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**Changing the Development Paradigm:**

**Key to Managing Drought Risk in areas of Chronic Food Insecurity in Africa**

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## The Policy Implications of Resilience to Drought

The recent food and nutrition crises in the Horn of Africa and the Sahel, affecting tens of millions of people, and requiring massive levels of humanitarian assistance costing billions of dollars, is causing a long overdue review thinking and policy for disaster risk reduction and development.

USAID, one of the biggest donors in the Horn of Africa has called for the development community to change “the way it does business” to ensure that the more than 30 million people who live in the arid and marginal lands of this region can cope with future and recurring shocks. USAID stated that “we can’t stop droughts from happening, but *we can enable communities to withstand these shocks and move forward by building resilience and fostering sustainable growth*”<sup>1</sup>. In September 2011, recognising that drought related crises are no longer cyclical but chronic, East African leaders met in Nairobi and requested support for long term programs and strategies to strengthen drought preparedness, promote ecosystem sustainability, anticipate and manage climate change. They also called for reform of the humanitarian response and development assistance, to enhance resilience and promote long-term solutions.<sup>2</sup>

Similarly, in the Sahel, national governments have become deeply concerned about the increasing frequency of food crises linked to drought that require enormous resources for humanitarian assistance. They are giving urgent attention to determine how to break the cycle of chronic hunger and malnutrition. At the high-level inter-ministerial meeting on regional food crises in Lomé in June 2012, African leaders made a strong appeal for concerted measures to address the root causes of recurrent food and nutritional deficiencies in the Sahel and West Africa, through coordinated action within the context of sustainable development<sup>3</sup>. Also in June, the European Commission, the leading international donor to the Sahel, hosted a high-level gathering on food crises. International donors, representatives from the Sahel countries, and international and local organisations attended<sup>4</sup>. The outcome of the meeting was the launch of a new partnership *on strengthening resilience within the Sahel to future crises*. The initiative, called AGIR Sahel (Alliance Globale pour l'Initiative Résilience), has one core aim: to make sure that the people in the Sahel can cope better with future droughts<sup>5</sup>.

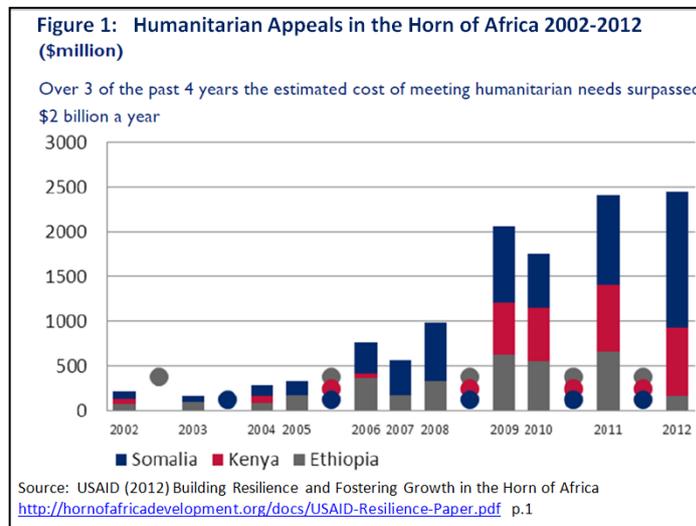
What is emerging, but not yet fully grasped in many donor and policy circles, including the various components of the disaster risk reduction community, is that the resilience agenda requires fundamental institutional reform and a re-thinking of current development policies. In particular, resilience to drought requires significant change in the current dominant pattern of investment in agriculture and livestock production in ecologically fragile and drought-prone areas. The analysis supporting this assertion is presented below.

### Drought in the Horn of Africa

In 2011, East Africa had two consecutive seasons with below-average rainfall, resulting in one of the worst droughts in 60 years. This put 12 million people in Kenya, Somalia and Ethiopia in urgent need of humanitarian assistance<sup>6</sup>. The entire Horn of Africa is often seen as a food security-challenged region. The arid and semi-arid lands of northern Kenya, eastern and southern Ethiopia and much of Somalia, are particularly volatile, and prone to drought. Drought is estimated to be the underlying factor in some 90% of the region’s disasters<sup>7</sup>.

For complex reasons, including national policies and conflict, the level of food insecurity caused by this latest drought varied significantly between and within countries in the Horn. The drought scorched pastures and killed huge numbers of livestock. Pastoralist families in

the region, dependent on livestock for survival, resorted to desperate measures to try to keep their animals alive. Many used food normally kept for the family to feed their dying herds, some even going so far as to take the grass off the roofs of their houses<sup>8</sup>. Thousands migrated to northern Kenya or to south-eastern Ethiopia.



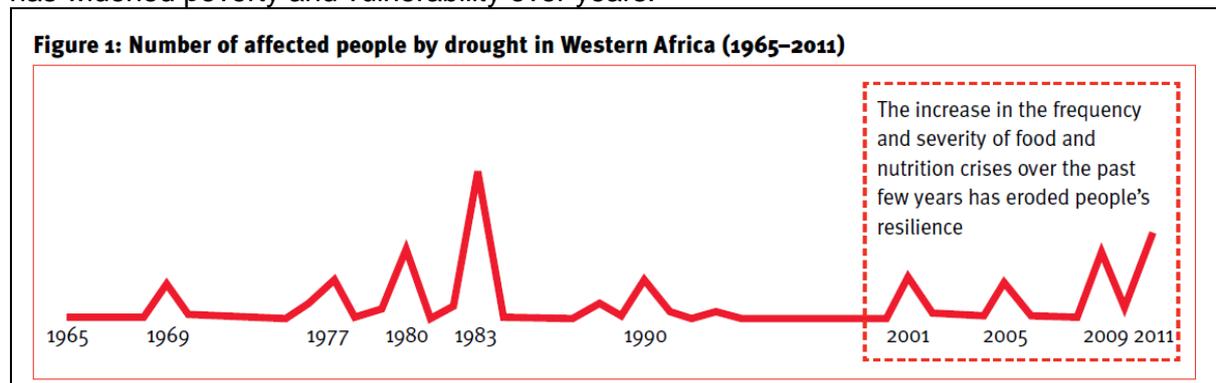
This was not the first drought, food and nutrition crisis and conflict cycle affecting the Horn. Nor will it be the last. Cyclical droughts are now coming faster than ever<sup>9</sup>. This has greatly increased the number of people trapped in chronic food insecurity and poverty. Figure 1 shows that the estimated cost of meeting humanitarian aid in the Horn is growing dramatically. Such levels of humanitarian assistance are not sustainable. Fundamental policy change, involving a major shift of development resources for resilience is required.

