who provided a definition: “the formal and informal rules and behaviors that affect rights, access to and control of seed at the international, national, local and individual levels” (Galiè, 2013 p. 33).

2.1.3 Adaptive governance for resilience

Adaptive governance aims at managing “the complexity and unpredictability of dynamic socio-ecological systems” (Termeer et al., 2010.p. 29). Although adaptive governance emerged from research in environment and resource management (Dietz et al., 2003, Folke et al., 2005) and primarily deals with ecosystem-based management, its concern with adaptation to (abrupt) changes makes it of interest to governance of seed systems in fragile contexts.

Folke et al. (2005) frame abrupt or gradual disturbance as an opportunity for fundamental change of the system, when the existing system proves no longer tenable. They contrast adaptability (i.e. the capacity to adapt to certain changes from outside and maintain a desired state) with transformability (i.e. the capacity to create a new system). Both are related to the resilience of a system.

Creating resilience, the capacity to respond to stress, is a primary aim of adaptive governance. For seed systems,

resilience is defined by McGuire and Sperling (2013, p. 646): “Resilient seed systems have the capacity to absorb shocks and stress, and reorganize so as to maintain and strengthen seed security over time. Resilience emerges as a property of germplasm, institutions, and interactive information systems, which allow for strategic response to change.” Resilience of seed systems thus goes beyond seed security at the household level as affected by wealth class, to include the capacity of the whole seed system to adequately respond to change (McGuire & Sperling, 2013). The adaptive governance literature yields insights on creating resilience (Folke et al., 2005) that are of particular relevance for the governance of seed systems in fragile contexts as will be discussed in chapter 3.

2.2 Integrative framework

In Figure 1 we present an integrative framework, that presents a model of the links between seed security and (resilient and adaptive) seed systems in fragile areas.

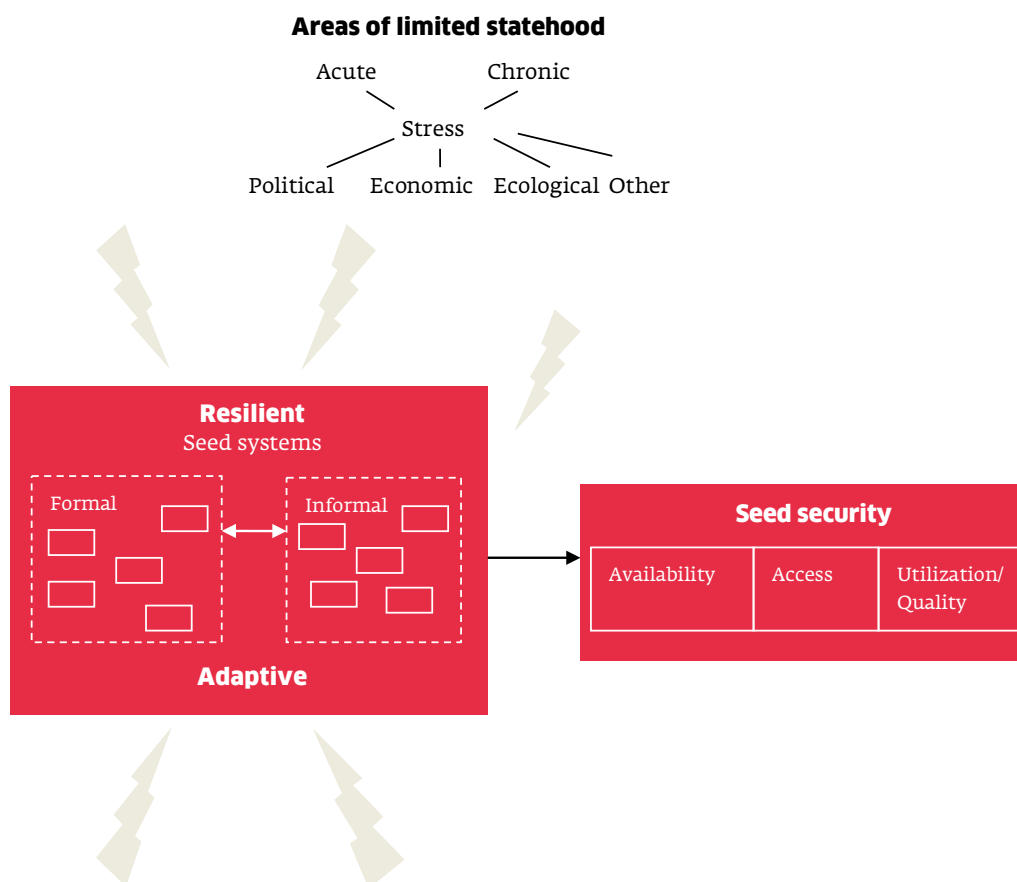
Fragile areas, characterized by limited statehood and continuous or intermittent occurrence of acute or chronic stresses of political, ecological, economic or social nature, provide the contexts in which the seed systems function. To function well in such contexts, seed systems should either be robust and able

to withstand disturbances or transform and reorganize following disturbance. Thus, they should be both resilient and adaptive (see Figure 1). Seed security can be delivered through a (resilient) seed system, in analogy to food security being an outcome of the food system (Pereira & Ruysenaar, 2012).

Governance occurs both within the seed system and in the wider context. In this study, we first of all conceptualize governance as collaborative problem-solving arrangements between government, business or civil society actors. We think that that such a broad conceptualization of governance is most apt to capture the dynamics of both formal and informal seed systems, and connects best to the scant literature that is written on governance of seed aid (as in Sperling & McGuire, 2010). Second, following Wiber & Bull (2009), we conceptualize governance as the allocation of power and decision-making between actors.

We consider resilience as the opposite of fragility. Thus, adaptive fragility governance aims at reducing fragility, both by alleviating chronic and acute stresses and by increasing resilience of seed systems. The challenge of seed governance in fragile areas, then, is to find those problem-solving arrangements that create resilient seed systems and contribute to seed security.

FIGURE 1 AN INTEGRATIVE FRAMEWORK ON SEED SECURITY AND SEED SYSTEMS IN FRAGILE AREAS



Explanation: Large arrows represent stresses as affecting the seed system. Small boxes in the seed systems represent different actors. Those actors are interrelated, as well as the formal and informal seed system, as indicated by the dotted lines and the arrow. Smallholders' seed security is conceptualized on the right side, whereas farmers are actors in the seed system, too. See text for further explanation.

3. FROM SEED SYSTEM FUNCTIONING TO RESILIENCE AND BEYOND?

This chapter consists of two parts: the first part is a literature review, the second offers a synthesis, using the concepts of governance and adaptive governance as lenses to look backward and into the future.

The first part consists of three sections. The first section provides a review of the literature on seed systems and seed security in fragile contexts. In this literature, a distinction between formal and informal seed systems is common. In our review, the main sourcing channels of seed will be shortly discussed, with a special focus on sourcing channels following disaster. This part will also discuss how lack of interaction between formal and informal seed systems hampers small-holders' access to formal sector seed. The second section is about 'resilience', that gets increasingly attention in the literature on seed system functioning and seed security. Resilience, seen as the capacity to withstand and recover from gradual or abrupt changes, is especially relevant in fragile contexts. Characteristics of seed system resilience will be presented, as well as lessons on working towards resilience that can be drawn from the literature on adaptive governance and adaptive food governance. In the third section, the scant literature on adaptive food governance is reviewed.

In the second part of this chapter, we will reflect on the literature and discuss the extent to which questions of governance are addressed and which areas of 'seed governance' hitherto have remained unexplored. Moreover, an outlook will be given on how concepts from the adaptive governance literature could enhance analytical rigor in looking at seed system functioning, and provide practical guidance on the development of governance arrangements for resilient seed systems.

3.1 Seed systems and seed security in fragile contexts

3.1.1 Formal and informal seed system functioning

There is quite a large body of literature on seed system functioning. Often, a systems approach is used in the literature on seed security. Seed systems are defined by McGuire (2008, p. 274) as "all practices and institutions that are involved in plant breeding and seed provision, as well as the related legislation". Seed systems thus entail the actors, institutions, processes, and knowledge involved in the development, certification, propagation, distribution, exchange and utilization of seed.

In the literature on seed systems, a distinction is made between formal and informal systems (see Table 2). Formal systems entail the development, production, dissemination and procurement of certified seed by commercial growers and specialized government or research institutions.² Certification

aims at guaranteeing phytosanitary and physiological quality standards, and varietal purity. Seed production is separated from crop production (Sperling et al., 2008).

In contrast, in the informal system, seed is produced, selected and processed by farmers themselves, as an integral part of crop production. Moreover, the informal system includes exchanging seed among neighbors, families or relatives, at informal markets (Sperling & McGuire, 2010) and via local seed dealers at open markets³ (the importance of the latter stressed by Okry et al., 2011). Sperling et al. (2008) mention own stocks, farmer-farmer-exchange and local markets as the most important informal channels, although mixtures may exist, such as exchange with local traders present in neighboring villages (Okry et al., 2011). Such exchange may take the form of giving, borrowing, bartering or selling seed (Longley et al., 2002).

TABLE 2: DISTINCTIVE FEATURES OF FORMAL AND INFORMAL SEED SYSTEMS

FEATURE	FORMAL SEED SYSTEM	INFORMAL SEED SYSTEM
Certification	Certified	Not certified
Seed production	Separate from crop production	Integral part of crop production
Variety release	Formal	Informal/not applicable
Exchange through	Officially recognized seed outlets, agro-dealers	Local markets, petty traders, social networks, own production
Main crop types	Hybrids, high-value horticultural crops	Self-pollinating crops and other crops reproduced by farmers' themselves

Source: Sperling et al. (2008), Louwaars and De Boef (2012).

Some distinctive features of formal and informal systems are presented in Table 2. Frequent interactions between both systems occur, as reviewed by Louwaars & De Boef (2012).

Based on rice seed sector research in Guinea, Okry et al. (2011) provide an overview of seed system stakeholders. They distinguish three groups: those directly affected by seed sector interventions, those functioning as intermediaries in the delivery or execution of seed projects, research programs and resource flows and those with the ability to promote or stop interventions. Stakeholders from the first group include individual farmers, farmer's associations, local seed dealers and agro-input dealers. Agro-input dealers could also be classified as stakeholders from the second group, just like extension services, national research institutes and (local) NGOs. The Ministry of Agriculture, CGIAR institutes, and intergovernmental agencies such as the World Bank, the FAO,

³ Contrasted to (local) agro-input shops, which are part of the formal system when selling certified seeds.

² Sperling et al. (2008) integrate relief organizations as part of the formal system, but we would argue that the relief organizations are not part of the formal seed system per definition, but that they can take up different roles and have different positions.

IFAD and WFP are considered stakeholders belonging to the third group. Not all actors may be present in other countries (and additional actors may be present) and their roles and interactions may differ.

Formal and informal seed systems shaping access to seed

McGuire (2008) investigated how social relations affected access to seed in Eastern Ethiopia. He found that seed exchange between farmers is an important source of seed, especially in times of seed shortage. Seed exchange was found to be ‘closely linked to social networks and to norms of reciprocity’ (McGuire, 2008, p. 223). Therefore, access to seed varied notably among households, both in quantity and terms of supply. The latter point is in line with Okry et al. (2011) who found that rice seed dealers in Lower Guinea only give, loan or barter seed to those farmers with which they have strong ties; others have to buy seed. Likewise, Longley et al. (2002) mention that giving away seed usually is done only through social networks, in which reciprocity is important. In South Sudan, poorly-endowed farmers may face problems accessing seeds when they have limited access to social networks (Longley et al., 2002). In Syria, intra-household access by women to seed and new varieties was hampered by persistent cultural norms and “customary discriminatory practices” (Caliè, 2013).

Social relations may also significantly affect the distribution of seed provided by seed aid, as shown by Archibald and Richards (2002). In Sierra Leone, they found that local institutions (“village committees”) responsible for distribution of seed denied access to people who had been labeled beneficiaries by the donor organizations. Finally, conflict may severely affect social relations between people and their willingness to exchange seed (McGuire et al., 2008).

Networks and social relations also are important in assessing the quality of local seed traders, and may serve as a form of quality control by what the Catholic Relief Service (CRS) and Sperling et al. (2008) called ‘social certification’. An example is given by Okry et al. (2011) who describe how farmers exchange information about local rice seed traders, so that possible cheating or the provision of misinformation would spread quickly in their network. Traders could consequently lose customers or be excluded from a customer’s group. At informal markets, farmers not only assess the quality of the seed, but also the provider (Sperling & McGuire, 2010), and seed exchange at local markets is regulated through “social norms of reciprocity or “good neighborliness” (Jones et al., 2002). Provision of ‘good quality seed’ was also said to be key for the loyalty of farmers to rice seed traders in Guinea, stimulating traders to provide clean and pure seed with high germination vigor (Okry et al., 2011).

Formal seed system functioning is often criticized, such as by McGuire, observing that “despite considerable investment, formal sector has had little success due to market failure or inappropriate policies” (Cromwell 1996, Tripp, 2001; in McGuire, 2008). The extent to which the formal sector is developed differs considerably among countries. Actual certification is not present (i.e. there are no formal certification laws) in some countries, and has little actual meaning in many more countries due to weak enforcement of regulations (McGuire, pers. comm.).

Farmers obtain the majority of their seed (estimated at over 80%) via the informal seed system (Byerlee et al., 2007; in Louwaars & De Boef, 2012). However, there are notable differences between crops. Formal sector delivery is important for commercially produced seeds, which are mainly high-value horticultural crops and hybrids, notably maize (Louwaars & De Boef, 2012). For crops that perish easily, such as groundnuts, farmers may source crops from formal or informal markets, especially if they lack adequate storage facilities. On the other hand, self-pollinating crops with high multiplication rates such as sorghum or millet are hardly ever obtained via the formal seed system (Louwaars & De Boef, 2011; Remington et al., 2002) (see Box 1).

Box 1. Multiplication, seeding rates and recovery of crops

The multiplication rate of a crop is the number of seeds that can be obtained from one seed. For small seed crops less than 1% of the harvest is needed for seed, whereas for large grain crops more than 10% can be needed (Sperling, Cooper & Remington, 2008; Longley et al., 2002). Crops with high multiplication rates and low seeding rates have the potential to recover within a single season (Longley et al., 2002), and the chance that production shortfall leads to seed shortfall is smaller than for crops with low multiplication rates and high seeding rates.

CROP	SEEDING RATE (KG/HA)	MULTIPLICATION RATE
Beans	100	8
Groundnut	120	6-10
Cowpea	90	15
Barley	100	15
Wheat	100	25
Rice	20 (upland) 80 (swamp)	50
Maize	20	100
Sorghum	10	100
Pearl millet	5	200

Source: ODI seeds and biodiversity programme (1996, p.41) in: Longley et al., 2002

Farmers thus obtain little seed from the formal system, which may reflect both their preferences and limited access to formal sector seed (McGuire, 2008). Okry et al. (2011), citing others, state that “in general the formal seed system fails to serve smallholders”. Among the factors that hamper farmer’s access to formal sector seed are the high price of seed from the formal sector, the larger distance to the places where this seed is available (Almekinders et al., 1994; in Okry, 2011), and the limited number of varieties and small quantities offered by research and seed centers (Okry et al., 2011).

In extreme cases, the informal sector may be the only sector through which farmers obtain seed, due to the virtual absence of a formal seed sector. This was the case in South Sudan,



Photo David Rivas

Distribution of seeds by motor taxis from warehouse to off-road villages and hamlets in the Central African Republic

where the absence of the formal seed sector, combined with a lack of linkages between research and farmers, seriously hampered the generation and adoption of new seed varieties (Jones et al., 2002).

Moreover, Okry et al. (2011) found that extension officers, researchers and employees from the seed center in Guinea held negative perceptions of farmers, hampering their involvement in the formal seed sector. Additionally, local seed dealers were largely ignored by governmental agencies and extension services, despite their crucial role in facilitating farmers' access to seed. The reluctance of the formal sector to recognize seed obtained from local channels was also noted by Sperling & McGuire (2010).

Whereas the formal and informal seed sector do interact in different ways (Louwaars & De Boef, 2012), such linkages tend to be under-developed and unorganized; several authors have stressed the need for better linkages between the formal and informal seed systems (Louwaars & De Boef, 2012, McGuire & Sperling 2013).

Likewise, scholars called for better institutional linkages between agricultural research institutions and people working "on the ground", especially in conflict or post-conflict contexts (Sperling & Longley, 2002). Opinions differ, however, on whether to focus primarily on strengthening local institutions and informal systems (e.g. Sperling & McGuire, 2010; Longley et al., 2002), targeting the formal sector (such as AGRA or IFDC), or both (e.g. Louwaars & De Boef, 2012). This will be further explored in chapter 4.