## The Sahel again affected by Food and Nutrition Crisis

In the wake of a drought in 2011 in West Africa's Sahel region, a similarly bleak narrative of an estimated 18.4 million people deeply affected by a potentially catastrophic food crisis captured media attention. Agricultural production in the Sahel fell due to late and irregular rains and prolonged dry spells in 2011. The Food Crisis Prevention Network (RPCA) meeting of April 12-13 confirmed that Sahel cereal production in 2011 was 26 percent lower than in 2010<sup>10</sup>. However 2010 produced a record harvest. If compared to the average of the past 5 years, total cereal production in the Sahel was only 3% lower<sup>11</sup>. Despite what seems like a modest overall food deficit, a severe food and nutrition crisis has started. Why?

In the Sahel, the growing reality is that ***periodic drought is no longer the root problem***. Instead, drought often triggers a shift from an existing, chronic livelihood and nutrition crisis into an acute phase. The structural factors that deepen vulnerability and poverty are often overlooked. These include: ecological degradation of soils, trees and pasture; inadequate support for small scale agriculture; climate change; low levels of education; lack of access to basic health services; poor governance; dependence on international markets; inequitable economic growth, and high population growth rates that have significantly reduced average farm size in many rural areas, as well as per capita food production. Although rooted in these structural factors, every new acute phase of the Sahel crisis has arisen with its own distinct features. The 2012 Sahel crisis differs significantly from those of 2010 and 2005. While triggered by drought, other particular circumstances include high food prices, the conflict in Mali and reduced international remittances.

The overarching driver of the Sahel crisis in 2012 was not the much scrutinized national and regional food deficits. It was the more complex, multi-dimensional “**resilience deficit**”<sup>12</sup> that has widened poverty and vulnerability over years.



Since the last Sahel crisis in 2010, the vast majority of the most vulnerable households had not yet been able to get out of debt, or restore their normal livelihoods and productive assets such as seeds and animals<sup>13</sup>. This has greatly undermined people’s purchasing power to access food, and their capacity to absorb a new shock, triggered by drought, less than two years later.

## A Misleading Narrative about the Role of Drought

The most salient and fatal consequence of drought linked humanitarian crises in the Sahel and the Horn of Africa is severe acute child malnutrition. The data shows that child malnutrition rates are not related to general food availability. Nor is child malnutrition limited to the most food insecure areas of the Sahel and the Horn. During the 2010 Sahel crisis, the case load of Severe Acute Malnutrition<sup>14</sup> (or SAM) in Niger, the epicentre, was 320,000 children. A year later, in 2011, Niger had exceptional rains and a record agricultural harvest. However, the case load of SAM dropped only slightly, to 307,000 children<sup>15</sup>.

Addressing the food deficits caused by drought is important. But drought is only part of the real crisis in the Sahel and the Horn of Africa, where the worsening **resilience deficit**, characterised by persistently high chronic hunger and acute malnutrition rates, must become the main concern in managing the risks of disaster.

In raising public awareness and mobilising a humanitarian response, media accounts over-emphasise drought and food aid. The headlines often fail to identify the core causes of food insecurity and child malnutrition in the Sahel. While targeted food aid and nutritional supplements are necessary, short term emergency food assistance cannot address the underlying resilience deficit.

Even though resilience is conceptualized differently by actors<sup>16</sup>, there is an emerging policy consensus that, in the context of the Sahel and the Horn of Africa, managing the risk of drought, and ending intolerable levels of chronic food and nutrition insecurity, requires strengthening resilience.

## A Paradox? Robust Economic Growth co-existing with Chronic Food Insecurity

Recent initiatives to promote resilience are arising because countries in the Sahel and the Horn are experiencing the apparent paradox of strong economic growth, even as food and nutrition insecurity, and the frequency of acute humanitarian crises, increases. Since 2007, (excepting only Niger in 2009) real growth rates in most of the Sahel ranged between 3.5 and

9%. In 2011, the rates of real GNP growth in Mali, Niger and Burkina were 5.3%, 5.5% and 4.9% respectively<sup>17</sup>. This is significant, even accounting for population increase. In the Horn, there has been a similar pattern. For example, according to the IMF, Ethiopia has experienced robust GDP growth rates for most of the last decade, averaging 8.1% from 2000-11<sup>18</sup>.

This economic growth, often spurred by agriculture, is not producing commensurate progress in reducing poverty, or improving child nutrition, or reducing the risks exacerbated by drought. The Sahel, for example, remains plagued by persistent, intolerable levels of malnutrition. In West Africa, the average level of chronic malnutrition is estimated to have remained unchanged at 38.2% since 1990<sup>19</sup>. In Niger, the high prevalence of severe acute malnutrition exceeded 12% since 2009 with a peak of 15% in 2010<sup>20</sup>. Only in Ethiopia has high growth rates started to reflect a drop in the headline poverty rate, reportedly from almost 50% in 1990 to under 30% in 2011.

***Current development policies in the Sahel and the Horn do not adequately take into account the special needs of people most prone to drought risk.*** The poorer households, and malnourished children in ecologically fragile, risk prone areas are being left behind. The thinking is that food aid and humanitarian assistance for such households will be adequate when food crises arise.

However, it is becoming evident that the massive humanitarian efforts required to address the increased frequency and scope of drought triggered food crises in the Sahel and the Horn is no longer sustainable. There is growing recognition that ***a major paradigm shift in development aid is needed to foster resilience*** improve food and nutrition security<sup>21</sup>, and generate pro-poor economic growth<sup>22</sup>. Retaining a “business as usual” development approach that seeks more and faster economic growth based on agriculture in the most favoured “breadbasket” areas, will not succeed in overcoming poverty, hunger, and child under-nutrition. Part of this paradigm shift requires policy makers and donors to address chronic poverty, malnutrition, risk reduction, and resilience as an integral part of development, and to treat drought as a predictable and manageable, (rather than an exogenous, uncontrollable) event when designing development interventions.

This agenda has become urgent, because the increasingly frequent crises in the Sahel and in the Horn have not enabled poor households time to restore their livelihoods before the next shock. Many of the poorest households are in a debt and hunger trap. They have extremely low levels of productive assets. For example, almost half of the rural population in the Sahel face structural food and nutrition insecurity with no realistic hope of escape on their own<sup>23</sup>.

## **Analysis of Competing models for Agricultural development in the Sahel**

In light of the food crises of 2004-5, 2007-824 and 2009-10 in the Sahel, what lessons can be learned about the role of agriculture to improve food security and strengthen community resilience?

Agriculture and livestock production play a vital role in the economies of the Sahel and the Horn. The majority of producers are small scale farmers and pastoralists. The common view is that improvements in agricultural productivity, and livestock exports hold great potential for poverty alleviation and improved food security. In the wake of the 2007-08 food crisis caused by high prices, governments across Africa have signed the Maputo accord which commits them to significantly increase their investments in agriculture to 10% of national budgets. The aim is to increase national and regional food security, eliminate hunger, reduce poverty by generating an increase of overall economic growth to six percent a year.

While there is consensus on the need to invest substantially more in agriculture, there is still great controversy, however, about the model of agricultural development to follow for

increased aid and investment. Despite repeated commitments by key donors and governments in the Sahel to support small-scale farmers and herders<sup>25</sup>, policies and practices in the agricultural/livestock sector in the Sahel and the Horn of Africa are still highly biased to export oriented, commercial production in more favourable areas that have access to more reliable rainfall, inputs, roads and markets.

In the Sahel and the Horn, economic restructuring and liberalization in the 1980's drastically decreased government support for small scale agriculture, and reoriented limited investments to export commodities in favourable production areas. Many analysts and even the World Bank's own Independent Evaluation Group, now link the growing food crises partially to the dismantling of government controls and support mechanisms for small scale farmers<sup>26</sup>.

Despite the lessons learned from the impact of these policies, through its current lending and investments in the Sahel and the Horn, the World Bank continues to give priority to larger scale, commercial, export-oriented agriculture and livestock production<sup>27</sup>, including large scale irrigation schemes. The influential proponents of AGRA (Alliance for a Green Revolution in Africa) <sup>28</sup> and agribusinesses such as Syngenta, are also investing in a conventional, high external input model for improving agriculture, based mostly on increased fertiliser use, high tech seeds, and use of pesticides, focused in the less risk prone agricultural areas, with good infrastructure for value chains and marketing.

The vision of the World Bank, and implicitly of AGRA and global agribusiness for small-scale agriculture is reflected in an early draft the World Development Report on Agriculture (2008): "...the priority is to secure [economic] growth through a focus on the favourable regions and the most entrepreneurial smallholders, and spread the benefits via employment generation and lower food prices' and that 'those with poor assets or remoteness...cannot connect to the growth process [through farming their land] <sup>29</sup>". The World Bank paradigm for African agriculture implicitly favours larger scale contract and corporate farming. One advocate of this approach has bluntly suggested to critics of this approach to stop romanticising peasant agriculture, because it is largely non competitive<sup>30</sup>.

Another equally direct expression of this paradigm is the 2009 policy document of the British government which calls for a necessary adjustment of small-farmers: "if the agricultural sector doesn't adjust, and if marginal farmers do not leave the agricultural sector sufficiently quickly then it is more difficult for more successful farmers to expand and for new entrants to get into farming.<sup>31</sup>"

Unfortunately, tens of millions of small-holder farmers who live in ecologically fragile, drought prone areas on less than \$1 or \$2 per day, cannot afford industrial inputs like hybrid or genetically engineered seeds, fertilizer, pesticides, or irrigation. Because of much higher risks, and declining soil fertility, distance from markets, small scale farmers in such marginal areas are largely seen as incapable of improving production. The current neo-liberal development paradigm thinking is that it is not economically prudent to invest in such areas. If droughts occur, the role of government and their donors is to provide temporary and occasional emergency food aid until households in such areas learn to diversify, earn a sufficient income from off-farm economic activities or gain employment on more successful small farms or large commercial farming enterprises, or in towns and cities<sup>32</sup>.

What the recent drought related food crises in the Sahel and the Horn made very clear however, is that the number of people in the rural areas affected by severe food insecurity are far too large (almost half the population in the case of Niger) to be supported indefinitely through very imperfect safety net interventions. Each new crisis increases the number of poor rural households pushed deeper into chronic poverty. Only a very few could be realistically obtain employment from agricultural growth in high-potential areas<sup>33</sup>. Massive migration to other countries such Ivory Coast, Nigeria or Libya used to be an alternative, but

this is now closed off, with huge reduction in remittances. Beyond this, rural migrants have low literacy levels and limited skills, and therefore have very limited opportunities.

## **Agro-ecology and re-greening for improved household resilience to drought**

An alternative paradigm for agriculture and addressing food security consists of enabling small scale farmers make a transition to agro-ecological farming system. This entails the sustainable intensification of small farming systems, using low external inputs, agro-ecological methods and crop diversification. Agroecology is an alternative, multi-functional model for agricultural development. The proponents of agro-ecological agriculture<sup>34</sup> advocate it as a way to empower vulnerable small-scale farmers in ecologically fragile, drought prone areas, offering them both greater control over their lives and an accessible means of improving their food security, while decreasing their risk of crop failure or livestock death due to climate shocks.

Agro-ecological practices can help build “resilient farms”<sup>35</sup> that improve livelihoods, and achieving multiple benefits at once: increase productivity, reduce rural poverty, improve food security; adapt to a changing climate, regenerate and sustain the natural resource base, and contribute to improved nutrition. Achieving farm resilience for sustainable food production requires enabling small scale farmers to develop their skills, expertise and voice, while supporting their use of agro-ecological farming practices.

### **Definition: What is Agro-ecological Agriculture?**

Agroecology is both a science and a set of practices. It was created by the convergence of two scientific disciplines: agronomy and ecology. The core principles of agroecology include recycling nutrients and energy on the farm, rather than introducing external inputs; integrating crops and livestock; diversifying species and genetic resources in agro-ecosystems over time and space; and focusing on interactions and productivity across the agricultural system, rather than focusing on individual species. Agroecology is highly knowledge-intensive, based on techniques that are not delivered top-down but developed on the basis of farmers’ knowledge and experimentation.

The most recent champion of agro-ecology is the UN Special Rapporteur on the right to food, Olivier De Schutter<sup>36</sup>. Drawing on an extensive review of the scientific literature published in since 2005, the Special Rapporteur identified agro-ecology as the preferred mode of agricultural development to concretize the right to food, particularly for vulnerable groups:

*“Today’s scientific evidence demonstrates that agro-ecological methods outperform the use of chemical fertilizers in boosting food production where the hungry live -- especially in unfavourable environments... Recent projects conducted in 20 African countries demonstrated a doubling of crop yields over a period of 3-10 years... We won’t solve hunger and stop climate change with industrial farming on large plantations. The solution lies in supporting small-scale farmers’ knowledge and experimentation, and in raising incomes of smallholders so as to contribute to rural development....If key stakeholders support the measures identified in the report, we can see a doubling of food production within 5 to 10 years in some regions where the hungry live”. The Report recognizes that “Food availability is, first and foremost, an issue at the household level, and hunger today is mostly attributable not to stocks that are too low or to global supplies unable to meet demand, but to poverty; increasing the incomes of the poorest is the best way to combat it.”<sup>37</sup>*

In the Sahel, there are already many well documented examples of successes in developing diversified and productive agro-ecological farming systems, which integrate food production, trees and livestock that support this perspective. Evidence from Niger, Burkina Faso, and Mali, indicates that low cost agro-ecological techniques, particularly agro-forestry<sup>38</sup> and soil

and water conservation<sup>39</sup>, have improved small-scale farmer resilience, and improved food security<sup>40</sup>.