Formal and informal seed system functioning affecting seed quality

Donors and development practitioners usually believe that improved or (formally) certified seed is better (Sperling & McGuire, 2010; Remington et al., 2002). In the debate over 'improved seed' or 'certified seed', it is important to distinguish

between seed quality (germination vigor, purity, sanitary quality) and varietal quality (genetic properties), as they are often conflated (Sperling & McGuire, 2010; Remington et al., 2002).

Farmers' evaluation criteria may differ from criteria developed by breeders or those setting seed certification standards, both with respect to seed quality and varietal quality. In South Sudan, farmers were generally satisfied with germination quality and general performance of locally sourced seed (Jones et al., 2002). Remington et al. (2002) show that farmers: first, sort and select seed by hand prior to planting reducing the need for pre-sorted seed; second, may compensate for low germination vigor by increasing seeding rate; and third, judged germination quality and seedling vigor to be sufficiently high. Genetic purity may be of lesser importance for farmers who do not sell their crops on the market and would receive a market premium for uniformity (Jones et al., 2002; Remington et al., 2002). Moreover, genetic mixtures may increase production stability. However, in the rice seed system in Guinea, farmers did perceive purity as an important seed quality characteristic for which they actively sought (Okry et al., 2011).

Last but not least, improved varieties may be developed under optimal conditions at research stations, but not be well-adapted to farmers' conditions. Agro-ecological conditions, such as rainfall and soil fertility, use of inputs such as fertilizers, herbicides or pesticides, level of mechanization and availability of labor for e.g. weeding may all notably differ between research stations and farmer fields, which obviously has important consequences for crop performance. On-farm testing of rice varieties showed that rice varieties developed by farmers performed better than improved varieties developed by breeding institutions, except for one field with high soil fertility (Interview 6). Galiè (2013) provides a telling example from Syria: varieties developed in a participatory breeding program were excluded from official approval because the submitted varieties did not perform as good as other varieties

on the trial stations. They did perform better on-farm, however, where growing conditions were less optimal than in the testing sites. The division of labor may also affect the suitability of certain varieties in a farming system, which may not be taken into account in variety development.⁴

3.1.2 Seed system resilience

The concept of resilience is increasingly being used in the literature on seed security. Recently, McGuire & Sperling (2013) applied the concept of resilience to seed systems. They identified eight (8) key principles for resilience in seed systems. First, a systems perspective is necessary. Second, maintaining seed system functioning is more important than maintaining a particular system state. Third, diversity is important. Fourth, both short-term and long-term resilience should be taken into account. Fifth, the provision of relevant information is necessary to guide strategic decision-making. Sixth, in order to facilitate learning, feedback loops should be nurtured. Seventh, a variety of flexible responses should allow farmers to maintain seed security. Finally, trade-offs between stress and risks should be considered when intervening in seed systems.

In order to strengthen seed system resilience, it is important to understand the ways in which crises affect seed systems and to what extent existing seed systems are resilient. Several authors have investigated seed system responses to stress. Seed systems have proven to be remarkably resilient after disaster, especially for crops with high multiplication rates (Box 1). If their own production is circumscribed, farmers may be able to obtain seed through social networks or in the local market (Longley et al., 2002).

Several studies investigated seed availability and sources of seed following conflict or disaster. Sperling et al. (2008) and McGuire & Sperling (2013) reviewed effects of seed systems under stress on the basis of several case studies. They found that access to seed, rather than availability of seed, was problematic (Sperling et al., 2008). Only in exceptional cases, conflict caused a total lack of seed. Sperling (2001) investigated the effect of civil war on Rwanda's bean seed system and bean diversity. She found that, only in the areas where severe dislocation took place, 5% of farmers reported absolute lack of bean varieties and/or overall absolute lack of seed.

In that case, as well as in other cases, many varieties did not disappear, but still existed locally (Sperling, 2001; McGuire, 2008). Access to seed, however, is problematic (Remington et al., 2002; Jones et al., 2002; Sperling & Cooper, 2003): conflict may leave farmers poorer than before, while seed prices rise (such as in Rwanda; Sperling, 2001). Also climatic crises may cause traders to demand higher prices (Sperling & McGuire, 2010). Moreover, social networks may be disrupted as people have been killed or fled (Remington et al., 2002; Sperling, 2001). Richards et al. (1997) found, based on research in West Africa, that war and conflict can disturb and alter agrarian social

relations and subsequently profoundly change the functioning of seed systems. In times of crisis, local informal markets gain importance as a sourcing channel of seed (McGuire & Sperling, 2008; Sperling & McGuire, 2010).

3.1.3 Adaptive food governance

The literature on resilience is closely related to that on adaptive governance. Specifically, resilient socio-ecological systems are believed to be sustained through adaptive governance. There is a growing body of literature on adaptive governance (e.g. Folke et al., 2005; Boyd & Folke, 2013; Termeer et al., 2010) outlining its' distinctive features and relationships with resilience (Folke et al., 2005) and other forms of governance (Termeer et al., 2010). In addition to and building on this literature, some authors recently have started to apply concepts from the adaptive governance-literature on food systems and to develop the notion of adaptive food governance.

Bohle et al. (2009, p. 54) argue that "(f)or most vulnerable food systems and food actors, the informality of rules has proven to be a major element of adaptive food governance." They use the mega urban food system of Dhaka as an example of adaptive food governance, whereby informal rules and institutions, as "the sum of agency of millions of food actors", play a key role in providing food security for the urban poor. Especially in vulnerable food systems, "agency-based actor-networks", as flexible and community-based systems, are central to adaptive food governance. Moreover, the authors stress the importance of inclusion of vulnerable food actors in decision-making over food governance. According to them, democratic principles should be the basis of rule-making in order to enhance the legitimacy, accountability and fairness of adaptive food governance. As they link adaptive food governance to building resilient food systems, they point to social and cultural capital as social sources of resilience notably important for vulnerable people.

Pereira & Ruysenaar (2012, p. 41) search for conceptions of governance that "take into account the complexity of food systems with food security as an outcome." They analyze whether forms of adaptive governance play a role in the contemporary governance of food security in South Africa. The government's Integrated Food Security Strategy suffered from lack of effective institutionalization and implementation, reflecting a lack of flexibility in and coordination of the governmental departments involved. On the other hand, the role of non-state actors in governing food security has increased in two ways: through 'good corporate governance' and through partnerships between stakeholders, notably businesses and NGOs. The authors see this as a form of "self-organization", creating new and adaptive forms of governance of complex adaptive systems (i.e. food systems).

Juhola (2012) loosely applies an adaptive governance framework to the national and international response to the 2004/05 food crisis in Niger. She points to institutional failures leading to an escalation of the crisis, and relates those to four adaptive governance principles. Among the factors hampering an adequate response were: lack of agreement among stakeholders on the severity of the crisis; inability of the Nigerien government to deal with the crisis; inflexibility of international

⁴ The local development of early maturing rice varieties in West Africa provides an interesting example. Whereas an early maturing rice variety proved to fit well in the Gambian cropping system, it was less suitable for the Guinean system. In the Gambian system, responsibilities for different crops were clearly distinguished between men and women, whereas the majority of the tasks were performed together in all crops in the Guinean system. Therefore, an early rice variety of which the harvest-time coincided with the harvest-period of peanut caused problems of labour availability in the Guinean system (Interview 6).

donors, and focus on emergency food aid rather than on building safety nets. The study shows how Niger's dependency on foreign aid contributed to its vulnerability and fragility.

Additionally, some lessons from the adaptive governance literature merit mentioning here. Folke et al. (2005) consider informal networks and brokering and leadership roles as "social sources of resilience for adaptability and transformation". Other sources they identify include the mobilization of social memory, actors or actor groups mobilizing social networks, roles taken up by key individuals with different 'characters' (such as mavens, connectors or brokers), and connections between actor groups. In her schematic representation of seed systems, Almekinders (2001) provides an example of NGOs fulfilling such brokering roles by linking informal and formal seed system actors.

Moreover, Folke et al. (2005) stress the importance of learning by organizations as well as individuals. Overseeing ten case studies on adaptive institutions, Boyd and Folke (2013) deduct three generic features of adapting institutions for social-ecological resilience: buffering, feedbacks and self-organization. Buffering refers to specified resilience as the capacity "to allow for backup and to translate signals". Under 'feedbacks', they stress the importance of links between different scales and between scientific and local knowledge. They consider self-organization to contribute to generalized resilience, as the "ability to construct flexible/transparent networks that can evaluate and absorb new ideas and prepare for unknown unknowns". These may be valuable lessons for systems that are prone to gradual and abrupt changes, such as seed systems in areas of limited statehood experiencing frequent stresses.

3.2 Towards adaptive seed governance?

3.2.1 Looking backward: governance in the literature on seed systems and seed security

Remarkably little has been written on the governance of seed aid and governance for seed security in fragile contexts. While there is quite some literature reflecting on the effectiveness and appropriateness of seed-related interventions, the governance of those interventions is seldom explicitly addressed, specifically in emergency situations (see also chapter 4.1). How are decision-making and power allocated between stakeholders involved, and, perhaps even more pressingly, who decides about that? Who designs or is supposed to design the interventions aimed at providing seed security, who is executing them and how and by who do they get evaluated? Those questions are not posed nor answered in the literature on seed relief, seed aid and seed security. For instance, McGuire & Sperling (2013) discuss which areas for action are key to achieving resilient seed systems, but they omit to address the question which modes of governance could best support the realization of those recommendations or which actors should undertake the actions proposed.

This lack of awareness of governance matters is reflected in the recommendations of several papers and reports oriented towards development organizations. For example, the calls for an assessment of current seed system functioning like seed security assessments (Sperling, 2008, Bramel & Remington,

2004, FAO, 2004, Longley et al., 2002) and seed system profiling (Longley et al., 2002) assume that the development practitioners will decide on the regions to intervene, the goals to achieve and the appropriate interventions to do so. Moreover, the assessments as such primarily focus on technical aspects and sourcing channels rather than on the (power) relations and collaborations between stakeholders.⁵ It should be noted, however, that SSSA methods have further evolved after their early creation and now include, as part of essential background to the assessment, national seed policies, the actions of research institutions and NGOs and seed release procedures and institutions.

Sperling & McGuire (2010b) give reasons for the lack of attention for governance of seed aid. Those include: the invisible nature of seed aid, its image as being unproblematic, the exclusion of relevant experts and important actors from involvement in seed aid, and the lack of clear and public goals for seed aid. Thus, while their reflection concerns the management of seed aid by the stakeholders involved, we observe that, additionally, little empirical research on governance of seed aid has been conducted and little has been written about it in the scholarly literature.

The literature on adaptive governance is emerging, and only recently authors have started to apply those concepts to food system functioning. To our knowledge, concepts of adaptive governance so far have not yet been applied to seed systems. In the literature on adaptive food governance (Bohle et al., 2009; Pereira & Ruysenaar, 2012; Juhola, 2012), the adaptive governance framework is used to describe food (crisis) governance: to what extent did the existing arrangements prove to be flexible and adaptive to change, and what elements of adaptive governance could be recognized in the governance of food (crisis)? The breadth of the topics covered in the adaptive governance-literature leaves room for different issues to be addressed in answering these questions. Additionally, how to realize a shift to adaptive food governance in practice is a different question. As Pereira & Ruysenaar (2012, p. 55) put it, "how to support this process without being overly prescriptive is likely to prove the greatest challenge". This is also the issue for developmental organizations aiming to foster resilient seed systems through seed system governance.

Little attention is paid to the issue of accountability of (inter) national agencies and development organizations intervening in seed systems in fragile areas. While a full discussion of this topic is beyond the scope of this report, we wish to mention a few key issues. Pereira & Ruysenaar (2012) observe in their discussion on food security that "the state is still the accountable and dominant entity when it comes to redistribution to the most vulnerable". Yet, the state is often not able to provide those basic services (Risse, 2011) and other actors like the private sectors, international institutions and civil society then come into play to complement state functioning (Risse, 2011; Pereira & Ruysenaar, 2012). The accountability of those other

⁵ Although the extensive SSSA formats such as proposed by Sperling (2008) do include questions on: decision-making within the household, the effect of disaster on collaborative arrangements such as labor sharing, the presence of social networks or institutions for distribution of planting material and knowledge sharing, and on the relative importance and functioning of social networks, markets, traders and the formal seed sector.

actors, like international institutions, is often questionable. As Juhola (2012, p.163) argues: “The international community can be highly interventionist in countries like Niger, but there is neither accountability nor responsibility to respond in times of shock (Devereux 2005, Le Vallée 2006).” Nevertheless, mechanisms to enhance accountability of interventionist institutions to beneficiaries can improve their functioning (Grindle, 2004; in Sperling & McGuire, 2010).

3.2.2 Looking forward: adaptive governance literature and areas for future investigation

Risse (2011) argues that the lack of governance by the government in areas of limited statehood should be replaced by governance by various combinations of state and non-state-actor. The state is not absent, but rather in a negotiating relation with other parties. He writes that, therefore, governance assistance rather than state-building should be the primary focus for development in areas of limited statehood. However, there is no blueprint for such governance assistance. Instead, it should be based on meticulous analysis of the political, social and cultural context in which development takes place. This aligns well with the often-read call in the literature on seed aid and seed systems that a better understanding of (certain aspects of) the informal seed systems is desirable, and that any intervention should start with an analysis of the current situation; i.e. a seed system profile or security assessment (e.g. McGuire, 2008, Longley et al., 2002; Sperling et al., 2008; Jones et al. 2002).

Seed system assessments as currently existing (e.g. Longley et al., 2002; Sperling, 2008; SeedSystem.org) are definitely useful and important, given the numerous examples of poorly-designed seed aid guided by false assumptions and implemented rashly. However, we would argue that several governance-related issues remain underexposed.

First, the involvement of farmers in seed-related interventions merits greater attention. As Sperling & McGuire (2010b) argue, farmers could and should play a greater role in the governance of seed aid, especially through their involvement in evaluations. Moreover, McGuire & Sperling (2008, p. 687) argue that “seed aid must ensure fair dealing with farmers through (...) informing beneficiaries of procedures and content well in advance, and establishing mechanisms to receive feedback and address grievances.” Potentially, this enhances efficiency and effectiveness of interventions, as well as their legitimacy. However, “as yet [there are] few effective ways to give farmers more say over the procedures, content or approaches of seed aid” (Sperling & McGuire, 2010b, p.200). (Inter)governmental agencies, relief and development practitioners and farmers are thus faced with the challenging task to develop such methods and arrangements. A first step might be to stop perceiving farmers as passive “recipients” or “beneficiaries” of seed aid, but as stakeholders or actors within a seed system, highlighting their agency and coping strategies (the latter point is stressed e.g. by Bohle et al., 2009, McGuire & Sperling, 2008). A second step might be to involve farmers from the very start of the planning and design of a seed system intervention, by aiming to understand the functioning of their seed system and how it could be supported and strengthened. This relates to the following point.

Second, prior to any intervention greater analytical attention should be given to existing institutional and governance arrangements within the seed system. Folke et al. (2005) emphasize the important role of informal networks and of brokering and leadership roles taken up by key individuals in realizing successful transformation towards adaptive governance (Interviews 10 and 13). In seed system functioning, local seed dealers (Okry et al., 2011) and traders (Sperling & McGuire, 2010) often fulfil such brokering functions by moving (improved) varieties (Sperling & McGuire, 2010, Okry et al., 2011) and by functioning as an information channel (Okry et al., 2011). McGuire & Sperling (2008) found that the impact and effect of different interventions depended on the implementation process and the existing governance institutions, as well as on the relation between implementing and existing institutions. Information on the strength and type of existing institutional arrangements thus could guide the choice for an apt strategy.

We would like to take this point further and argue that, thirdly, the roles of different stakeholders involved in the intervention and the type of partnerships between them deserve greater attention, including questions about the responsibilities of different stakeholders, the distribution of decision making power between them, the procedures and mechanisms by which they operate, and, ultimately, how they affect seed system functioning and farmers’ seed security. This would imply a shift from often-sought *best practices*, focusing primarily on interventionist activities conducted by agencies and organizations, towards *best arrangements*, wherein more explicit attention is paid to the processes and mechanisms by which interventions are designed and decided upon.

The adaptive governance literature provides insights on the roles different stakeholders could play in order to contribute to systems resilience. As adaptive governance is concerned with multi-level and multi-scale interactions, the capacity to create linkages between knowledge and actors operating at different levels is important (Termeer et al., 2010). So-called “bridging organizations”, who can connect local actors and communities and regional, national or international actors, can play a crucial role in moving towards resilience. NGO’s can fulfil such a role by bringing in resources and knowledge; by creating space for communication and deliberation between actor groups, and by translating scientific knowledge into recommendations for policy and action (Folke et al., 2005).