In Niger, World Vision's pioneering agro-forestry work in promoting Farmer Managed Natural Regeneration (or FMNR) has produced dramatic results<sup>41</sup>, increasing crop harvests in many areas, and sparking a regional, farmer-led re-greening movement<sup>42</sup>. In some villages, the annual "hungry period" when food supplies are nearly exhausted has been significantly shortened.<sup>43</sup> Many rural producers have doubled or tripled their incomes through the sale of wood, seed pods, and edible leaves<sup>44</sup>. Large areas of countryside that a few years ago faced constant shortages of fuel wood and fodder now produce surpluses for sale in nearby markets<sup>45</sup>.

## **Evidence for Effective Drought Resilience: The case for Agro-ecology in Niger**

In Niger, desertification and soil degradation, low soil fertility, unreliable and erratic rainfall patterns, high levels of crop and livestock disease and pest attack make agricultural activities very risky.

Despite these risks, most small scale farmers and herders, who make up the great majority of the population, rely on annual crops and grasses for meeting their basic food needs. All too often, crop and grass growth is inadequate. For example, in many parts of Niger, even in good years, many poorer farm families do not produce enough food to meet their family's nutritional needs for more than three to six months<sup>46</sup>. Depending on the context, different factors can contribute to low productivity, including reduced land area for farming (high population growth reduces the ability of fallowing to restore soil fertility), and poor production practices.

In some zones of Niger, up to 50% of the landmass is totally unproductive because land degradation and erosion has resulted in hardpan formation<sup>47</sup>. When it rains, water cannot infiltrate the hard soil. Extensive water runoff and flooding occur, destroying crops and increasing erosion. With limited tree cover, young sorghum and millet plants, particularly in sandy areas, are often blasted and buried by strong winds that also cause extreme evaporation and loss of moisture. Few farmer families have sufficient organic matter to maintain soil fertility. Fewer still can afford artificial fertilizers.

Promoting resilience to drought risk and food security through agriculture in such conditions is not feasible unless the productive resource base – the land and soil fertility - can be restored.

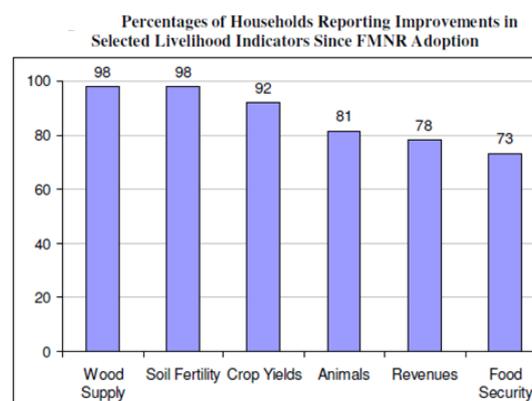
***Despite these problems, on farm research has shown that it is possible to enable farm families regenerate their resource base, produce enough to eat, or to trade, in order to meet basic needs, even under the harsh environmental conditions in the Niger.*** The key is to diversify production away from annual crops, particularly the monoculture of millet through agro-forestry.

This "re-greening" of much of southern Niger and many other parts of the West African Sahel has been well documented<sup>48</sup>. In just over two decades, the age old and destructive practice of clearing all trees and bushes from farmland has been replaced with agro-forestry, promoted by a farmer led movement called ***Farmer Managed Natural Regeneration (FMNR)***. In Niger, farmers in several densely populated regions protect and manage natural regeneration of trees and bushes on their farms<sup>49</sup>.

The process began in 1985 and has led to on-farm re-greening of about 5 million hectares: the largest scale environmental transformation to date in the Sahel and possibly in Africa. An informed writer on the environment, Mark Hertsgaard calls it "one of the great success stories in the field of climate change and agriculture" and "**the single largest environmental transformation in Africa**"<sup>50</sup>. Fifty percent of Niger's once treeless farmland has experienced reforestation rates unprecedented elsewhere in Africa.

Because of the practice of FMNR (protecting and growing trees on their own land), small scale farmers in Niger are producing an estimated additional 500,000 tons of cereals a year which helps feed about 2.5 million people<sup>51</sup>. A World Bank study estimates the annual production value of the new trees is at least \$US 260 million, which flows directly back to farm families, either as cash or as produce<sup>52</sup>. In the region of Maradi in Niger alone, in 2008, a very conservative estimate is that 62,000 farm families practicing a full version of FMNR have generated an additional gross income of US\$17 - 23 million per year, contributing 900,000 to 1,000,000 new trees to the local environment<sup>53</sup>.

Many assessments indicate that in regions where FMNR has been practiced, degraded land has been restored, crop yields have increased and resilience to shocks has strengthened. Financial benefits through sale of tree products and increased grain and livestock production are estimated to be up to \$250 per hectare<sup>54</sup>. FMNR adoption appears to increase household gross income by between 22,805 and 27,950 FCFA (or about 46 and 56 USD) per capita, or by between 18 and 24 percent<sup>55</sup>. These results are consistent with the impressions of farmers themselves, strong majorities of whom report improvements, since FMNR adoption, in the availability of wood, soil fertility, crop yields, numbers of livestock, household revenues and food security<sup>56</sup> (see graphic below).



Source : Haglund E., et al (2009)

According to agencies that promote FMNR, trees better withstand climatic variability than annual crops and can be grown as an economically valuable 'crop' species. Once established, trees produce valuable products year after year, require minimal maintenance and withstand drought. Having reliable income from sales of wood and other tree products enables farmers to buy food from other areas where rainfall is more reliable. The widespread adoption of FMNR is attributed to the fact that its benefits are obtainable at minimal costs to the farmer. There are no expenditures beyond additional labour<sup>57</sup>. For these reasons FMNR is considered as a cost effective, easily adopted means of enhancing food security and increasing resilience.