Adaptive governance is an emerging field, and the ways in which it could be applied, both conceptually and as practical guidance, in relation to seed systems, are largely unexplored. Together with the dire need for more investigations in seed system governance and the effects on seed security, this provides a promising research area. Moreover, the urge to find legitimate and fair interventions through partnerships in which farmers are fully fledged partners, provides an intriguing area for development, practically as well as conceptually.

4. CURRENT PROGRAMS & INITIATIVES: BEST PRACTICES & PITFALLS

In this chapter, best practices and pitfalls of programs and initiatives aimed at providing seed security will be presented. Different interventions will be discussed along the axes of seed security: availability, access and quality. Respondents expressed different opinions about the most and least appropriate interventions and programs. Those opinions reflected differences in preferred entry points and on institutional preferences of agencies, initiatives and development organizations, which will be discussed in section 4.2. We turn to insights regarding best practices from the emerging literature on resilient seed systems and adaptive governance in section 4.3. In section 4.4 we then reflect on the findings.

The question “what are best practices of programs that aim to provide seed security in contexts of fragility?” can be answered at different levels. First, interviewees commented on things that went well in the design, planning, implementation and evaluation of a program: are we doing things right? Second, interviewees responded to the appropriateness of programs and interventions: are we doing the right things? Finally, opportunities for development were mentioned. The same levels could be discerned when asked for pitfalls. Interviewees not only mentioned potential hazards and difficulties that could hamper a successful implementation of a program (pitfalls), but also “bad practices” or “worst practices”, both regarding the choice of strategies and programs and performance in execution. This chapter is meant to contribute to the discussion on the question how to do the right things right?

4.1 Direct interventions towards seed security

4.1.1 Interventions targeting limited availability, access & quality: Direct seed distribution

Although direct distribution of seeds and tools is the most widespread form of seed aid, experts do not consider it as the most appropriate intervention. Such kind of intervention is based on the assumption that seed availability, access and quality have been compromised, which is often not true (Remington et al., 2002). Sperling & McGuire (2010b) go further and qualify the assumptions that seed aid is needed whenever food aid is needed, and the belief that disasters wipe out food systems, as two “persistent myths” about emergency seed aid. Moreover, the authors contend that the conception that food insecurity leads to seed insecurity is one of the most widespread misconceptions in seed aid (McGuire & Sperling, 2011, Sperling & McGuire, 2010, among others based on Longley et al., 2002). None of the respondents advocated unquestioned and continuous distribution of free seeds, and notably the interviewees from AGRA and IFDC took a firm stance against the free distribution of seed (Interview 2 and 3). The main arguments against the free distribution of seeds relate to the appropriateness as well as to the way free distributions have been executed.

Controversies over the appropriateness of direct seed distribution

Free distributions are deemed inappropriate, except for specific situations, primarily because they “distort markets” (Interview 2) and create expectations among farmers and contribute to the idea that fertilizers and seeds are for free (Interview 3). This, in its turn, is not conducive to the development of a private sector, since the private sector is dependent on the willingness of farmers to pay for seeds (Interview 3).

Moreover, the AGRA-representative argued that free distribution of seed is disempowering farmers: “As long as it is only supplied through a donor decision basis and an NGO decision maker, the farmer’s voice is going to be completely wiped out. Even taking decisions in terms of what variety of seed the farmers prefer, the variety of seed that eventually arrives at the farmer, is done by bureaucrats working in an NGO.” (Interview 2). Then, practitioners involved in free distribution of seed can reach only part of the population, and are faced with the associated challenges of reaching the most vulnerable part of the population (Interview 3). Contrary to this view, one interviewee mentioned that “seed is in short supply all over Africa” and pointed to the risk that, through a large demand for seed by donor programs, seed stocks are running short in a neighboring country and that too little seed is left on the market for the farmers it used to supply (Interview 2). This point, however, was neither confirmed in the literature nor brought up by other interviewees.

More importantly, short-term direct seed supply is not always needed. Seed is often present, also directly after disasters (McGuire & Sperling, 2013). Data from four case studies (in South Sudan, Kenya, Haiti and Zimbabwe) showed that farmers obtain seed by and large through own production, from relatives or via local markets (McGuire & Sperling, 2013). This was also concluded by Sperling et al. (2008), based on a review of studies on effects of disaster on seed system functioning, as described in section 3.1.2. Moreover, in countries without a well-developed formal seed system, seed from donor agencies is often obtained from within the region, suggesting that access to seed rather than physical availability of seed is the main problem smallholders are facing (Remington et al., 2004 in Sperling et al., 2008).

In several cases, direct seed distribution has been repeated for many years. For example, Burundi received seed aid for 22 seasons between 1995 and 2008, and seed aid in Ethiopia has been almost continuous since 1974 (Sperling et al., 2008). One of the interviewees mentioned that since he has started working in South(ern) Sudan in 2001, the quantities of seed imported to South(ern) Sudan have only increased (Interview 8). The permanent nature of such repetitive aid bears adverse effects: it may undermine retail sales and thereby compromise commercial seed supply systems (Rohrbach et al., 2005, in Sperling & McGuire, 2010). Moreover, it can make recipients dependent on seed aid (Sperling & Longley, 2002; interviews 7

and 8), although one interviewee argued that some farmers anticipate the incoming of seeds and tools, and hence sell their tools and use their seeds because they expect new seeds and tools to come (Interview 12).

Finally, the efficacy of repetitive seed aid is questioned (Sperling & Longley, 2002). Lack of access to seed may be caused by pressures as unpredictable weather patterns, lack of liquid assets, lack of adapted crops and varieties and lack of nearby markets (Sperling & Longley, 2002). Such chronic stresses hamper the effectiveness of direct seed distribution.

Sperling et al. (2008) argue that direct distribution of seed is only appropriate in specific situations, where seed system assessments revealed that availability of seed of certain crops and/or varieties is problematic. Preferably, such distribution should not take a repetitive nature. Timely evaluations of the effectiveness and need for direct distribution, for example after giving seed aid three years in a row, of seed can help preventing continuous seed handouts (Interview 12).

Pitfalls and best practices in executing direct seed distribution

Various interviewees mentioned pitfalls related to the execution of direct seed distribution, particularly with regard to seed quality, varietal quality and the timely arrival of seed. The expectation of direct seed aid poses risks to farmers when promises of seed fail to materialize (Sperling & McGuire, 2010b). Farmers may have invested in the preparation of fields in terms of money or labor and may have omitted to search for other sources of seed. This causes harm if, eventually, seed does not come, comes too late, or the seed is of poor quality.

Cases of seed distribution whereby seed was of poor quality were reported by interviewees across agencies and organizations (Interview 2, 3, 7, 8, 13). Specifically, carrying seed over long distances is problematic, especially for seeds and planting materials prone to quality deterioration (such as cowpea, groundnut or beans) or desiccation (such as sweet potatoes or cassava) (Interview 7). The case of seed provision in Bahr El Ghazal provides a telling example (Box 2). Conducting a germination test of seed from local markets prior to buying it was identified as a best practice (Interview 14).

Moreover, two interviewees mentioned lack of attention for the cultural value of food crops as a pitfall (Interviews 1, 14). One of them gave an example from Malawi whereby white maize was introduced whereas people preferred to eat yellow maize (Interview 1), whereas the other mentioned the introduction of a crop in the Central African Republic that people were not familiar with and did not know how to prepare (Interview 14).

Direct seed aid can pose risks to farmers when crops and varieties supplied are not well-adapted to the agro-ecological growing conditions of the recipient area. This can and has caused in several cases) crop failure or the introduction of pests, diseases and weeds (Sperling & McGuire, 2010b).

Finally, direct seed supply by donors often involves certified seeds coming from the formal sector (Remington et al., 2002).

This implies that only a limited number of crops and varieties is available.

FAO has extensive experience in a range of responses to seed insecurity, among which direct seed distribution. Basic technical information for field staff to use in a variety of methods of seed aid can be found in “Seeds in emergencies: a technical handbook” (2010) (Interview 7).

Box 2. Pitfall: The case of direct seed distribution in South Sudan.

“In 1998, southern Sudan was hit by severe drought and famine. CRS had money from Caritas, probably Cordaid as well, and we purchased seed from procurement agencies in Kampala. With these companies they just went to the market and bought sorghum, whatever they could find and put it all together, different varieties. We trucked it through Uganda and all the way to Bahr El Ghazal and gave it to farmers. It was lousy. Not only that, but in fact they did not need it. So at that time we say, why are we enriching a select few of business people in the disaster industry in Kampala? Why do we not do something that strengthens communities - at least that leaves the money in the community? And that is why we started sourcing seed locally through vouchers.”

Source: Interview 8.

4.1.2 Interventions targeting limited access: vouchers and seed fairs

Contrast to the provision of direct seed distribution, the organization of seed vouchers and fairs is based on the assumption that seed is available in fragile contexts. Seed vouchers are “coupons or certificates with a guaranteed cash value that can be exchanged for seed from approved sellers” (Remington et al., 2002, p. 321). Often, seed vouchers are issued at locally organized fairs, as to facilitate the exchange of knowledge over seeds and varieties among farmers and traders, as well as over other issues (Remington et al., 2002, Sperling et al., 2008; citing others). Again, experts disagree about the appropriateness of seed vouchers and fairs, and expressed concerns related to the best way to execute vouchers and fairs.

Controversies over the appropriateness of seed vouchers and fairs

There are both strong arguments in favor and against seed vouchers and fairs. Various authors and interviewees emphasize that seed vouchers have several advantages over direct seed distribution.

First, they facilitate access to seed for farmers lacking the resources to obtain seed otherwise. Second, they allow farmers to choose which varieties and crops they want to use, including those from the farmers’ system (as also mentioned in interview 1). Third, they provide an investment in local seed systems, by supporting small farmers and petty traders as well as commercial seed producers (Remington et al., 2002, Sperling et al., 2008). In Nigeria, a rice seed voucher program significantly increased annual household income and reduced poverty

(Awotide et al., 2013). In this way, seed vouchers and fairs support the development of local markets (interview 5). Fourth, seed vouchers and fairs have a low risk of providing seed that is maladapted to local circumstances, as most seed is sourced from channels farmers typically use, and as the diversity of seed provided is often large, so that the amount of poorly adjusted seed is usually small (interview 8).

For those reasons, FAO has shifted part of its interventions from direct seed distribution to distributing vouchers and organizing input trade fairs/seed fairs, collection of seed from farmers and redistribution and community seed production in a number of countries including Burundi and South Sudan (interview 7).

However, there is also fundamental critique on seed vouchers and fairs. First, they are still supply-side driven interventions and not necessarily based on assessment of actual seed security (McGuire & Sperling, 2013). Moreover, critics suggest that seed vouchers and fairs “inflate the price of seed, (...) and that the fairs do not always provide the range of varieties needed or in sufficient quantity” (Sperling et al., 2008, p. 601). In addition, one interviewee stressed the importance of the interactions between farmers and seed sellers while trading, as farmers who pay (a good price) for seed today may buy on credit tomorrow. According to him, vouchers distort those relations (interview 12). Finally, as direct seed distributions, seed vouchers and fairs are often organized repeatedly. Experts termed this ‘a chronic seed aid syndrome’ (interview 8) or ‘the new treadmill’ (interview 13) and argued disadvantages of both forms of continuous aid are similar.

Pitfalls and best practices in executing seed vouchers and fairs

The question: “Who benefits?” is central to concerns over the fairness and effectiveness of seed vouchers and fairs. Larger traders may benefit more from vouchers and fairs than smaller traders. In central and eastern Africa, commercial seed growers and stockists earned approximately ten times as much as local grain traders with seed vouchers and fairs (Remington et al., 2002). One interviewee expressed concern over the possibilities for small sellers to benefit from vouchers and fairs (interview 13): “Did we make sure that people carrying seed on bicycles and people who carried rice on their head also had a right to participate? Or were the only people that could participate people that showed up in a truck?” This is related to the pitfall that sellers fix prices between them and exclude other sellers that would like to participate in the fair (interview 13).

Moreover, governmental regulations may prescribe that only specific private seed companies may participate in providing seeds for seed vouchers and fairs. This was reported to be the case in Sudan, South Sudan, Uganda and Liberia, although the extent to which the intervening NGO was bound by these rules, differed (interview 12).

In addition to concerns related to a fair distribution of benefits among buyers, one interviewee expressed concern about the extent to which seed buying farmers benefited from vouchers and fairs. He wondered whether farmers get value for their money and to what extent they are satisfied with the seed

obtained, to what extent seed vouchers and fairs truly provide a choice to farmers (e.g. when there are few vendors), and to what extent farmers are making informed decisions (interview 13).

In a summary on criticism on seed vouchers and fairs, Sperling et al. (2008) write that several donors showed concern over the quality of the seed as seed vouchers can be used for farmers’ seeds as well as for commercial seeds. In an ex-post evaluation of seed fairs in southern Sudan, at least 70% of the farmers rated seed quality as equally good or better than their own seed, with notable differences between crops and seed suppliers (Remington et al., 2002). Due to governmental regulations or preferences of local staff, only certified seeds may be sourced on seed vouchers and fairs (interview 12). Seed quality and certification are more extensively discussed in ‘Interventions targeting seed quality – varietal quality and seed quality’ and in ‘Formal certification?’

Furthermore, seed fairs are mainly organized locally and require knowledge of and logistic capacity in a specific area. Therefore, staff and logistical capacity is a challenge for organizations aiming to scale up seed voucher distribution and fairs (Sperling et al., 2008). The need to develop the expertise and logistical capacity to conduct seed vouchers and fairs was also stressed in interview 7.

Moreover, in conflict or post-conflict areas, seed vouchers and fairs may attract criminality and carrying large amounts of money may be risky (interview 7). Pressing security issues can seriously hamper conducting seed vouchers and fairs in such areas (interview 7).

4.1.3 Interventions targeting seed and varietal quality

Neither in the literature reviewed nor in the interviews, we encountered debate over the appropriateness of interventions aiming at enhancing seed quality (as germination vigor, purity, sanitary quality). Regarding the execution of interventions aiming at improving seed quality, two best practices were distinguished.

Best practices and pitfalls of interventions targeting seed quality

First, CRS promoted on-farm hermetic storage of seed in projects in Burkina Faso and Burundi. This prevented quality deterioration of seed and lowered the amount of insecticide that had to be used to prevent insects eating the seed. At the same time, the building of seed storage functioned as a means to raise awareness of seed quality. Farmers were taught and experienced that seed is different from grain and that it should be dried and stored separately, and that varietal purity can be maintained in this way (Interview 8). Also, in Ethiopia, the building of seed storage facilities supported by CARE spurred merchants to take better care of seed quality, and hence better develop their trading business, which contributed to the conservation of specific varieties (Interview 5, Box 3).

‘Positive selection’ was put forward as another best practice aimed at raising farmers’ awareness on quality of planting materials and improving agricultural practice. ‘Positive selection’ entails the selection of healthy and vigorous potato-plants for seed potatoes in the field and marking them by placing a stick

Box 3. Best practice: the case of seed vouchers, building seed storage and resilience in Ethiopia.

“In Ethiopia, CARE has done vouchers and fairs, rather than giving seed. They were working with merchants, traders of grain. Selling potential seed would always be a small proportion of the business of those merchants there (around 10%), and often entails more than passing off grain as seed (e.g. sourcing from a specific region, separating out inert material or shrunken grains, placing an order with a set of farmers to produce seed, selling at a higher price than grain, and so on). CARE required that, in order to participate in a voucher programme, these traders build a separate storage space for seed. Moreover, CARE performed some inspection of the condition of potential seed. This encouraged participating merchants to get more involved in selling potential seed, and probably did bring some merchants into selling seed who were not doing it before. When we talked to some of these people one or two years later, they weren't getting any more money from CARE via seed vouchers and fairs, but they were still selling seed, still had that storage. Because they saw that they had built a market, that farmers were coming to them because they thought ‘this is a reasonable source and they're keeping stuff in good condition, so I'll come back.’ And in one case there was this person with pearl millet from the dry lands of Ethiopia that was now becoming a source of a variety that people thought had disappeared. He found some, collected it and was selling it. So it had become a reservoir of lost varieties. Now that's a very good example. So this is an argument you can try to make for resilience, because now certainly we've got varieties that had otherwise perhaps dropped off the radar from twenty years ago, that people now want back, like a drought tolerant crop. And here's this merchant making it more widely available. And if it's useful people are buying it.”

Source: Interview 5.

Box 4. Pitfalls of working in fragile areas: the case of BXW in Eastern Congo

“I will give an example of BXW (Banana Xanthomonas Wilt) in eastern Congo. There was an approach, a great example I think, where regulation and governance fell down. So the partial response to BXW in eastern Congo was; help people really understand and identify the disease. Farmers were losing their banana plantations. And the advice is, once you get your plantation infected, to uproot the diseased plants. The disease was very present in Uganda and in the Kagera region of Tanzania, and it is still very present in Rwanda, eastern DRC, particular between Bakabu and Goma.

Specifically speaking about the BXW bacteria wilt; in 2008, 2009, there was a programme in DR Congo which was basically to promote a lot of planting material through greenhouses. It is a good concept, but how do you carry it out? Regarding the planting material that came out of the greenhouses, the material that went in was not clearly validated. But even when the material comes out of the greenhouse and goes into the farmers' fields, it is not clear whether the farmer's fields themselves have had no pathogen in the field for six months, as is recommended. So what happens, the new plants that come up are diseased; to what extent does the farmer's field have pathogen in it? To what extent does the multiplication chamber, the macro propagation chamber, have a diseased plant in the original? Was the origin of the problem with the diseased plant?

What I am getting at here is that we have had a number of examples where less than ideal outcomes occurred, because there was no good regulation and management around the movement of planting material. It is a very good example and something to be looked at. This occurred in eastern DRC, because basically macro propagation is a cheap way, if it is done correctly, to produce clean banana planting material at a fraction of the cost of tissue culture. You can produce it at ten percent of the cost of tissue culture. But if the material comes out of that greenhouse and goes into a field that is already diseased, what do you get? Angry people is what you get, unhappy customers. But then you also have a situation where some of the material went into the greenhouse, and we do not even know if it was clean. So, the whole thing gets undermined by a lack of effective regulation. This is just an example where if there was improved seed governance, we may have had a better outcome.”

Source: Interview 13.

next to them. Positive selection is promoted by ISSD as an alternative to the selection of good-looking-potatoes from a heap, as is common practice among potato growers (Interview 11).

A different example of work on seed quality was provided by a CRS expert (Interview 13). In Eastern DR Congo, CRS worked on the propagation of planting material for banana through greenhouses, combined with awareness-raising of farmers on disease management. Lack of governmental regulations was identified as a pitfall hampering successful control of the banana wilt disease (Box 4).

Controversies over introducing new varieties

Many interviewees advocated the introduction of new varieties to farmers (Interview 2, 3, 5, 7, 8, 10). In contrast, one interviewee stressed the large number of varieties of staple crops such as cassava, sorghum, maize and groundnuts already existing, and the extensive knowledge farmers possess regarding these varieties and their suitability under different conditions. Hence, he said that “although I am a plant breeder, I am the last person to advocate improved varieties”, except for situations where there is a dire need for e.g. a disease-tolerant or resistant variety (Interview 12).

Best practices and pitfalls of introduction of new varieties

For the four cases described by McGuire & Sperling (2013), direct seed aid as source of seed seemed fairly insignificant in terms of quantity. However, it was an important source of new varieties in areas receiving seed aid, and farmers reported that between 45 (in Zimbabwe) and 83% (in Haiti) of new varieties they obtained in the last five years came from seed aid. Also, in contexts where the formal seed sector is virtually absent, such as South Sudan, introduction of new varieties to farmers to experiment with may seem apt (Jones et al., 2002). Using direct

seed aid for the introduction of new varieties was also advocated by Sperling et al. (2008). In this case, direct seed aid is not aimed at improving the physical availability of seed (the first pillar of seed security) but rather at improving the disposal of good quality seed and appropriate varieties (the third pillar of seed security).

However, a former FAO employee said that a technical guideline in emergency services of FAO was that providing unknown new varieties to vulnerable farmers as emergency seed aid was not advisable. Introducing a variety previously unknown to farmers is risky in case it is not adapted or it does not have the right organoleptic properties. In addition, there was a risk that farmers would not plant the seed. If new varieties are to be introduced then this should be done through demonstrations on farmers' fields to ensure the new varieties are the ones they will want to grow and eat (Interview 7). Also ZOA warned against a careless introduction of new varieties, for resistance to diseases, tastes and overall trustworthiness of the variety may be unknown (Interview 12).

One of the interviewees mentioned an example from Kenya to illustrate pitfalls related to the introduction of new varieties. The drought-resistant millet that was introduced proved to be less bitter than the local variety, so that the birds ate all the seed from the field (Interview 1). In-soil preservability proved to be a problem of improved cassava varieties in South Sudan. Improved varieties of cassava, that are tolerant to cassava virus, often have a better taste and higher yield, but they cannot be kept in the soil as long as the 'old' varieties. Therefore, after introduction of the new variety, farmers in South Sudan grew the old variety on larger fields, and the new variety on a small area (Interview 12).

Moreover, access to new varieties appeared to be a major obstacle to farmers' adoption of those varieties, especially for hybrid and certified seed (Interview 2, 12). This is related to availability in local shops, especially if certified seed has to come from abroad due to the lack of a formal sector, as was

mentioned for the case of South Sudan (Interview 12), and to the risk of cheating by middlemen, as well as to the higher price of those seeds. According to the interviewee from AGRA 'farmer demand is still a major issue', and considerable time and effort should be dedicated to raising farmers' awareness on the desirability of certified seed. Costs-benefit calculations show that the investment in improved seed pays off (Interview 2, 10,12). Nevertheless, farmers claim that "they cannot afford it" (Interview 2). One of the interviewees argued that it is a miscalculation that farmers can be convinced to save money for high-quality seed once they have experienced the benefits. Poor farmers facing liquidity issues logically choose to spend money on food or health care when needed, rather than keeping savings to buy improved seeds (Interview 12).

Providing improved varieties in very small packages, in order to enhance accessibility for seed otherwise deemed too expensive, was mentioned as a best practice (Interview 2, 5). Providing such small packages allows people to access new varieties at low costs and little risk, also for women. Depending on the type of crop, people can multiply the seed themselves and have a larger stock the subsequent year. One of the experts framed such sale as "one very simple technical intervention that [is] about ways of getting access to new technologies increased through markets" (interview 5).

Demonstration of new varieties in trials can help to familiarize farmers with new varieties (Interview 7) and lower risks. For example, in so-called mother-and-baby-trials, a host farmer grows all five or six new varieties, and a larger groups of farmers grows one variety to compare to their old variety (Interview 8). Demonstrations often take place on experimental research stations. However, if those are not in close vicinity of farmers' homes, ecological conditions on-station may differ from those on-farm, and farmers' willingness or ability to travel long distances to visit such trials is limited (Interview 3, 12). In order to reach many farmers, a finely-meshed demonstration network is vital (Interview 3).

TABLE 3. SEED PROBLEMS AND BROADLY APPROPRIATE RESPONSES

PROBLEM	SHORT-TERM	LONG-TERM
Unavailability of seed	Where farmers source seed predominantly through informal seed channels: Enhance immediate operation of local and regional markets	Where farmers source seed predominantly through informal seed channels: Support development of local and regional markets (encourage more access to credit, better established market information channels, more effective transport and seed storage support)
	Where farmers source seed predominantly through formal seed channels: Direct distribution of seed	Where farmers source seed predominantly through formal seed channels: Support development of quality assured seed production or supply chains, incl. commercial enterprises where viable.
Poor and vulnerable farmers do not have access to seed	Cash disbursement Voucher disbursement (w/seed fairs)	Poverty reduction programs
Seed of poor quality and/or lack of appropriate varieties	Seeds fairs with quality controls Direct distribution or sale of samples of quality seed (for subsequent multiplication)	Programs to improve seed quality (on farm and/or in seed and grain markets)
	Distribution of foundation (pure and healthy) seed to a limited number of farmers, making use of informal seed channels to diffuse the seed to others	Participatory varietal selection

Source: Sperling et al., 2008.

Box 5. Case: Integrating emergency aid and recovery in Bozoum area

“Emergency aid and recovery in Bozoum area’ is a joint programme that we (Cordaid) have in collaboration with WFP, FAO, Dutch Postcode Lottery, with a component of support through Caritas Bozoum, in Bozoum, which is an area heavily affected by conflict in the Central African Republic.

Because of the crisis in December 2013, many people from the area of Bozoum had to move, were displaced and became internally displaced persons. Some others had to move out of the areas, so most of the households were affected in the sense that they had lost the previous planting season and that their houses had been looted by the different groups. So their livelihoods were taken away. When they returned to their areas and it became safe enough to continue with the agricultural production cycle, they did neither have tools, nor seeds nor food.

The programme consisted of three interrelated components: the first component is food aid and nutritional support for the people affected, the second is seed aid, and the third is early economic recovery.

We made an alliance with WFP and FAO, and they complemented each other in this integrated approach. WFPs first goal was to alleviate existing food crises, with a component for food crisis prevention, whereas the FAO was more focused on mid-term recovery and DRR for the mid-term, so that these food crises will not happen again. In that way, they are linked. Additionally we brought the component of early economic recovery, and strengthening the local farmers and economy.

The role of WFP was to support us with the food aid and the nutritional support for the entire planting cycle until the harvest season, which is four months. They also had a logistic role to bring the food from outside and also to bring it to the Bozoum area affected, and to keep it into our store rooms.

And from there, we distributed it to all the different distribution points and villages. Through the seed protection programme of WFP, 7,500 households, that means 37,500 people approximately received food aid. This programme had the objective to provide the necessary food and nutrition for the people in need, in order to sustain their lives and to prevent them from eating the complementary seeds that were distributed to prevent losing another planting season and be prepared for a future crisis. That is also the reason why the food rations and the nutritional support needed to start before the first seed distribution and were continued on a monthly basis until the harvesting was done.

The FAO provided seeds and tools for the families in order to be able to plant and in order to be able to harvest the crops after the four months after the planting season. The seeds were distributed just once.

The program for early economic recovery, run by Cordaid, consisted of three pillars: food security, trying to ensure that people have access to the minimum food necessary after the planting season; enhancing local markets and trying to increase the capacity of local farmers; and livelihood restoration of the families identified as being most in need. I think what went very well is to perceive this kind of actions as an integrated approach, whereby you are not only focusing on the crisis, but seeing all the linkages there are between the different approaches that you can use, thus integrating the projects of FAO and WFP, and combining the seeds protection program with a component for food security and a component to support the local market and to test and strengthen existing local capacities. Because in the end, the market should be self-sustainable. If the security situation allows for it in fragile areas, you always need to integrate emergency aid and recovery.”

Source: Interview 14.

In addition to the introduction of varieties already developed, participatory varietal selection and participatory plant breeding are activities that promote the development of quality seeds by actively involving farmers in experimentation and selection of variety crops. However, few evaluations on the effectiveness of such seed-quality related assistance have been conducted (Sperling et al., 2008; but see e.g. Galiè, 2013 and Okry et al., 2011).

Questions on seed quality, such as the appropriateness of hybrid seeds as well as the need for certified seed, are closely related to a wider set of questions about the ways in which seed systems can best be developed, and the role of different stakeholders therein should be. These different perspectives on seed system development, and how they relate to the debate over seed quality, will be further discussed in the section 4.2 Interventions directed at system or sector development.

4.1.4 Short-term and long-term perspectives on interventions for seed security

According to Sperling et al. (2008), the choice for specific interventions should be guided by an identification of the component of seed security that is most under pressure (see

Table 3). This should be accompanied by an exploration of immediate and underlying causes of seed insecurity. When seed insecurity is caused by chronic stress rather than by acute conflict or stress, seed aid alone may not be sufficient to alleviate this insecurity. Marginalization -either economically, ecologically and/or politically- often lies at the root of such chronic seed insecurity. In such cases interventions aiming at poverty eradication and stimulating local economies are most appropriate (Sperling et al., 2008).

Whereas interventions in the second column of Table 3 (‘short term’) are focused on relief, interventions in the third column (‘long-term’) are geared towards recovery. Based on his experiences in the Central African Republic, an interviewee from Cordaid stressed the need to integrate emergency and recovery (see Box 5). Rather than providing short-term seed security, activities should focus on the long term as to contribute to seed system development. We will further explore this in section 4.2.

4.1.5 Conducting seed security assessments

Table 3 shows that, prior to planning any intervention, an understanding of the actual seed security-related problem and of the main sourcing channels of seed is needed. Conducting

an assessment prior to intervening in seed systems in fragile areas was generally perceived as a good practice (Interview 7, 8). The mainstreaming of seed security assessments was mentioned by several interviewees as a current point of concern. The seed security assessments-methodology describes a quite elaborate investigation, which raises costs and reduces the willingness of countries and organizations searching for funding, especially in emergency situations. Proponents of SSSA however argue that the costs involved (around USD 20,000) are a small fraction of the total budget of most seed-related interventions. Currently, several parties work on mainstreaming SSSA⁶, amongst others CIAT and UEA through an OFDA-funded project and FAO and CRS through an ECHO-funded project. A livelihood assessment can provide initial insight into seed security and if it is an issue then a more detailed seed security assessment can be conducted (Interview 7).

4.2 Interventions directed at system or sector development

In this section, a stylized account of different approaches towards interventions in seed systems will be given. We will outline the different entry points for working on seed security and seed systems and touch upon the philosophies/paradigms of seed system development on which they are based, as became apparent through expert interviewees and texts and documents on websites of agencies and organizations working in the field. In Annex 5 an overview of several intergovernmental initiatives, development organizations and NGOs is given.

4.2.1 Product-oriented formal sector development

First, there are parties “who enter from a formal sector perspective and believe that they are intervening to give farmers a better product” (Interview 11). Among those is a group of international agencies that mainly focus on commercial seed sector development, like the Alliance for a Green Revolution in Africa (notably its’ Program for Africa’s Seed Systems, PASS) and the International Fertilizer Development Centre (IFDC). At the heart of their approach lies the conviction that access to fertilizer and certified seed of improved varieties can greatly enhance smallholders’ agricultural production, and that farmers should buy rather than receive seed (Interview 2, 3). Those parties notably focus on the formal sector and its products, which are believed to be of higher and guaranteed quality (i.e. better than those of the informal sector) (Interview 11).

Moreover, in the countries where they work, the agencies aim to develop an autonomous commercial seed sector, including the development of new varieties, and local production, certification, and the distribution of seed. From their perspective, agricultural development should start with the private sector, whereas the government’s main task is providing a framework wherein this development can take place (Interview 2, 3). Behind this perspective lies a particular view of the contributions that seeds can make to food security, and of the type of institutions that drive agricultural development, that are linked to green revolution-ideologies (as exemplified by AGRA’s name) and modernization (Interview 5). Such a modernization agenda “emphasizes a few staple crops, linked

to formal multiplication, promotion and delivery efforts” (McGuire & Sperling, 2013, p. 649).

The interviewee from AGRA commented that their organization prefers to work in areas that are not fragile, as “we feel that our model works better in stabilized situations” (Interview 2). They are not involved in emergency work or relief provision of seed. In contrast, IFDC is working on developing the seed input sector in fragile areas, and notices specific challenges in these areas, such as the reluctance of the private sector to invest and the lack of farmers’ knowledge, especially in areas of protracted conflict and/or where a large part of the population has been killed or has fled.

Box 6. Pitfalls of working in fragile areas: the case of trying to build a seed sector in South Sudan

“In fragile areas, the private sector will be very reticent to invest, because the risk is too high that the investments done will get lost. For example, we invested in training agro-dealers in South Sudan. Those agro-dealers, eventually, should take care of the distribution of inputs. The work we did all got lost. The people who invested in purchasing inputs for distribution have lost their money. One observes that the private sector is very reticent to take risks. The past three years we have invested heavily in building private sector capacity. This is a good example of a case whereby a country falls back in civil war, and we have to start all over again. We have to wait a year until there have been elections, and the security situation in the country has stabilized. Investing in governance remains utterly important. It means that, in this types of economies, one should start with low-risk activities, and with working with small farmers, small-scale, with minimum investments, and with stimulating the government to make local high-yielding varieties available. After all, that is the best starting point.”

Source: Interview 3.

4.2.2 Farmer-oriented seed system development

In contrast to the mainstream view outlined above, there are several alternative views that partly overlap. First, there is a group of social movements primarily concerned with food (and seed) sovereignty, and issues of identity or self-reliance. These movements may be skeptical towards the efforts aimed at commercializing the seed sector. For instance, the notion that farmers need to pay for seed is opposed. Rather than fostering the introduction of improved varieties they would promote local varieties (Interview 5). Elements of these lines of thinking could be recognized in interviews with NGO representatives (e.g. interview 1, 12).

Second, there is “a set of practitioners and program managers and policy makers who believe that the product could come from the formal or informal, but that the key operating principle is that the farmers have choice to strategize. So that even in a fragile situation, choice and supporting systems that

⁶ See FAO (2012); and SeedSystem.org for examples of Seed System Security Assessments.