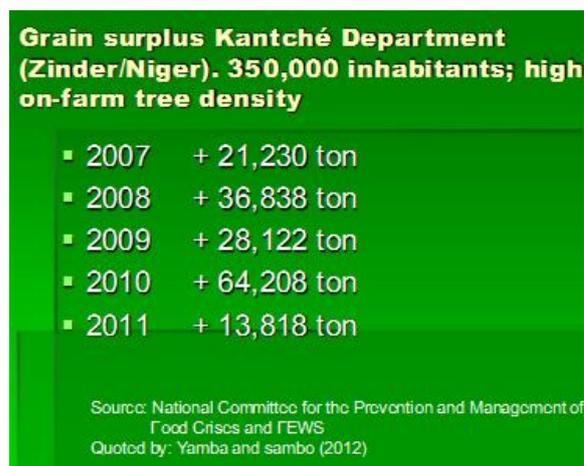
The FMNR technique described often serves as an "entry point" for additional complementary agro-ecological farming techniques related to soil and water conservation. It lays the basis for enabling households to make a progressive transition into a more complex

and diversified farming system, making multiple and integrated use of trees, crops and animals to enhance food security. Other complementary methods to reduce risk include: village Grain Banks, improved cowpea storage, dry season gardening, microcredit for women and provision of improved seed. Mechanisms such as “warrantage” (credit using grain as collateral) would enable poorer households to avoid the debt trap by being able to store their grain to benefit from selling when prices are higher.

There is mounting evidence that FMNR contributes significantly to resilience, in terms of community capacity to absorb shocks. When drought and accompanying food shortages hit the regions of Maradi, Tahoua, Tillabéri, and Zinder in 2004–05, villages with high levels of adoption of FMNR fared much better than those devoid of trees. For example, villages in Aguié District were able to harvest regenerated trees for food, fodder, and firewood to sell in exchange for grain. The inhabitants did not rely on famine relief and did not have a single death of a malnourished child.<sup>58</sup>

Farmers practicing FMNR and other agro-ecological techniques have been able to stockpile grains during good years, harvest trees for food and income in bad years, and sustain productivity by improving fertility and water holding capacity of soils, reducing erosion, and preventing ill effects of sun and wind on young crops. All this has strengthened farmer resilience in the face of cyclical droughts<sup>59</sup>.

Such impact goes beyond the village level. Evidence from the Kantché department of Niger, where adoption of FMNR is widespread, shows overall grain surpluses both in the drought of 2009, and again in the most recent drought of 2011<sup>60</sup>.



In summary, the evidence in Niger suggests that agro-ecological techniques such as agro-forestry, integration of livestock, soil and water conservation constitute an alternative pathway for investing in agriculture that not only increases productivity, but also strengthens resilience, sustainability of the natural resource base and improves food security.

While not sufficient by itself to end food and nutrition insecurity, of the most vulnerable households in the face of recurrent drought, the evidence shows that agro-ecological farming is a far more appropriate and cost effective approach for reducing the “resilience deficit” in drought prone, ecologically fragile areas, compared to conventional “Green Revolution” agriculture. To achieve resilience, agro-ecology must be accompanied by complementary strategies to diversify incomes, reduce risk, protect livelihoods, and improve nutrition<sup>61</sup>.

### **Supporting Drought Resilience in Pastoral Regions**

Pastoralism<sup>62</sup> is the dominant production system in the arid areas and some parts of the semi-arid areas (ASALs) in the Horn of Africa and throughout the Sahel. The recent spate of

droughts severely affected these pastoral areas where livestock production is the main source of both food and income, were severely affected recurrent droughts. Many animals became weak due to lack of adequate pastures and water. This considerably reduced milk availability, a major contributor to pastoralist households' diet. Due to the poor physical state of animals, the increase in distress sales drove down the price of livestock even as cereal prices were sharply rising. The drastic erosion in purchasing power increased food insecurity and malnutrition and led pastoralists to severe coping strategies by pastoralists.

As with agriculture, the international community is concerned that the expenditures for humanitarian aid in pastoral dry lands are rising, and hunger has become a chronic crisis. There is widening agreement that the root causes of the crises must be addressed, moving beyond annual humanitarian aid to supporting long-term development for resilience. This arises from a belated, if not grudging recognition that investment in development will be, in the long run, less expensive and more humane than humanitarian aid, if it is done in such a way as to build the resilience of dry land communities, and ensure the sustainability of the natural resource base on which livelihoods depend.

### **Competing Approaches for Managing Drought Risk in Pastoral Areas**

As with agriculture, there is still much controversy about “how to invest” in resilience for pastoral areas in a way that would generate a high level of sustained benefits in the face of frequent drought. While a deeper understanding of the nature of pastoralist livelihoods and production systems is gradually seeping into policy and programming<sup>63</sup>, there is still much debate about appropriate policy directions.

The recent droughts in the Horn of Africa, in particular, has intensified debate about whether traditional pastoralism is still viable, or whether a radically different livelihood system is needed, as it may no longer be feasible to restore sustainable pastoralist systems<sup>64</sup>. The pessimistic side of the debate cites declining herd sizes, and shrinking grazing land and reduced water access. More frequent droughts make it difficult (in some cases impossible) to restock herds, thus permanently pushing many pastoralists into non-pastoralist livelihoods that are often even less resilient than pastoralism.

In addition to cyclical problems, secular trends in human and livestock population growth are widely thought to be creating unsustainable pressure on land and water resources, and increasing the vulnerability of pastoralist populations to drought. Human populations are growing rapidly just as grazing lands for pastoralists are shrinking, due to cropland expansion, shrub or pest encroachment, and conflict. Part of this pessimistic argument is that in most of the dry lands, there are now too many pastoralists. Combined with a natural resource base that is not increasing in productivity, this means that not enough livestock can be kept to sustain a viable pastoral system.<sup>65</sup> Climate change is also a major threat to such an arid region, and some studies predict an impact already and a greater impact in the future.<sup>66</sup>

According to this pessimistic policy argument, just as in small scale agriculture in drought prone areas, some policy makers and analysts think a significant reduction in the number of people dependent on pastoral livelihoods is required because pastoralism is not a long term viable livelihood. Again, the implicit “solution” is that a mix of rural and urban sedentarisation is the right way to go<sup>67</sup>.

Reacting against this kind of thinking are many analysts who argue that policy and development programming aimed at pastoralists and the lands in which they live have often been based on misconceptions about the nature of both pastoralism and the non-equilibrium environments in which pastoralists live. Despite the validity of some of these arguments of

the pastoralist pessimists, it is important to raise awareness about a number of under-recognized facts<sup>68</sup>.

First, pastoralism is undoubtedly a sector of comparative advantage in the semiarid lowland regions of the Horn. These regions are characterized by relative land abundance but also by rainfall patterns that vary markedly across both time and space. Mobile livestock herds make efficient and risk-minimizing use of such an environment. Numerous studies have shown that mobility and trade are key to both wealth accumulation and drought management for pastoralists.

The evidence is growing that pastoralism is a site-appropriate and productive land-use system: it is the most economically viable and environmentally appropriate way to use dry land areas not suitable for cropping and it makes a significant contribution to national economies. In Kenya, for example, pastoralist activities are estimated to account for more than 35% of the agricultural GDP<sup>69</sup>. The rethinking of pastoralism is partly due to the work on range ecology at disequilibrium,<sup>70</sup> which showed that dry rangeland systems are subject to high temporal and spatial variability in rainfall and that mobile pastoralism is the best way to exploit this heterogeneity.