Photo: David Rives

Inside one of the Cordaid warehouses in Bozoum. Food, nutritional aid, seeds and tools lie waiting to be distributed

exist, might give more durable resilient results.”(Interview 11, and recognized in interview 5, 8, 13). A key concern, as expressed by several interviewees from NGOs, is to put the farmer at the center (Interview 8, 13).

Many NGOs therefore work together either directly with farmers, or with local partner organizations working with farmers. However, this does not mean that NGOs work exclusively with the informal sector: direct seed distribution is often done only with formal-sector certified seed, and formal sector suppliers may also have preferential access to seed vouchers and fairs, as explained in Pitfalls and best practices in executing seed vouchers and fairs.

Based on their experiences in West Africa (e.g. see Box 7), two interviewees (Interview 6, 9) mentioned the cultural and political sensitivity in providing seed aid, for instance, stating that, “Insuring that the seed aid is delivered in a way that is sensitive towards the hierarchical structures that might exist, so that it does not strengthen structures that are not really democratic and just, that is the most important.” (Interview 9). In conflict or war zones, a sound analysis of the causes of conflict is necessary to avoid that seed aid fuels further conflict (Richards et al., 1997).

Box 7. Best practice: direct seed distribution as a means to address community relations

“For me, a best practice is what Paul Richards did related to direct seed distribution in Sierra Leone (see: Archibald & Richards, 2002). The question was: if one wants to distribute seed, how can one best do that? Actually, distributing seed is a way to discuss the different roles people in the village take up. Does everyone get the same amount of seed? So poor people, people with a low status, old people, you people. Why would it be that way, wouldn't it make more sense to give more seed to people with a high status and men of certain age? By distributing seed, one has a way to put other issues on the agenda, too. Richards & Archibalds cooperated with an NGO, and they had success. (...) Related to that was a discussion about governance and rights. One could refer to all kind of international treaties that state that “everyone is equal”, but how are rights defined at a local level? Are rights defined top-down or bottom-up? Of similar importance is access. Access to land, access to seeds, et cetera. One can use direct seed distribution to put these kind of topics on the agenda.”

Source: Interview 6.



Photo David Rivas

Acknowledgement of receipt by beneficiaries of Cordaid and Caritas seed aid in the area Bozoum, Central African Republic

4.2.3 Seed system development through strategic integration of formal and informal systems

A third group looks both at the formal and informal and at possible points for strategic integration. They analyze carefully the context (from the 'pull' and 'push' side) and assess how to move seed systems forward, building on what exists and also deliberately catalyzing novel systems (Interview 11).

Integrated seed sector development, as developed by the Centre for Development Innovation (CDI) and the Dutch Royal Tropical Institute (KIT), is one of such approaches. The approach advocated by AGRA and IFDC can be part of integrated seed sector development. In fact, IFDC and CDI have cooperated in several countries. However, ISSD aims to support the whole seed sector, including public and informal parts. This is reflected in the ISSD-principles (Annex 6) to "foster pluralism and build programs on diversity of seed systems" (1) as well as "recognize the relevance of the informal sector" (4) and "recognize the complementary roles of the public and private sector" (6). ISSD was developed as a conceptual framework, aiming to "better link informal and formal seed systems, and balance public and private sector involvement" (Louwaars & De Boef, 2012, p. 40) at the technical as well as the institutional level (Louwaars & De Boef, 2012).

The ISSD guidelines, developed by the CDI and the KIT, provide insight in what is considered best practice (Annex 6). The same holds for the FAO guiding principles for seed relief that were developed as a result of a workshop on improving the effectiveness of seed aid in 2002 (Annex 7).

4.2.4 Controversies over hybrid and certified varieties

There is considerable debate over the potentials and pitfalls of hybrid maize and other hybrid crops. The development and distribution of hybrid and certified varieties is linked to the formal sector (Interview 8). Thus, promoting hybrid and certified varieties goes together with choosing the formal sector as an entry point. As a consequence, promoting a particular type of crop becomes intertwined with promoting a particular view of modernity (Interview 5), and discussions about the advantages and disadvantages of those varieties can be as much about agronomic appropriateness as about desirable paths for development.

Hybrid varieties of maize and other crops were passionately advocated by representatives of IFDC and AGRA. However, several other interviewees expressed doubts. Some doubted the appropriateness of hybrid varieties in general, including maize. As hybrid maize cannot be multiplied on-farm (that is, the genetic characteristic of the multiplied seed will be poor), farmers have to buy hybrid maize seed each time they want to grow it – and with it, fertilizers to realize its high potential. Especially in fragile areas where supply is insecure, the interviewee deemed this undesirable (Interview 1). Others however did not find such dependency problematic, as 'you are also dependent on oil companies if you drive a motor' (Interview 10).

One of the interviewees mentioned the need to be sensitive to the condition under which people grow crops, notably the inputs they have at their disposal. As hybrids require more inputs to realize their potential, open-pollinated varieties

can outperform them when those inputs are not available (Interview 1, 6, 9). However where the inputs are in fact available, the hybrid variety might be suitable (Interview 9). Yet others argued that, for these reasons, improved seed should be seen as part of an overall package, and emphasis should lay

Box 8. FAO's work on seed in emergencies

FAO is involved in seed-related activities through its plant production and protection division (AGP) and through its emergencies division. It undertakes a broad range of activities targeting both public and private stakeholders, and a very clear and distinctive approach is hard to discern: "In the broadest sense, this encompasses the whole range of actions involved in the conservation, diversification, adaptation, improvement and delivery to farmers through seed systems." (www.fao.org/seeds). In 2002, the FAO's General Assembly adopted nine 'Guiding principles for seed relief' after considerable debate and discussion (Interview 11), which can be found in Annex 7. Implementation of these guidelines, however, has been difficult (Interview 7), as illustrated by this point on the seed security assessments expressed by a former FAO-officer: "But I became more concerned and I think FAO as well, how do you really mainstream the seed security assessment methodology? (...) [T]his is going to be a long haul, and this [project] is just a first step." Historically, seed aid was provided as seed and tools distribution, but it has been diversified to include, among others, input trade fairs, community seed production, introduction of new varieties. Over the past fifteen years, FAO has gained experience with interventions different from direct seed distribution, and the operations in South Sudan and Burundi have gradually shifted from direct seed distribution to community seed production and seed vouchers and fairs (Interview 7). Information and case studies are contained in the joint FAO/CIAT publication "Toward effective and sustainable seed relief activities" (2004). Nevertheless, direct seed distributions still seem to be a significant part of their activities, as follows from this quote from the AGP Seed security and rehabilitation website: "The basic rationale is that in emergency situations affected farming and displaced households *have lost their seed* and capacity for food production. By *supplying* good quality seed of appropriate varieties they can resume and increase agriculture production thereby reducing or eliminating dependence on food aid following the next harvest." (<http://www.fao.org/agriculture/crops/thematic-sitemap/theme/seeds-pgr/seed-sys/security/en/> visited: May 2014, our emphasis), and further illustrated by the recent distribution of seed in the Philippines (<http://www.fao.org/emergencies/fao-in-action/stories/stories-detail/en/c/211834/>) and in the Central African Republic (<http://www.fao.org/emergencies/fao-in-action/stories/stories-detail/en/c/218258/>), to name but a few of similar operations. Moreover, the FAO-publication "Seeds in emergencies: a technical handbook" (2010) is completely dedicated to technical aspects of seed procurement, and seed quality assurance. It thus seems to take for granted direct distribution of seeds in emergency situations is the way to go.

on improving access to certified seed and fertilizer and seed dressing (Interview 8).

Some of them saw a clear role for hybrid maize, but argued that the maize model should not necessarily be copied to all other crops. Although the interviewee from AGRA mentioned the potential of hybrid varieties of sorghum and millet (Interview 2), NGO-interviewees argued that hybrid varieties are not needed for open-pollinated crops (Interview 8). For self-pollinating crops, genetic purity can be easily maintained by farmers, and hybrid varieties may have little added benefit (Interview 6, 8). Moreover, commercial parties may not be interested in developing hybrid varieties of sorghum or cassava (Interview 10).

Lack of certification of seed, or lack of a certification system by the government, were mentioned by AGRA and IFDC-representatives as pitfalls (Interview 3, Interview 2). Related to lack of certified seed, lack of farmer's awareness on the quality of seed, or, more specifically, on the advantages of certified seed, was seen as a pitfall (Interview 3, Interview 2), as discussed above. However, other interviewees argued that certified seed is not and will not be accessible to all farmers, due to the high price and the lack of outlets off the main roads (Interview 5). Indeed, reducing the costs of certification was seen as an important area for action by the interviewee from AGRA (Interview 2).

As an alternative to certified seed, quality declared seed was mentioned by several interviewees (Interview 5, 10). Quality declarations would greatly reduce costs and therefore be a compromise between enhancing farmers' access to seed and guaranteeing seed quality.

Box 9. No specific seed-related programs and initiatives

Some of the international agencies with a high profile in agriculture do not seem to have specific or specialized programs on seed. For example, for IFAD, seed security is off the radar. The key document 'IFAD performance in fragile states' (IFAD, 2014) does not contain the word "seed". The lack of specific programs or monitoring of seed-related activities of IFAD was confirmed in an interview: "we are a broad financing institution, seeds are only a small part of the whole thing, we do not keep a record on seeds" and "it is not really an important item in our program" (Interview 4).

Also within the FAO, there seems to be a gap between the frontrunners involved in defining guidelines on seed relief (FAO, 2004), advocating implementation of SSSA and working on development of appropriate seed-related interventions, and those involved in the often-critiqued business-as-usual, mainly consisting of direct seed distribution.

Additionally, some NGO's do not specifically work on seed security in fragile contexts. On the website of Misereor, little reference to work on seed is made. More specifically, no seed- or agricultural-related projects could be found in the countries of specific interest to Cordaid.

In the discussion over certified seed, the terms “certified seed” and “hybrid seed” at times seemed to be used interchangeably - whereas not only hybrid varieties are certified.⁷ Further conceptual confusion became apparent when one interviewee seemed to assume all hybrid seed is genetically modified. More commonly and less obviously wrong, in the discussion over seed quality, seed phyto-sanitary quality and varietal quality where used interchangeably. The discussion would benefit from a clear definition of concepts and a precise use of the terms.

4.3 Seed system resilience

Farmers have different strategies to deal with stress: they have a range of crops to grow and choose between them depending on the circumstances. For example, in a very poor rainy season, Ethiopian farmers may resort to chick pea, for its low water demand and its ability to grow on residual moisture (Interview 5). Recognizing this and enhancing farmers’ possibilities to strategize is key to creating resilient seed systems (Interview 5, 11). According to McGuire & Sperling (2013, p. 651) “building resilient seed systems means building up a set of reserves of knowledge and action possibilities, and helping to ensure their availability and accessibility in a timely manner”. Moreover, building resilience is about finding and intervening at “catalytic leverage points” or “catalytic entry-points” that can spur the development of seed systems (Interview 11).

McGuire & Sperling (2013) suggest five areas for action that contribute to building of those reserves of knowledge and action possibilities and enhance seed system resilience. Those include the identification of germplasm, ensuring availability of germplasm, enhancing access to vulnerable groups, fostering information systems and enabling systems evolution. Access has already been discussed in previous sections, the other points will be highlighted in the following section.

Farmers should have access to a large diversity of crops and varieties (McGuire & Sperling, 2013, Interview 5, 8, 11), in order to respond to shocks or changing circumstances. The identification of the germplasm farmers use and could potentially use is therefore important, as is making sure that this germplasm is available when it is needed.

In addition to access to seed, access to information is crucial for seed systems resilience (McGuire & Sperling, 2013). Information can help farmers in choosing their response strategies, and shape demand for certain products. As “seed is only as useful as the associated information guiding its use” (McGuire & Sperling, 2013, p. 650), farmers would need information at several levels. Not only would they need to know about the existence of new varieties and their suitability for stress, but they should also have the opportunity to access the material and experiment with it themselves, and, while and after doing so, share the information obtained with others (McGuire & Sperling, 2013).

Especially in times of stress, farmers should be able to access specific information (Interview 11). For example, on crops or varieties that may fit well in their cropping system at that

particular moment because they are drought-tolerant or otherwise well-adapted, on where these crops or varieties could be obtained, and at what price. Hitherto, this area of research and development is relatively unexplored (Interview 5), and McGuire & Sperling (2013, p. 651) perceive the development of “resilience-linked information systems” as an important area for action. Communication technology such as radios, websites, and sms could play an important role in information provision to farmers (McGuire & Sperling, 2013; Interview 5).

“Enabling evolution of systems” is mentioned by McGuire & Sperling (2013) as a final area for action. They provide some examples of successful commercialization of agricultural production, and point to the possibility to go beyond crop-variety-seed-interventions to find other livelihood opportunities that contribute to the resilience of agricultural and seed systems. This is in line with the remark of one of the interviewees that “It is not about seed” (Interview 11), and the call of another interviewee for a livelihood approach, rather than a narrow focus on seeds (Interview 8).

4.3.1 Best practice: the use of scenarios & preparation (diversity of crops & varieties)

Pereira & Ruysenaar (2012) argue that scenarios, rather than forecasts, can be useful tools in developing food governance strategies to deal with uncertainty. This corresponds with the quest to learn to live with change and uncertainty, which was identified by Folke et al. (2003, in Folke, 2005) as one of the four “social sources of resilience” needed for adaptive governance.

Scenario building also seems to be part of community managed disaster risk reduction (CMDRR), a tool used by Cordaid to prepare communities for disaster. In CMDRR, communities identify potential hazards that may be threatening them, investigate which groups or areas in the community are most vulnerable and what capacities are present within the community to prevent and mitigate damage from disasters (Interview 1).

McGuire & Sperling (2013) and McGuire (interview 5) propose the use of scenarios specifically for seed systems. They argue that farmers face high variability and therefore need more than only a few staple crops: “Rather, the goal is to develop a set of seed system strategies that are in reserve, which can be revitalized when needed. This means that diversity needs to be “smart diversity” which is potentially targeted for different scenarios.” (McGuire & Sperling, 2013). Identifying the range of options farmers currently have, and the stresses and variability they are facing, can thus enhance insight in farmers’ current response possibilities. Also, the need for new germplasm can be identified, as scenario planning can reveal that “the range of crops people normally grow may not be as large as the range of crops their repertoire would need for different scenarios” (Interview 5).

Such scenario building assumes that building resilient seed systems starts prior to an acute emergency phase. This is in line with the distinction between short-term and middle- or long-term actions and strategies as identified by McGuire & Sperling (2013), and by Sperling’s observation that responses enhancing resilience immediately after shocks are very

⁷ In a similar vein, ‘certification’ is not included in the definition of hybrid seed, although in practice all hybrid seed entering the market is most likely certified, as it is developed and marketed through the formal sector.

different from interventions prior to or in absence of acute shocks (Interview 11). She argues that sustaining market systems and getting credit systems working, along with improving farmers' choice of crops, varieties, information and access channels, are most important areas for action in the emergency phase. In order to enable farmers to access a wide range of crops and information when the going gets tough, identifying crops and varieties that are well-adapted to specific conditions should be a priority in the preparatory phase.

The distinction between a disaster-risk-reduction-phase and an emergency phase corresponds well with the paradigm to "go from relief to development". According to this discourse, which is omnipresent in NGO's and intergovernmental agencies like FAO, activities of foreign aid organizations in a certain region provide "relief" directly following disaster, and gradually move via recovery or rehabilitation to sustainable development. However, as two experts commented, such a smooth evolution is hardly ever seen in practice, and, more importantly, seems to be ill-suited to the reality of local people's lives (Interview 5, 11). Besides, the people and organizations working in emergency relief are often different from those working in development, and they "work on different timeframes, they come from different modalities, different funding structures" (Interview 5). Nevertheless, there is a general sense that resilience is long-term, as exemplified by one of the principles of resilient seed systems 'temporal breadth should be integral' (McGuire & Sperling, 2013) and put forward by some of the interviewees (e.g. Interview 8).

4.3.2 Best practice: integrating informal and formal systems

Almekinders (2001) argues that seed system resilience could be enhanced by a better integration of informal and formal seed systems, 'making the distinction between formal and informal seed actors irrelevant' (p.73). Such integration should be based on recognition of the complementarity of formal and informal seed systems, and of farmers as clients and seed-producers. Notably, linking innovation and improvements from the formal sector to the informal and vice versa is important (McGuire & Sperling, 2013). Related to this, Richards et al. (1997, p. 53) advocate the development of regional seed safety webs, "a socio-technical ensemble, linking seed reserves, seed systems, information networks, technical facilities, relief agencies and farmer groups in a transnational web of mutually reinforcing interactions".