Second, pastoralism has proved to be much more dynamic than most policymakers had expected: pastoralists have adapted to new challenges and opportunities, especially in trade but also in the way they deal with mobility. There is an increasing tendency for part of the family to have a fixed base near a small town, while the herd continues to be mobile, managed by younger men. The distance normally covered by the herds has also tended to decline in some areas, but pastoralist reliance on mobility as a key risk management strategy continues to be important.<sup>71</sup> Households are adopting a mixed strategy – maintaining herds on the range and developing trade, business or services. Women are engaging in value-addition, gaining an independent source of income. Pastoral women - traditionally experimenters and initiators of livelihood activities – are taking advantage of new economic opportunities around trading towns. Many engage in small-scale enterprises – packing milk, yoghurt, aloe and honey for sale.

Third, there is evidence that most non-pastoralist livelihoods in the dry lands yield lower incomes than do pastoralism, with the exception of urban livelihoods and irrigated farming, but these have limited capacity to absorb growing populations. An impact study by IFPRI<sup>72</sup> concluded that diversification, while inevitable when herd sizes are decreasing, does not appear to be pulling people out of poverty.

## **The need for Change in Development Thinking for Resilience in Pastoral Areas**

Those arguing for investing in the resilience of pastoralist livelihoods point out that many policies and development interventions in the dry lands have, in the past, been based on a poor understanding of pastoral systems. This has been evident in land policies, in resettlement of pastoralists to make way for more 'commercial' investment, and in allocations of development support and services. Development planners have responded to a perceived backwardness of pastoral areas with modernisation programmes: dip tanks, boreholes, livestock markets, irrigation schemes, fencing and rotational grazing. Most of the infrastructure is underutilised and dilapidated.

While noting that irrigation can play a role in diversifying livelihoods in the pastoral lands, analysts raise the issue of how much land is profitably irrigable. Capacity is limited by both biophysical and institutional factors. Moreover, irrigation can stimulate various types of *land*

*grabs* which too often preclude pastoralists from benefiting. Irrigation can also cause outright harm by restricting access to, or damaging, land and water resources. Some analysts advise extreme caution on irrigated agriculture in the dry lands because it threatens to convert productive riparian grazing areas to agriculture and thereby "encouraging even greater collapse" of pastoral livelihoods.<sup>73</sup> Large-scale irrigation schemes also involve high costs, and are likely to be targeted by large scale (non-pastoralist) investors.

Interventions by governments, NGOs and private individuals in water development in the ASALs Africa have also led to increasing privatisation and commoditisation of water. Poor water development has destroyed traditional systems of managing grazing resources and led to land fragmentation, which inhibits herd mobility and thus undermines the key component of pastoral resilience.

In addition to poor policy and inappropriate development interventions, pastoralism is still being subjected to competing demands on resources (parks, new legislation, borders restricting mobility) access to resources and resilience. 'Land grabs' – local and external investment in land – are undermining access to critical pastoralist resources and increasing vulnerability. In Kenya, investors have targeted the Tana Delta, the largest wetland in the country for tourism, although it is a vital drought-grazing land for pastoralists from across northern and eastern Kenya.

## **Development Support for Pro-poor Herd growth and Resilience**

Within the current dominant development paradigm, aid donors have invested much in livestock marketing in pastoralist areas of the Horn of Africa for over 30 years. Most recently, this support has included attention to export of live animals and related certification, quarantine and other inputs. It has often been assumed that, in pastoralist areas, a linear and simple relationship exists between "better access to export markets" and "poverty alleviation."

However, a recent report from Tufts University<sup>74</sup> analysed the benefits derived from the livestock export trade by different pastoralist wealth groups. It was found that the considerable investment in market infrastructure and export markets did not benefit poorer pastoralists. While the livestock export trade from the Horn continued to grow, so did levels of pastoralist destitution.

This widening equity gap is partially due to the increasing control of productive resources by richer pastoralists (e.g. private enclosures of communal rangeland, private water development), constraining the opportunities for families with smaller herds to gain a livelihood from pastoralism. ***Rather than reducing poverty in pastoralist areas, a long-term impact of donor support to livestock export markets could be an acceleration of asset shifts from poorer to richer pastoralists.***

This asset redistribution—from small herd owners to large herd owners—results in poorer herders relying more heavily on non-livestock economic activities, working as contract herders, or leaving pastoralist areas altogether. There is little evidence that investments in livestock export systems have specifically benefited poorer pastoralists.

When considering the poor in pastoral areas, there is a need to distinguish between those who are still struggling in the system with small but not viable herds who complement their income from diverse activities, and those who have exited the system already. Efforts should not be made to restore livestock to those households who have exited.

Policies for a more poverty-focused approach in pastoralist areas would explicitly recognise and support a strategy of herd growth for poorer households.

Such policy support to these poorer pastoralists needs to recognize that a certain level of livestock acquisition has to be reached before these groups start to sell more animals. In terms of livestock marketing, the priority for poorer households is to maximize herd growth. Livestock is sold only to meet basic household needs. Everywhere, such sales are already happening. They use existing networks and systems of trading. These don't benefit much from investments in modern market infrastructure. Instead, investments in physical capital are probably better directed at non-livestock investments such as mobile phone networks and secondary roads.

Other support would include tailoring credit and financial services to poorer herders, supporting primary veterinary services (e.g. through community-based animal health workers, and institutionalising livelihoods-based programming and drought-cycle management as outlined below:

#### ***Herd growth through loans targeting the poor***

Poor pastoralists can rebuild their herds through loans of livestock. Conventional collaterals can be substituted with flexible systems involving peer group pressure and guarantees by village chiefs, pastoral associations, or cooperatives. Restocking programs, implemented either post-drought or to assist rehabilitation of returnees or internally displaced people in pastoral areas. When designed and implemented well, these programs show good results in terms of herd growth and households returning to a pastoral way of life.

#### ***Preventing avoidable losses***

During normal or "non-drought" periods, an important type of avoidable loss in pastoral herds is livestock disease. In general, veterinary services in pastoral areas are still extremely weak. Disease prevention through vaccination is still weak in pastoralist areas<sup>75</sup>. Pastoral herds treated by community-based animal health workers (CAHWs) supplied through private pharmacies can achieve marked reductions in mortality.

#### ***Integrating drought cycle management into development strategies***

There is still a tendency to expect pastoral households to rebound to their former asset levels through food aid responses in spite of recurrent droughts resulting in massive livestock mortalities. Market-based approaches to drought, such as commercial destocking, far outweigh food aid in terms of impact, but are not yet widely applied.

In summary, to promote resilience in pastoral areas, there is often a need to influence national policy responses dominated by the drive to acquire hard currency. This leads livestock exports to be prioritized over regional or domestic markets. These policies may increase GDP and economic growth, but the benefits for poorer pastoralists, including resilience, are likely to remain minimal<sup>76</sup>.

## **The Way forward in Pastoral Areas**

Beyond a much stronger focus on pro-poor growth, how can positive transformation of pastoral livelihoods for resilience take place? Devereux and Scoones<sup>77</sup> have summarized principles to transcend the current policy debate about resilience for pastoral communities,

particularly for efforts to address diversification. Rather than imposing a single model on all pastoralist families (from “do nothing” through to “mass sedentarisation”), policy-makers should provide *appropriate support to whichever pathway particular groups, families, and individuals choose to follow*. Two key principles are to expand people’s options and to maximise their physical, economic, and social mobility. *Policy should focus on strengthening local market linkages and fostering diversification, while also supporting and strengthening the resilience of traditional livelihoods and the resources that these livelihoods rely upon*.

The expansion of options could be facilitated by increased education and vocational training, microfinance, irrigation, and an array of policies that could facilitate migration and remittances. Remittances from migrants tend to be countercyclical with respect to pastoralists’ booms and busts; they therefore provide an important source of risk-coping capacity.

Improved access to formal education is another strategy. Demand for education is high among pastoralists. Educated pastoralists – particularly women – can increase family incomes, nutrition and health and remittances from urban employment. Provision of flexible education with new technologies can reach large numbers of pastoralist children at low cost. Distance learning for nomadic children using radio programmes, mobile tutors and print materials is a flexible approach to education being taken by the Ministry of Education in Kenya<sup>78</sup>.

The path forward for resilience is a **balanced** path involving both movements out of pastoralism and the transformation of pastoralism into a more resilient sector,<sup>79</sup> by supporting measures to strengthen mobility, pastoralist local institutions and communal access and management of land and water resources.

## **The Pathways to Resilience in Drought Prone, Ecological Fragile areas in Africa**

Managing drought risk in areas in Africa such as the Sahel and the Horn where tens of millions of people suffer from chronic, not temporary, food and nutrition insecurity, requires a fundamental change in development thinking and investment. The current “neo-liberal” development paradigm focused on rapid growth does not see investment in ecologically fragile, drought prone, areas as being economically feasible. The vision for small scale farmers and pastoralist communities living in such areas is that they mostly leave and work in towns and cities or large scale commercial plantations or farms, and benefit from food aid during periodic droughts and shocks while making this transition. In the context of the increased frequency of drought, loss of resilience, and massive chronic food insecurity, this is no longer to be a realistic or cost effective option. Both national governments and donors increasingly perceive the need for a major shift in the architecture of development aid to manage risk of large scale drought related crises, through resilience.

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<sup>1</sup> USAID (2012) *Building Resilience and Fostering Growth in the Horn of Africa*  
<http://hornofafricadevelopment.org/docs/USAID-Resilience-Paper.pdf> p.2

<sup>2</sup> Ibid. p.1 This occurred at the Nairobi Summit of African leaders meeting on the Horn of Africa crisis

<sup>3</sup> *Prime Minister Urges Coordinated Solution To Recurrent Food Crises In West Africa*  
<http://allafrica.com/stories/201206061206.html>

<sup>4</sup> Participants included Valerie Amos, the UN Under-Secretary-General for Humanitarian Affairs, and Nancy Lindborg, the

Assistant Administrator for Democracy at USAID

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<sup>5</sup> European Commission (June 2012) **Joint Declaration on Building Resilience to Food Crises in the Sahel**

[http://ec.europa.eu/echo/news/2012/sahel\\_conference\\_2012\\_en.htm](http://ec.europa.eu/echo/news/2012/sahel_conference_2012_en.htm)

<sup>6</sup> USAID (2012) **Building Resilience and Fostering Growth in the Horn of Africa**

<http://hornofafricadevelopment.org/docs/USAID-Resilience-Paper.pdf> p.1

<sup>7</sup> Mosley, J. (July 2012) **Translating Early Warning into Early Action** East Africa report (Draft) Chatham House p.3

<sup>8</sup> Murphy B. (July 20) **East Africa Crisis One Year On** Concern Blog <http://www.concern.net/news-blogs/concern-blog/east-africa-crisis-one-year>

<sup>9</sup> USAID (2012) op.cit. p.1

<sup>10</sup> The most seriously affected countries included Chad (decline of 49% in relation to 2010-2011 and 22% in relation to

2006-2010), Senegal (36%/21%), Niger (31%/14%), Mauritania (34%/10%) and Burkina Faso (20%/5%). The pastoral situation also became very difficult in many regions because of poor pastures and low water filling rates, causing overgrazing and severe shortage of fodder.

<sup>11</sup> OXFAM et al. (May 2012) **Sahel Markets Under Pressure** Inter-agency briefing note ROPPA, RBM, APESS, POSCAO and WILDAF p.3

<sup>12</sup> See the article Garvelink, William J., Tahir, Farha (May 2012) **Misunderstood: Getting the Right Response to Food Shortages in the Sahel** Center for Strategic and International Studies

<sup>13</sup> It is estimated that it takes a minimum of 3 years to rebuild a herd of goats or sheep and 5 to 8 years for a herd of cattle. However, pastoralists in the Sahel were already seriously affected by the past crises of 2005, 2008 and 2010, and so are especially vulnerable to new shocks. OXFAM et al. (May 2012) **Sahel Markets Under Pressure** Inter-agency briefing note ROPPA, RBM, APESS, POSCAO and WILDAF p.3

<sup>14</sup> Severe Acute Malnutrition Severe acute malnutrition is defined by a very low weight for height (70% or less of the median WHO growth standards), by visible severe wasting, or by the presence of nutritional oedema. Where SAM is common, the number of cases can exceed available inpatient capacity, which limits the effect of treatment; case-fatality rates have been 20-30% <http://www.ncbi.nlm.nih.gov/pubmed/17141707>. Innovative new community based treatment of SAM has reduced this.

<sup>15</sup> OCHA (Feb 2012) **Strategic Document Version 2 Response plan addressing the food and nutrition crisis in the Sahel** p.19

<sup>16</sup> Resilience has become the new buzz word in the discourse. See Brown, Katrina. July 2011. **Lost in Translation: Resilience Ideas in** Science, Policy and Practice. University of East Anglia.