Potentially, traders and merchants can play a large role herein, as they transfer crops and varieties as well as information. Often, they travel between agro-ecological regions (Interview 5) and they can link supply with local demand. Their role could be reinforced by structurally linking them to new research products and to skilled farmer multipliers, by giving them access to formal extension information and field day opportunities and by raising their awareness on seed quality (such as the importance of tracking the origin of seed, keeping varieties separate and using good storage facilities) (Sperling & McGuire, 2013). Moreover, traders can play a role in enhancing resilience if they become more aware and knowledgeable of the potential for specific crops or varieties at specific times (Interview 5).

4.3.3 Pitfall: lack of learning and of evaluations

The literature on adaptive governance stressed the importance of learning by individuals and organizations for management of resilient systems (e.g. Folke, 2005). Lack of learning, especially by organizations, came out as an important pitfall in providing seed security in fragile contexts. Several interviewees (Interview 7, 8) put forward that the chronic nature of seed distribution is related to the lack of institutional learning in development as well as donor organizations.

Different causes have been put forward, including: poor transmission between experienced staff moving to new positions and their successors. Moreover, most practitioners and organizations are not so eager to broadcast their mistakes and bad experiences, afraid to throw their good name to the dogs and fearing donor repercussions (Interview 8). Additionally, distribution of seed is relatively easy (Interview 8) and meets donor requirements for rapid results (Interview 7). Thus, learning from past experiences and moving towards approaches beyond free distribution of purchased seed requires "a shift in mentality and a shift in skills" (Interview 7). Likewise, a shift towards resilience-thinking in interventions in seed systems requires a shift in donors' thinking and awareness, too (Interview 7).

Moreover, interviewees expressed critique on an overall lack of evaluations (specifically of the FAO emergency operations in Malawi) (Interview 8).

These issues relate to the importance of learning and of integrating accountability mechanisms.

Two experts (Interview 5, 11) stressed the need to hold intervening organizations accountable for their interventions in seed systems. As a practical recommendation, they argue that seed aid needs to be reviewed for its relevance when it is conducted three years in a row in a particular locality, that is, the effect of the seed aid needs to be evaluated, rather than its execution. Such critical review needs to explore whether the approach supported farmers at critical times and "did not waste their resources" (Interview 11), whether the approach contributed to enhanced seed security, to enhanced resilience, and if not, what were the main causes for that and what might be a better, alternative approach. This kind of evaluation thus includes a different set of questions than the evaluation focusing on the amount, type and quality of the seed provided and the number and characteristics of beneficiaries, which is what evaluations, if performed at all, currently often entail (Interview 5, 11).

Further, this evaluation should serve as a basis for changed practice (Interview 11). Realizing increased accountability of intervening organizations requires developing effective and efficient mechanisms to integrate such evaluations and institutionalize organizational learning. Moreover, the success of such mechanisms will depend on their enforceability, since "we can always talk about rights or responsibilities, but unless someone is going to enforce those it's just empty words." (Interview 5).

4.4 Reflections

Interviewees expressed different opinions on best practices and pitfalls of working on seed security in fragile areas, what would be the most pressing issues to address, which actors should be most important in realizing seed security, and which partnerships would be most fruitful.

This is in line with McGuire & Sperling's (2008) observation that the approach towards seed aid of a government, agency or development organization reflects institutional preferences, norms and capacity: "institutional norms and institutional capacity affected the approaches used, crops/varieties supplied and partnerships used far more than any assessment of vulnerability on the ground." (p.687). Thus, the debate over seed systems development and seed security is highly normative (Interview 5). Whereas there is considerable debate over which approaches could be considered best practices and with which stakeholders could best be cooperated (doing the right things), a fairly high degree of consensus exists over the way certain interventions could best be executed (doing things right).

Reflections on interventions in seed systems only started around twenty years ago, which makes this a rather young field of research and development (Interview 11). In this period, thinking about those interventions has first evolved from a paradigm primarily focused on 'relief seed' and direct seed distributions, via the rise of the concept of seed security, to a search for other types of interventions, starting with market-based approaches such as vouchers and fairs. Moreover, gradually, the importance of seeing seed aid as interventions in seed systems became clear, and scholars pointed to the importance of understanding seed system functioning. More recently, the concept of resilience has emerged in thinking about seed systems by scholars (e.g. Sperling & McGuire, 2012; McGuire & Sperling, 2013) and development agencies as is illustrated by the new name of CRS's seed fairs with vouchers: DINERs (Diversity and Nutrition for Enhanced Resilience). There, the search for interventions that enhance seed security has extended to a search for interventions that strengthen seed systems and enhance seed system resilience.

Despite this evolution in thinking about interventions in seed systems, several interviewees (e.g. Interview 5, 8) pointed to the gap between knowledge and insight gained regarding best practices of seed system interventions, as illustrated by this quote: "Overall after 15 years of really focusing and investing and trying to change the institution of seed aid to shift from direct purchase, transport and distribution of seed, to a market-based approach that is based on the understanding of seed systems and seed security, we really have not made much progress." Others are more positive and point to the shift in practices that can be observed on the ground (Interview 11).



Motor taxi transporting seed aid to off-road hamlet in the Central African Republic

Although a review of the extent to which practices of development organizations and international agencies have shifted over the course of the past twenty years is beyond the scope of this report, we note that those practices seem to lag behind insights from research and development. Lack of institutional learning was perceived as one of the fundamental causes of the repetitive nature of direct seed distributions.

Discussions over resilience not necessarily relate to questions about governance. The resilience-perspective has helped to change response interventions, but thus far has not led to an increased attention for questions of governance, e.g. accountability (Interview 11). Moreover, resilience is not only a property of systems, but emerges from the institutions and organizations managing or interfering in those systems. Thus, a shift to adaptive governance also requires institutional changes in the NGOs, intergovernmental agencies and other donors and practitioners dedicating themselves to international development and cooperation. These organizations, and those governing seed systems locally, may benefit from lessons from the adaptive governance literature such discussed in this report.

Moreover, a conceptualization of working on seed security through the support of resilient seed systems might contribute to the aim to "go from relief to development". Supporting resilient seed systems assumes the existence of one system (e.g. with different sub-systems) in a continuously changing environment. This system may be subject to sudden shocks (disasters) and to longer term stresses. Building resilience aims at enhancing the capacity of the system to respond to these shocks and to evolve - prior to, during or after the event or change in the environment. As McGuire & Sperling (2013) conclude: "The "one shock" needs "one response" mentality might best be laid by the wayside. There will be on-going stresses and shocks, and a one-time action plan (even for urgent action) might best be viewed with caution."

5. CONCLUSIONS AND RECOMMENDATIONS

Over the past fifteen years there has been considerable debate among intergovernmental agencies, development organizations, relief agencies and academics on interventions directed at seed security, whether in fragile contexts or not. This debate has broadened from a traditional focus on direct interventions targeting one or more dimensions of seed security (availability, access and quality) to newer approaches aimed at linking formal and informal systems and the development of resilient seed systems. On the one hand, the newer approaches form a more or less implicit critique to the traditional one. On the other hand, we have noticed that for each of these types of interventions, including the traditional one, there is growing consensus on what are best practices and pitfalls. We will briefly present these now and for each type of intervention identify a knowledge gap and how Cordaid could profile or position itself per level of intervention.

5.1 Direct interventions

Direct seed distributions are the most dominant seed-related intervention in fragile contexts. However, there is widespread consensus that this form of seed aid has not only often been poorly implemented but has provided an insignificant or even negative contribution to seed security. Such seed aid has wrongly assumed that lack of available seed is the main problem for many farmers in crisis or post-crisis-situations. It is now widely agreed that access, not availability, is the main problem in such situations. Therefore, alternative interventions like the organization of seed vouchers and fairs, geared towards enhancing access to seeds or access to new varieties, have been

developed. These were found to be more appropriate and effective than direct seed distribution. However, the organization of seed vouchers and fairs can suffer from weak performance and repetition, herewith not contributing to seed system development.

Finally, the debate over access to seed is closely related to seed quality, leading to questions over which type of seeds and varieties farmers have access to, and their genetic, phytosanitary and physiological properties. Intervening agencies should not only consider seed quality when providing direct seed distributions or conducting vouchers and fairs, but, when seed quality is an issue of concern, could also turn to interventions directly targeting seed quality (notably including raising awareness on seed quality and providing seed storage) or varietal quality (notably enhancing access to new varieties).

Table 4 provides an overview of these interventions as well as other best practices and pitfalls of direct interventions. Note that the table focuses on the right way to execute the interventions (“doing things right”) rather than on the appropriateness of the interventions (“doing the right thing”).

The soaring debate over seed quality could benefit from (more) evidence on the performance of farmer-saved-seed in comparison with seed traded locally and with certified seed; and from investigations of farmers perceptions’ over different types of seed, as well as on the extent to which seed certification provides a guarantee for quality.

TABLE 4. BEST PRACTICES AND PITFALLS IN DIRECT INTERVENTIONS TOWARDS SEED SECURITY

TYPE OF INTERVENTION	BEST PRACTICE	PITFALL
	<ul style="list-style-type: none"> Conduct seed system security assessments (www.seedssystem.org) Donors requiring SSSA's 	<ul style="list-style-type: none"> Assuming seed aid needs are known Assuming there is no time to conduct a SSSA in an emergency situation Lack of simple assessment tools and/or expertise Conducting solely a 'seed needs assessment'
Direct seed distribution	<ul style="list-style-type: none"> Timely delivery of quality seeds of appropriate crops and varieties Involve knowledgeable local staff to provide logistic capacity Clear division of tasks between collaborating partners Review effectiveness of repeated seed aid Use of 'Seeds in emergencies: a technical handbook' (FAO, 2010) Use of Accountability to Affected Populations guide (FAO, 2013) 	<ul style="list-style-type: none"> Poor quality of seed or planting material Crop or varieties maladapted agro-ecological environment or socio-cultural preferences Lack of information on seed and varietal quality of seeds provided No timely arrival of seeds Lack of infrastructure in areas affected by conflict Lack of accountability
Seed vouchers and fairs	<ul style="list-style-type: none"> Fair distribution of benefits among traders Participation open to small and large traders Involve knowledgeable local staff to provide logistic capacity 	<ul style="list-style-type: none"> Price-fixing of seed among traders Restrictive governmental regulations prescribing which companies may participate in seed vouchers and fairs Risk of criminality in areas with security issues
Raising awareness on	<ul style="list-style-type: none"> Promoting on-farm hermetic storage Positive selection 	<ul style="list-style-type: none"> Lack of governmental phytosanitary regulations
Introduction of new varieties	<ul style="list-style-type: none"> Selling small packages of new varieties Introducing new varieties in the absence of a formal system Demonstration of new varieties in trials Involving farmers in variety selection and breeding 	<ul style="list-style-type: none"> High risk for farmers due to lack of opportunity to test or see performance of a new variety High price of certified varieties

Potential role for Cordaid. Direct seed distribution and, to a lesser extent, seed vouchers and fairs are the most common seed-related interventions. In particular, FAO and CRS have gained extensive experience with these kind of interventions. If Cordaid considers to (further) work with direct seed distribution and vouchers and fairs, collaboration with those parties is recommended. Such collaboration should be characterized by complementarity of roles and a clear division of tasks and responsibilities between parties involved.

5.2 Seed system development

A second type of interventions aims at developing seed systems rather than directly addressing lack of seed availability or access to it. Seeking collaboration with parties involved in the seed system (the government, research institutes, seed traders, farmers) is central to this type of intervention. Innovative programs and organizations aimed at system development are trying to develop both the formal and informal sector and to forge strategic linkages between them, rather than focusing solely on the formal sector (which provides only a limited fraction of the seeds being used by farmers) or the informal sector (which may suffer from lack of improved or new varieties).

Several important lessons regarding best practices and pitfalls in seed system development are summarized in Table 5. It should be emphasized, however, that the record on best practices and pitfalls is still rather thin. In order to identify more specific and additional best practices and pitfalls, rigorous evaluation of programs aiming for seed system development is needed. Apart from evaluating interventions, a deeper and more fundamental understanding of seed system functioning, notably informal market functioning, is deemed necessary.

Potential role for Cordaid. In developing seed systems, bridging organizations, leadership and brokering activities are particularly relevant, as stressed in the literature on adaptive governance. This could be potential roles for development organizations, like Cordaid and partners, when adopting a systems approach aimed at connecting different actors within the seed system, identifying their needs and establishing linkages between actors in the seed system.

The interviews showed that several organizations, for example the CDI and KIT, take up the brokering role, for instance through Integrated Seed Sector (or: System) Development. This form of seed sector development has recently gained momentum. However, the principles of integrated seed system development are not specifically adapted to fragile contexts. Here lies a potential role for Cordaid: the support and development of seed systems in fragile areas is a niche with potential for further development, conceptually as well as practically.

5.3 Seed system resilience

Using the concept of seed systems resilience sheds new light on seed aid, seed relief and interventions in seed systems. With a resilience perspective, the focus shifts from building a physical stock of seeds of a few staple crops and varieties, developed and distributed through the formal system, to the need to “develop a set of seed system strategies that are in reserve, and which can be revitalized when needed” (McGuire & Sperling, 2013, p. 649). The identification of seed varieties that can be part of those strategies, making sure they are available and that smallholders have access to them as well as access to relevant information about their properties, price and availability, are crucial areas for action when working on seed system resilience. Resilient seed systems are able to withstand shocks, absorb them, or transform and evolve in response to them, so that they continue to provide seed security for smallholders over time.

Any kind of intervention directed at resilient seed systems has to start from an understanding of both the socio-political and the ecological drivers of acute and chronic stresses. The dimensions (e.g. agro-ecological, political, social, economic) in which building resilience is most needed, as well as the kind of resources and actors that can be mobilized to build resilience, will depend on the nature of fragility in a specific area.

Defining resilience is a difficult endeavor, and therefore discussions over resilience risk to become vague and endless. Very little research has been done on the relation between interventions aiming at creating resilience, alleged properties of resilient seed systems and seed security. Are interventions aimed at increasing seed systems resilience actually increasing resilience? In order to answer this type of questions, and with

TABLE 5. BEST PRACTICES AND PITFALLS IN INTERVENTIONS FOR SEED SYSTEM DEVELOPMENT

AREA OF INTERVENTION	BEST PRACTICES	PITFALLS
	<ul style="list-style-type: none"> Gaining insight in seed system functioning through SSSA, including background assessments 	<ul style="list-style-type: none"> Direct seed distribution hampering seed system development
Fragile context		<ul style="list-style-type: none"> Strategies for (integrated) seed system development not adapted to fragile circumstances Lack of willingness to invest in fragile areas by private parties
Cooperation between actors	<ul style="list-style-type: none"> Facilitating knowledge exchange between actors involved in the seed system (e.g. through Agri-Hubs on seed) Fostering exchange and cooperation between public research and private partners Cooperating with government agencies Facilitating farmer-to-farmer exchange 	<ul style="list-style-type: none"> Lack of governmental capacity for seed certification
Building on existing	<ul style="list-style-type: none"> Banking on existing networks, e.g. producer organizations 	<ul style="list-style-type: none"> Existing networks and organizations suffering from lack of accountability, lack of legitimacy and/or favoring of men and elites Local producers related to “big men”

TABLE 6. BEST PRACTICES AND PITFALLS IN INTERVENTIONS FOR RESILIENT SEED SYSTEMS

AREA OF INTERVENTION	BEST PRACTICES	PITFALLS
Use of scenarios & preparation	<ul style="list-style-type: none"> Starting working on resilient seed systems prior to acute emergencies Include scenario building in disaster risk reduction programs Contingency planning leading to a seed security plan Explore & expand 'seed repertoires' 	
Arrangements, partnerships & cooperation	<ul style="list-style-type: none"> Fostering relations between farmers, farmers and traders over a wide spatial range Improve cooperation between partners in the relief and development community, e.g. through the United Nations cluster approach 	<ul style="list-style-type: none"> Segregated funding architecture Separation between organizations working on relief and those working on development
Learning and evaluation	<ul style="list-style-type: none"> Realizing increased accountability of intervening organizations 	<ul style="list-style-type: none"> Organizations with limited agricultural knowledge working on seed Assuming lack of seed and lack of local entrepreneurs in emergency situations Lack of institutional learning
Integrating formal and informal systems	<ul style="list-style-type: none"> Linking innovations and improvements from the formal sector to the informal sector and vice versa Reinforcing the role of local traders and merchants 	
Information provision	<ul style="list-style-type: none"> Enhancing access to relevant information on seeds e.g. by mobile phones and radio's 	

it, assess the success of certain interventions, the development of indicators for resilience will be necessary as a first step. Research on interventions for seed system resilience will also allow for more evidence on the success of the best practices for working on resilient seed systems (see Table 6) and for more specific recommendations on their interpretation.

Potential role for Cordaid. The adaptive governance literature yields a set of interesting, yet general lessons on what resilient institutions look like and what social source of resilience might exist. Among others, and especially relevant for intervening organizations, it emphasizes the importance of brokering and leadership. Working towards resilient seed systems could start at any point in time, but is preferably done prior to any acute emergency, and could be well integrated with activities for disaster risk reduction. There are relatively few organizations dedicating their seed-related interventions to building resilient seed systems. For Cordaid, embracing a resilience-perspective could provide an opportunity to develop leadership and further develop innovative interventions that are especially relevant in fragile contexts. Such a perspective would connect very well with Cordaid's focus on fragility.

5.4 Governance of seed-related interventions

Very little has been written about seed governance and governance of seed aid. Questions about the type of partnerships that underlie specific interventions in seed systems, and their legitimacy are hardly being addressed in the literature. Questions over which collaborative problem-solving arrangements best contribute to seed security, and how power and decision making are distributed in seed systems and in seed-related interventions, are highly relevant to all levels of intervention discussed.

Current guidelines on direct seed distribution and seed vouchers and fairs assume that the donor or implementing organization decides on goals, design and implementation of the intervention. Especially in the case of direct seed distribution, this may disempower farmers as they have no choice but to

accept (or reject) the seed offered. We believe that more attention should be given to existing institutional arrangements in the seed system, and that the roles of stakeholders involved in seed system interventions deserve greater attention. Consequently, issues of accountability and legitimacy of interventions come into play. This could well start with involving farmers in evaluations on direct interventions, especially reviews of direct interventions after being conducted three years in a row, and adapting intervention practices based on their comments.

With respect to seed systems, there is a growing appreciation of the existence of formal and informal seed systems, and the actors involved in their functioning, which is a first step towards thinking about governance. So far, this growing appreciation has led to calls to connect to and strengthen existing systems (e.g. Longley et al., 2002). However, a call to "connect to existing systems" conceals important questions of accountability, legitimacy of governance-arrangements, and division of power and decision making within them.

In academic articles as well as NGO reports, the relation between governance arrangements and seed security is not explicitly being addressed. Building on existing research, this relation could be explored by focusing on specific aspects of governance, such as the formal and informal engagement of farmers in decision-making over seed aid and the role of property rights in shaping access to seed. Also, much could be learned from the functioning and effectiveness of specific arrangements, such as public-private partnerships, that have been extensively discussed in other areas of development but not in the area of seed system development.

The concepts of seed governance and seed system resilience have only recently emerged in the literature. While a promising start has been made with respect to their theoretical and conceptual development, there is an urgent need to link those concepts to real-life situations and empirical data, in order to understand the relations between governance of seed systems, seed system resilience and seed security.

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ANNEX 1. CORDAID AND FOOD SECURITY

1. Cordaid

Cordaid is a civil society organization focusing on development and collaboration in vulnerable regions and areas of conflict. Cordaid strives for a fair and sustainable society in which every individual counts; a society in which people share the Global Common Goods and one that leaves room for diversity. Cordaid is based in the Netherlands and inspired by values and beliefs founded in Catholicism.

Cordaid believes that engagement with “Communities of Change” through social entrepreneurship in fragile communities and societies contributes to peace-building and state-building at the highest level; to increasing measures of security, empowerment and opportunity at all social levels, to stable social contracts and covenants that benefit people equally, and to sharing of the global common goods more fairly and sustainably.

Cordaid has made a strategic corporate decision to focus its development interventions on vulnerable groups in fragile environments, i.e. in conflict and post-conflict areas. Cordaid runs local offices in: Afghanistan, Burundi, CAR, DR Congo (2), Ethiopia, Kenya, Haiti, South Sudan and Zimbabwe.

2. Food Security

The unit Food Security is one of twelve units or departments of Cordaid. Cordaid Food Security supports groups and organizations of resource-poor smallholders to strengthen food security through organization, production, processing and marketing. The focus is on fragile conflict and post-conflict areas, in particular in Afghanistan, Burundi, DR Congo, Haiti, Sierra Leone, South Sudan and Uganda.

Food security is about people having access to food in a sustainable manner (access and stability over time). Food security may be gained through production or purchase. In fragile areas, where agriculture is often the main source of income, food insecurity may be both an outcome (effect) of conflict and a source (cause) sustaining conflict.

Cordaid Food Security contributes to processes of re-habilitation and change that enable resource-poor smallholders in fragile areas to sustainably produce more food and income. Cordaid believes that sustainable and inclusive economic development is necessary for building peaceful and thriving communities, reducing the breeding ground for social tension.

3. Guiding principles of the BU Food Security

Smallholder farmers

Smallholder farms provide a livelihood for about 40% of the world's population. In Africa, 90% of agricultural production is derived from small farms. Smallholder farms are a key source of employment and income, and a valuable mode of living. In fragile areas smallholders are particularly important to increase food availability and to reduce poverty and malnutrition. We believe in the potential of knowledge and innovation to enhance smallholders' efficiency and effectiveness.

Building scale

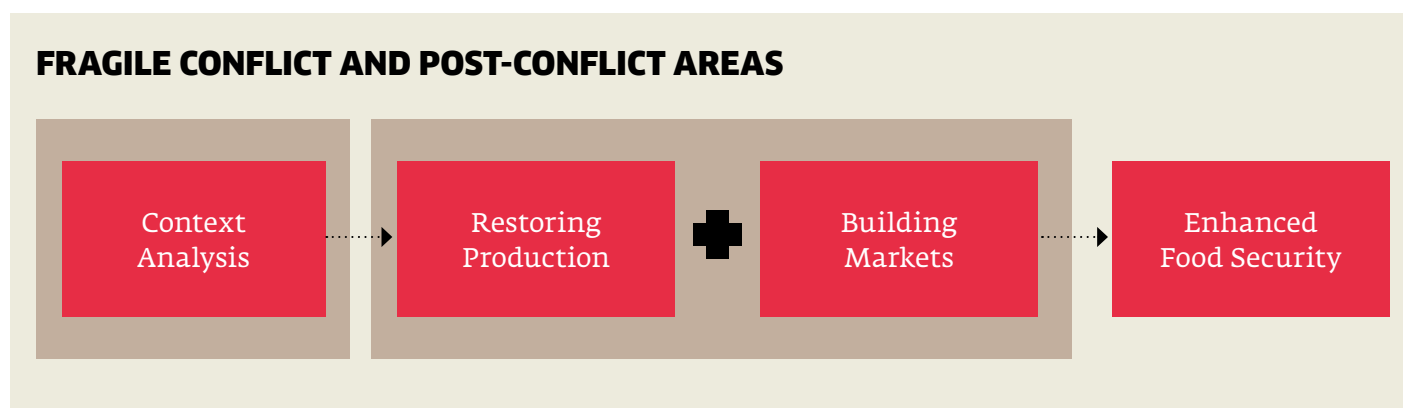
Smallholders need scale to have access to markets. Organizing smallholders helps to remove barriers to production and trade, to have a voice, to create new opportunities and to respond to dynamic environments. Strong formal and informal organizations can serve and facilitate the resource-poor amongst their members.

Communities of Change

Social inclusion and cohesion is key in fragile areas to foster a secure and sustainable livelihood. Organizing smallholders will contribute to building communities which are self-confident and interact with others (i.e. communities, organizations, institutions and enterprises). We support “Communities of Change” where actors acknowledge, reach out and seek synergy with other actors in order to find solutions to problems or find opportunities to grow and flourish. This includes strategies which increase the resilience of these communities to potential recurrence of violence and instability.

Participatory approaches

Participatory and gender-sensitive approaches are needed to ensure that the process of development is attuned to the beneficiaries (women and men). In conflict and post-conflict regions women often bear the responsibility for the survival of the family as men have died or disappeared. Smallholder farms are multi-functional (providing food, feed, fibre, fuel, etc.) and form part of society. Development interventions should therefore be integrated and adapted to context. We support actors who seek productive collaboration with others (i.e. development organizations, governments, business, knowledge institutes, civil society) with the aim that local actors take ownership in the necessary activities.



4. How Cordaid Food Security is organized

Cordaid Food Security works in a limited number of fragile, conflict and post-conflict countries; i.e. Afghanistan, Burundi, DR Congo, Haiti, Sierra Leone, South Sudan, Uganda.

Depending on program or project, we support groups and organizations of resource-poor smallholders in:

Organization: Cordaid supports the organization of smallholders in formal and informal groups (e.g. associations, cooperatives, unions, etc.) in order to develop scale and to gain a stronger bargaining position.

Production: Cordaid supports organizations of smallholders to restore and improve their production in quantity and quality, through access to knowledge, inputs and innovations adapted to context.

Processing: Cordaid supports organizations of smallholders to reduce post-harvest losses and to add value by enabling the access to better storage, improved selection, processing and appropriate packaging.

Marketing: Cordaid supports organizations of smallholders to develop the entrepreneurial skills of the organization and its members, for example through trainings on product quality and pricing, and through linkage to traders, market information systems, and access to finance. This way Cordaid contributes to building access to markets.

Given the important role women play in securing food for the family we put special attention to the appropriateness of interventions for women and the tailoring of services to their needs.

ANNEX 2. TERMS OF REFERENCE

Final version as per 16 December 2013

1. Background

Cordaid has made a strategic corporate decision to concentrate its development interventions in fragile countries and regions (conflict and post-conflict countries). In the area of food security and agriculture, Cordaid supports and leverages interventions that aim for structural and sustainable improvement of the food security of communities by supporting smallholder farming at the local, regional, national and international level.

Seeds are a key input for successful smallholder production. In fragile areas the common seed savings, acquisition and distribution systems are often distorted following conflict or disaster. Cordaid aims for the development of a coherent and conflict-sensitive approach to seed system rehabilitation; through seed provision and/or the revival of seed markets at the local, regional and national level.

2. Seed provision in contexts of fragility

Smallholders in developing countries generally keep seed stocks of food crops for home consumption and purchase seeds for industrial market crops. In fragile areas the common seed savings, purchase and distribution systems are often distorted following conflict or disaster. This may work out differently for resident smallholders and for migrated smallholders.

Resident smallholders (locals) may have become the victim of looting etc., or have become more vulnerable to natural disaster. Their seed reserves may have disappeared or may have been consumed. Resident smallholders may be able to re-gain access to locally-adapted seeds at a community level, yet availability may be limited and price prohibitive. Emergency aid often comes in to provide seeds and farm implements. Where possible seed fairs may be organized in order to increase and/or revive the circulation of seeds at a community level.

Migrated smallholders (refugees, IDPs, returnees) generally have little access to land, and where they do they will usually not have access to quality seeds (and other farming inputs). They have no proper seed reserves to fall back on, and their farming knowledge and expertise may not be sufficiently adapted to local conditions. Emergency aid will generally come in to provide these groups with seeds and farm implements.

3. Research on seed governance in fragile areas

Through this ToR, Cordaid commissions Wageningen University (WU) to carry out research on the governance of seeds in fragile conflict and post-conflict areas, which are transiting from a phase of emergency aid to a phase of rehabilitation and economic development. 'Governance' refers to cooperative problem-solving arrangements that (inter)governmental, civil society and/or business actors have put into place to deal with common, societal or developmental problems, like insecure access of smallholders to seeds in areas characterized by fragility or limited statehood.

The main objectives of this research are:

- a. To identify seed governance that is adapted to the fragility of conflict and post-conflict areas and can improve access to seeds for resident and migrated smallholders in such areas.
- b. To identify the potential and distinctive role of Cordaid in promoting or developing seed governance for resident and migrated smallholders in fragile conflict or post-conflict areas.

The two key questions of the research are:

- a. What are best practices and arrangements to secure access of resident and migrated smallholders to seeds that are fit for local growing conditions in areas characterized by fragility and/or limited statehood in conflict or post-conflict areas?
- b. What are pitfalls in seed interventions and governance in areas characterized by fragility and/or limited statehood, which might permanently disturb local, regional and/or national seed systems and negatively affect access of smallholders to critical means of production (i.e. planting materials)?

To realize the objectives and to answer the questions of the research, the following research activities are planned:

1. To systematically review the scientific literature on the relationship between seed governance and seed security for resident and migrated smallholders in contexts of fragility.
2. To develop and use the concepts of seed security, governance in limited statehood and adaptive (seed) governance to identify problem-solving arrangements and activities that are adapted to contexts of fragility and can help improve smallholders' access to seeds in such contexts.
3. To make an inventory of best practices and pitfalls of programs of intergovernmental agencies (e.g. FAO, WFP, IFAD, etc.) and initiatives (AGRA, IFDC, Bill & Melinda Gates, etc.), governments and national input supply programmes, development organizations (e.g. CARE, Cordaid, CRS, Misereor, Oxfam, ZOA, etc.) and their local partners, that aim to provide seed security to resident and migrated smallholders in contexts of fragility.
4. To document and analyze a number of examples (of minimally 5 and maximally 10 cases) in which seed provision and seed governance in fragile areas were either well adapted or not adapted at all to the local growing conditions.
5. To elaborate practical guidelines and recommendations on seed governance for development organizations working in fragile areas on the transition from emergency aid to development.
6. To draw up and present a Draft Final report for discussion during a workshop in early-June 2014 organized by WU in close collaboration with Cordaid.
7. To draw up a Final report which is ready for publication in English by Cordaid.

The research will be carried out by WU in the period January-June 2014, and will include a Cordaid-organized international workshop in early-June to discuss the Draft Final report.

ANNEX 3. LIST OF INTERVIEWEES

#	DATE	AFFILIATION - POSITION	AFFILIATION - POSITION (FORMER)
1	11-4-2014	Cordaid	
2	10-4-2014	AGRA - Director, PASS	
3	16-4-2014	IFDC - Director, East and Southern Africa Division	
4	14-5-2014	IFAD - Senior Portfolio Manager	
5	10-4-2014	UEA - Senior Lecturer, School of International Development	
6	14-4-2014	Louis	TAD, WUR - Post-doc
7	18-4-2014	Independent consultant	FAO - Senior Agricultural Officer Seed Policy
8	11-4-2014	CIP - Sweet Potato Value Chain Specialist	CRS - Principal Agricultural Advisor
9	23-4-2014	Oxfam	SEARICE - Executive Director
10	29-4-2014	CDI - Advisor farmers, rural innovation and agribusiness development	
11	11-4-2014	CRS - Principal Agricultural Advisor	CIAT - Consultant
12	23-4-2014	ZOA - Programme Officer, Refugee Care	
13	16-4-2014	CRS - Agricultural Advisor	
14	11-6-2014	Cordaid	

ANNEX 4. EXPERT CONSULTATION REPORT

From seed aid to seed governance: Exchanging ideas and experiences on organizing seed security and exploring the concept of seed system governance

Museon, The Hague, Netherlands, 17 June 2014

A list of participants, the program and a photo impression are included at the end of this report.

1. Opening

Evelijne Bruning (day chair) opened the day and welcomed the participants. **Simone Filippini** (Cordaid) introduced Cordaid's work and the research project, and called upon the participants to work with an open mind, an open heart and a good work ethic. **Marcel Beukeboom** (Ministry of Foreign Affairs) also called upon participants to get out of their own space and to develop partnerships between different actors (public sector, private sector, knowledge institutes, civil society; the "Dutch diamond"). He acknowledged the 'governance gaps' in food security between disaster relief and post-disaster recovery and rehabilitation and development, and called for joint solutions.

Otto Hospes (Wageningen University) then introduced Wageningen University and presented key concepts used in the Draft Final report of the study, which had been shared with participants before the meeting.

The introduction of the concepts and the working groups, as well as the presentations of McGuire, Gildemacher, Remington and Kapran are available as appendices.

2. Practices and paradigms: between theory and practice

Shawn McGuire (University of East Anglia) presented 'What is seed system governance for, and what holds it back? Reflections from Seed System Security Assessments in stressed regions'.

Peter Gildemacher (Royal Tropical Institute) then presented the Integrated Seed Sector Development (ISSD) program, a pragmatic approach towards seed sector intervention linking the formal and informal seed systems.

3. Practices and paradigms: practitioners' experiences

Thomas Remington (CGIAR-CIP) drew on 20 years of experience with CRS while presenting 'From seed aid to seed governance: The CRS experience 1994-2014'. He discussed the pitfalls of direct seed distribution, and the development of seed vouchers and fairs as an alternative. The often repetitive nature of both types of interventions were discussed.

In his presentation, **Issoufou Kapran** (AGRA-PASS) reflected on experiences with the Program on Africa's Seed Systems (PASS) of the Alliance for a Green Revolution in Africa (AGRA)

4. Working groups. Discussing best practices and pitfalls of seed governance in fragile areas: interventions, systems and resilience

Petra Rietberg (Wageningen University) introduced the working groups. Participants were asked to identify best practices and pitfalls at three types/levels of intervention: direct seed interventions, seed system or sector interventions, and interventions directed towards resilient seed systems. Specifically, participants were asked to discuss best practices and pitfalls related to (1) seed security in fragile areas and (2) questions about arrangements and collaborations between actors and power and decision-making between them, that is, governance. A summary of the most important and remarkable points from two sessions of each of the three working groups is given in the next section.

1. Direct seed interventions

The discussion on direct seed interventions mainly coalesced around seed system security assessments. Conducting such assessments to understand seed system functioning was identified as a best practice. Preferably, donors would provide strong incentives for seed security assessments by requiring that a valid SSSA is conducted prior to any seed-related interventions. These assessments should then be linked to recommendations and follow-up.

Several pitfalls that prevent the execution of seed security assessments were identified. Willingness or ability to conduct a seed security assessment is hampered by: 1) the assumption that people already know what the situation is; 2) the idea that, in an emergency situation, there is no time to conduct an assessment because one needs to act immediately; 3) lack of a simple assessment tool or expertise on how to use it; and 4) the idea that an assessment is a "seed needs" assessment, assuming a problem of seed availability. As a consequence, donors or interveners make decisions on seed with insufficient understanding of seed systems. This also holds for the execution of direct seed distribution which, according to the participants, often is conducted by people who aren't professionals in distribution and who have limited (technical) knowledge on seed.

A shift from reflecting on 'doing things right' to 'doing the right thing' was seen as a best practice, whereas failure to reflect, evaluate and learn was seen as a pitfall.

Lack of accountability in direct seed distribution was seen as a pitfall. The use of the Accountability to Affected Populations guidance (FAO, 2013) was seen as a best practice related to governance.

2. Seed system or seed sector⁸ development

Farmer-to-farmer exchange and the building of local knowledge networks was seen as a best practice enabling the development of (informal) seed systems. Agri-Hubs such as developed by Agri-ProFocus, where different actors come together to share knowledge on particular topics, could play a role in such knowledge exchange at a regional or national level.

Banking on existing networks (e.g. producer organizations) was identified as best practice. However, governance-related questions need to be addressed there as well, as these organizations may suffer themselves from lack of accountability and legitimate representation, and favour men and elites.

According to some of the participants, local seed producers are often identified by “big men” and the extent to which they are reliable partners with an interest in producing seed is questioned.

Free direct seed interventions do not contribute to the development of seed systems. A former project of FAO in the Central African Republic was described as a case where the effect of the interventions faded away after the interventions ended. FAO invested in training 800 seed producers and bought the seed they produced to give it to other farmers. However, as the funding ceased, the farmers lost interest in using the seed and consequently the seed producers could not maintain their business. Seed vouchers and fairs might contribute to seed system development if well designed, yet often they do not (a.o. for their repetitive nature, large traders taking over).

Fostering exchange and cooperation between public research and private partners was seen as a good practice for the development of new varieties.

At local markets, the quality of seeds may be problematic as seed may be adulterated or sellers may cheat on buyers. However others stated that the quality of seed at local markets is often higher than the quality of farmer produced seed. Certified seed, according to several participants, does not necessarily guarantee varietal and/or seed quality. Quality declared seed was mentioned as an alternative to certified seed that is cheaper and may require less bureaucratic procedures. Such quality declarations not necessarily would need to be backed up by state legislation, although such legislation could allow some formal recognition to quality declared seed.

One of the participants stressed that in order to effectively intervene in and develop seed systems, intervening parties should not only think about the type of activities and practices that would serve their goals, but rather develop a vision on the partners with whom to cooperate and how they would like to work on reaching certain goals.

⁸ The working group participants generally sensed that seed systems are broader than seed sectors and encompass them. Seed systems include seed sectors as well as farmers, civil society, informal markets and government actors, whereas seed sector seems to refer to formal seed sector actors. As we did not want to narrow the discussion to formal seed sector development only, we decided to focus on seed system development.

3. Resilient seed systems

It was generally acknowledged that building resilient seed systems should start *before* the acute emergency situation. Working towards resilient seed systems should be part of disaster risk reduction programs.

Several people advocated a bottom-up approach, strengthening existing systems and building upon them. Such strengthening should allow for self-governance of communities and strengthen local entrepreneurs and the functioning of local markets. Building and fostering relations between farmers and between farmers and merchants was considered important, as social relations play a role in shaping access to seed. When they are mobilized in times of stress, relations between people can turn into social mechanisms of access to seed. Preferably, social relations should be fostered over a wide spatial range: that would enhance the chance that there are contacts with areas that are not hit by a specific shock, and allow for the opportunity to gain access to seeds of specific varieties when needed. Means of communication such as mobile phones were seen as essential in providing information to farmers (e.g. on the availability and price of (new) varieties), and in enabling communication between different farmers and merchants, also over longer distances.

The exploration and expansion of so-called “seed repertoires” was seen as another best practice. This entails the identification of different types of crops that farmers plant or could plant under different conditions. The identification and development of seed repertoires prior to any emergency combined with their mobilization in times of stress could contribute to seed system resilience.

It was also suggested that the relief and development community itself could work on better disaster preparedness and better cooperation between different partners. The United Nations’ Cluster-approach was mentioned as a good example. Under this approach, different actors such as WFP and FAO come together to discuss their roles and responsibilities in emergency situations, so that they can respond to disasters quicker and more effectively and efficiently.

The United Nations Cluster approach is an example of contingency planning, whereby different parties come together to discuss possible scenarios and how to best be prepared for them. More generally, contingency planning by different actors, including government actors and farmers, was seen as a best practice. For seeds, a seed security plan would be the outcome of such contingency planning. Also in this case, fostering relations between different parties is part of disaster preparedness.

Perfectly resilient seed systems react to shocks and stress by absorption of stress, adaptation or system transformation, so that seed security is maintained for all involved. Several elements of the current dominant humanitarian aid paradigm were critiqued and seen as pitfalls to building resilient seed systems: organisations with limited agricultural knowledge working on seed, the separation between organisations working on relief and those on development, the segregated funding architecture and the lack of follow-up and continuity. Especially the assumption that seed is not available or that there are no local entrepreneurs is rarely true and made too easily.

5. Concluding debate

In the concluding debate, the findings of the different working groups were briefly discussed and reflected upon.

6. Concluding remarks

On behalf of Cordaid, **Peter Ton** and **Edith Boekraad** noted that the issue of seed governance should be on the agenda of all participants' institutions, as most do not currently have a specific policy on seed interventions in and after emergency. They thanked the participants, speakers and organizers, and expressed their interest in further developing the topic and building relationships with others in the field. **Otto Hospes** (Wageningen University) then reflected on the importance of thinking about governance when discussing seed security and interventions in seed systems. **Geert Westenbrink** (Dutch Ministry of Economic Affairs) complimented Cordaid with taking the initiative to organize this expert meeting. He called upon Cordaid to take on a leadership role in the debate on interventions in seed systems. Both the Ministry of Foreign Affairs and the Ministry of Economic Affairs are looking for new ways of combining or better integrating relief and development.

LIST OF PARTICIPANTS

- Marcel Beukeboom (Dutch Ministry of Foreign Affairs)
- Edith Boekraad (Cordaid)
- Gareth Borman (CDI)
- Evelijne Bruning (day chair)
- Théophile Djedjebi (Cordaid)
- Hein Gevers (WUR)
- Peter Gildemacher (KIT)
- Otto Hospes (WUR)
- Issoufou Kapran (AGRA)
- Niels Louwaars (Plantum)
- Neil Marsland (FAO)
- Shawn McGuire (University of East Anglia)
- Nicole Metz (Agri-ProFocus)
- Lucio Olivero (FAO)
- Archana Patnaik (WUR)
- Thomas Remington (CGIAR/CIP)
- Petra Rietberg (WUR)
- Roelof van Til (ZOA)
- Simone Filippini (Cordaid)
- Peter Ton (Cordaid)
- Ido Verhagen (Access to Seeds Index)
- Geert Westenbrink (Dutch Ministry of Economic Affairs)

THE PROGRAMME

From seed aid to seed governance in fragile areas: Exchanging ideas and experiences on organizing seed security and exploring the concept of seed system governance

TIME	PROGRAMME
08.30-09.00	Registration with coffee and tea
09.00-09.40	<ul style="list-style-type: none"> ■ Opening by chair: Evelijne Bruning (day chair) ■ Welcome by Simone Filippini (Director of Cordaid) ■ Introduction by Marcel Beukeboom (Dutch Ministry of Foreign Affairs) ■ Key concepts by Otto Hospes (Wageningen University)
09.40-11.00	<ul style="list-style-type: none"> ■ Practices and paradigms: between theory and practice ■ Shawn McGuire (University of East Anglia) and Louise Sperling What is seed system governance for, and what holds it back? Reflections from Seed System Security Assessments in stressed regions ■ Peter Gildemacher (Royal Tropical Institute) Integrated Seed Sector Development: a new model for seed sector improvement ■ Debate
11.00-11.30	Break (coffee/tea)
11.30-12.50	<ul style="list-style-type: none"> ■ Practices and paradigms: practitioners' experiences ■ Stephen Walsh (Catholic Relief Service) and Thomas Remington (Consultative Group on International Agricultural Research / Centre for International Potatoes): From seed aid to seed governance: The CRS experience 1994-2014 ■ Issoufou Kapran (Alliance for a Green Revolution in Africa) Reflecting on experiences with the Program for Africa's Seed Systems ■ Debate
12.50-14.00	Lunch
14.00-15.00	Working groups. Discussing best practices and pitfalls of seed governance in fragile areas: interventions, systems and resilience
15.00-15.15	Break (coffee/tea)
15.15-16.15	Working groups. Discussing best practices and pitfalls of seed governance in fragile areas: interventions, systems and resilience
16.15-16.30	Break (juices)
16.30-17.15	<ul style="list-style-type: none"> ■ Concluding debate ■ Harvesting ideas and experiences on how to organize seed security in fragile areas ■ Questions and your action for follow up
17.15-17.30	<ul style="list-style-type: none"> ■ Concluding remarks ■ Otto Hospes (Wageningen University) ■ Geert Westenbrink (Dutch Ministry of Economic Affairs)
17.30-	Drinks

ANNEX 5. ORGANIZATIONS AND SEED

The overview below aims to provide insight in the type and the relative importance of seed-related projects run by a number of intergovernmental initiatives and NGOs.

IFDC is working in twenty two countries throughout Africa. They are mainly working on creating linkages between farmers and the input sector (of seeds and fertilizers), the output sector (of marketable products), the credit sector (loan officers, banks). They do not work with farmers directly, but through farmer's organizations. Moreover, part of their work consist of lobbying governments to develop policies and regulations conducive to private sector driven agricultural development.

PASS is running in twenty countries in Africa, and comprises of four sub-parts: first, providing funding for students to pursue MSc and PhD degrees mainly in plant breeding; second, providing financial support for public breeding initiatives working on specific staple food crops; third, supporting the development of private local seed enterprises both financially and by giving trainings and sharing expertise; and fourth, certifying, licensing and registering small seed and fertilizer shops operating at village level. The latter is part of the so-called agro-dealer development initiative. (Interview 2).

The CDI has run extensive ISSD-programs in Ethiopia and Uganda, whereas a pilot-project is underway in Burundi, Ghana, Mali, Malawi, Mozambique and Zambia.

Catholic Relief Services (CRS) is a US-based Christian charity that runs, and has run, both agricultural and disaster relief projects in South(ern) Sudan, DR Congo, Uganda, Haiti and Afghanistan, and agricultural projects in Sierra Leone (and Burundi – though not seed-related). Increasing agricultural productivity and profitability are among the main goals of their agricultural development work. Seed aid is a major part of their work in many agricultural projects. Their approach is primarily based on providing seed vouchers and organizing seed fairs, as described by Remington et al. (2002). According to project descriptions their work includes the provision of (improved) seed and planting material to farmers, organizing markets or setting up market structures, training agricultural extension agents and facilitating seed agents (www.crs.org last visited 4 March 2014).

Cordaid often collaborates with local Catholic caritas organizations as well as churches, especially when governmental institutes are absent or poorly developed. Distribution of seeds and tools was or has been part of Cordaid's programs in DR Congo, Kenya, Ethiopia (interview 1), and, recently, in CAR (<https://www.cordaid.org/nl/projecten/emergency-aid-in-central-african-republic/109830/>), Sierra Leone (<https://www.cordaid.org/nl/projecten/enhancing-economic-performance-of-farmers/109579/>), Haiti (<https://www.cordaid.org/nl/projecten/development-of-agricultural-value-chains/110558/>) and South Sudan (<https://www.cordaid.org/nl/projecten/food-security-and-peace-building-programme/110196/>). The establishment of community seed banks has been part of Cordaid's work in Sierra Leone. In South Sudan, seed distribution is combined with training on post-harvest management and the establishment of community seed banks is foreseen for the future. In Haiti, seed distribution and seed banks are part of a wider program on value chain development. In DR Congo, Cordaid worked on importing cassava that did not suffer from the mosaic virus (interview 1).

Oxfam International has a modest track record in working on seed security in fragile areas. The only mention of seeds in its 2012-2013 annual report is "the distribution of over 216 tons of seeds to more than 60,000 households" in response to the Sahel food crisis. Oxfam was involved in seed-related projects in Sierra Leone and Liberia, using distribution of seed as a means to address issues of equality and participation and working on setting up farmer field schools (Interview 9). In Ethiopia, Oxfam Novib worked on the distribution of seeds, the development of a seed bank and testing new varieties on farmers' fields (Oxfam Novib, April 2011). Oxfam recently started a large SIDA-funded project on seeds biodiversity, food security and the GROW campaign (2013-2018).

ANNEX 6. ISSD-PRINCIPLES

ISSD-principles (ISSD Africa, 2013):

1. Foster pluralism and build programs on diversity of seed systems
2. Work according to the structure of the seed value chain
3. Promote entrepreneurship and market orientation
4. Recognize the relevance of informal seed systems
5. Facilitate interactions between informal and formal seed systems
6. Recognize complementary roles of the public and private sector
7. Support enabling and evolving policies for a dynamic sector
8. Promote evidence based seed sector innovation

ANNEX 7. UN-FAO GUIDING PRINCIPLES FOR SEED RELIEF

1. A needs assessment should underpin any decisions to undertake seed relief and guide the choice among possible interventions. This needs assessment should be holistic, putting seed security in the context of livelihood security.
2. Seed relief interventions have to be clearly matched to the context (for example, a crisis caused by drought may require very different actions from a crisis caused by war). By supporting food production, seed relief should decrease dependence on repeated food aid.
3. Seed relief activities should aim both (i) to be effective with the immediate objective of facilitating access to appropriate planting material; and (ii) to contribute to the restoration, rehabilitation or improvement of agricultural systems in the longer term.
4. Ideally, considerations of seed system sustainability should be built into seed interventions from the beginning. As a minimum, seed aid should do no harm to farming systems. Thus, emergency relief activities should support local seed system development, ideally by integrating long-term needs into the design of the project.
5. Seed relief activities should be built upon a solid understanding of all the seed systems farmers use and the role they have in supporting livelihoods. The local system is usually more important to farmers' seed security and has been shown to be quite resilient. Depending on the context, the focus in an emergency should normally be on keeping the local seed system operational. One practical problem is that seed systems are often not sufficiently understood, especially in emergency situations. Hence, there is a need for more emphasis on understanding seed systems, their role in supporting livelihoods, and needs assessment.
6. Seed relief interventions should facilitate farmers' choices of crops and varieties. Seed relief interventions should aim to improve, or at least maintain, seed quality and to facilitate access to crops and varieties that are adapted to environmental conditions and farmers' needs, including nutritional needs.
7. Monitoring and evaluation should be built into all seed relief interventions, to facilitate learning by doing and thereby to improve interventions.
8. An information system should be put in place to improve institutional learning and to function as a repository of information gained from cumulative experience. Such information systems should be institutionalized at national levels, to the greatest extent possible.
9. A strategy to move from the acute emergency response to a capacity building or development phase should be included in the design of the intervention.

These guiding principles were endorsed by the FAO Emergency Coordination Group (Rome, 20 June 2003), based on the recommendations of a stakeholders' workshop "Improving the Effectiveness and Sustainability of Seed Relief" (Rome, 26-28 May 2003). The initial draft was prepared by the FAO seed relief discussion group (FAO, 2004).

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ABOUT CORDAID

Cordaid is a global development organization whose mission is to create flourishing, self-reliant communities in the world's most fragile and conflict-affected areas. Together with local actors, we rebuild trust and stability by tackling multiple challenges in healthcare, education, disaster risk reduction and response and more. We use Performance Based Financing and local investments to secure solutions to complex problems. Our results are visibly shared, through open data and open development, empowering objective and transparent citizen engagement in the South and North.

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