[http://csid.asu.edu/resilience-2011/program/files/Panels/53\\_Policy/brown.pdf](http://csid.asu.edu/resilience-2011/program/files/Panels/53_Policy/brown.pdf)

<sup>17</sup> See World Bank <http://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG>. Also CIA Fact Book

<https://www.cia.gov/library/publications/the-world-factbook/rankorder/2003rank.html>

<sup>18</sup> Mosley, J. (July 2012) **Translating Early Warning into Early Action** East Africa report Chatham House. p.6

<sup>19</sup> UNDP (May 2012) **Africa Human Development Report 2012: Toward a Food Secure Future**. Chapter 6: Resilience and

Social Protection for Stability in Food Systems

<sup>20</sup> UNICEF Niang, O et al. 2012: **The effects of safety nets on the resilience of vulnerable households in Niger**. Other authors include Guido Cornale, Representative, UNICEF Niger ([gcornale@unicef.org](mailto:gcornale@unicef.org)); Ousmane Niang, Chief of Social Policy, UNICEF Niger ([oniang@unicef.org](mailto:oniang@unicef.org)); Soukeynatou Fall, Monitoring and Evaluation Specialist, UNICEF Niger ([sfall@unicef.org](mailto:sfall@unicef.org)); Rocio Berzal, C4D Specialist, UNICEF Niger ([rberzal@unicef.org](mailto:rberzal@unicef.org)); Véronique Mistycki, Reports officer,

UNICEF Niger ([vmistycki@unicef.org](mailto:vmistycki@unicef.org)).

<sup>21</sup> World Bank April 2012 **Safety Nets Work: During Crisis and Prosperity**

<http://siteresources.worldbank.org/DEVCOMMIT/Documentation/23170403/DC2012-0003%28E%29SafetyNets.pdf>. See also and Sahel Working Group (October 2011) **Breaking the Hunger Cycle: Pathways to Resilience in the Sahel**, pp.37-38 and Annex B10 p 96

<sup>22</sup> Alderman, H and Ruslan Yemtsov, R. March 2012 **Productive Role of Safety Nets** Discussion Paper No 1203

Background Paper for the World Bank 2012–2022 Social Protection and Labor Strategy. World Bank

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<sup>23</sup> EU (April 2012) *Addressing food and nutrition security through the implementation of national social transfer programmes*. ROSA Newsletter No. 36 [http://www.reseau-rosa.eu/IMG/pdf/ROSA\\_Newsletter\\_36\\_EN.pdf](http://www.reseau-rosa.eu/IMG/pdf/ROSA_Newsletter_36_EN.pdf)

<sup>24</sup> This refers to the global food price crisis which also affected the Sahel

<sup>25</sup> In April 2008, by 58 governments in Johannesburg approved the *Summary for Decision Makers of the Global Report by The International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD)*, which advocated support of small scale

farmers and agroecological approaches, as the best way to improve the resilience and sustainability of food systems. It was approved.

The United States refused to ratify it.

<sup>26</sup> See the chapter “*Destroying African Agriculture*” in Bello, W. (2009) *The Food Wars* for a cogent analysis. Also Mousseau, F. with

Anuradha Mittal (2009) *Sahel: A Prisoner of Starvation? A Case Study of the 2005 Food Crisis in Niger*. In its 2008 “*World Development Report*”, the World Bank admits that “structural adjustment in the 1980’s disbanded the elaborate system of public agencies that provided farmers with access to credit, insurance inputs, and cooperative organisation. The expectation was....the market for private actors to take over these functions....too often, this did not happen....the private sector emerged only slowly and partially, serving commercial farmers but leaving smallholders exposed to extensive market failures, high transaction costs and risks, and service gaps” Cited in Bello op cit p.82

<sup>27</sup> Mousseau, F. With Anuradha Mittal (2009) *Sahel: A Prisoner of Starvation? A Case Study of the 2005 Food Crisis in Niger* p.30

<sup>28</sup> This include the Bill and Melinda Gates, and the Rockefeller Foundations

<sup>29</sup> Cited in Christian Aid (June 2007) *Farmers left behind. How markets, governments and donors have failed Africa’s greatest resource*. This quotation, which appeared in the first draft was subsequently been removed, but remains implicit in the document

<sup>30</sup> Bello, W. (2009) op. cit. p82

<sup>31</sup> Mousseau, F. (2010). *The High Food Price Challenge: A Review of Responses to Combat Hunger*. Oakland, CA: The Oakland Institute, p.34

<sup>32</sup> Christian Aid (June 2007) op.cit. p.7; See also Bello, W (2009) p.83

<sup>33</sup> Christian Aid (June 2007) op.cit. p.7

<sup>34</sup> See also Wardle, C. (Nov 2008) *Community Area Based Development Approach (CABDA) Programme: An alternative way to address the current African food crisis?* ODI Natural Resources Perspective 119, for experiences similar to the World Vision case study in Ethiopia, Uganda and Malawi

<sup>35</sup> OXFAM (2009) *People-Centred Resilience Working with vulnerable farmers towards climate change adaptation and food security* Briefing Paper 135 p.2

<sup>36</sup> OXFAM GB, Christian Aid, World Vision, ACF are among the many international agencies that have all published documents advocating agroecology.

<sup>37</sup> Source: de Schutter, Olivier (Dec 2010) Report submitted by the Special Rapporteur on the right to food.

<sup>38</sup> Simple, low-cost techniques for managing the natural regeneration of trees and shrubs, are known as farmer-managed natural regeneration, or FMNR.

<sup>39</sup> These include rock bunds along the contour, « Zai” micro-water harvesting planting pits, and half-moon basins

<sup>40</sup> See in particular World Resources Institute (March 2012) *Building Climate Smart Agriculture and Resiliency in the Sahel*. This event featured leading global experts who discussed lessons learned from farmer innovations. Web-based presentations describe experiences in Niger, Burkina Faso & Mali in using “Climate Smart Agriculture” to increase productivity and resiliency and pictures of observed landscape transformations. The speakers drew on their experiences in the Sahel to explore how to use Climate Smart Agriculture to increase productivity and resiliency. This event focused on scaling up interventions to address the root causes of chronic food shortages while strengthening household economies. <http://www.wri.org/event/2012/03/building-climate-smart-agriculture-and-resiliency-sahel>

<sup>41</sup> Rinaudo, T., Yaou, S. (2009) *Agricultural Task Force Report: World Vision Niger Agricultural Development* World Vision p.4;

<sup>42</sup> Tougiani et al. (2008:10) cited in World Resources (2008) *Roots of Resilience - Growing the Wealth of the Poor*, Chapter 3: Turning Back the Desert: How Farmers Have Transformed Niger's Landscape and Livelihoods

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- <sup>43</sup> (Larwanou FAO et al. (2006:1) World Resources (2008) op cit.
- <sup>44</sup> Winterbottom (2008) World Resources (2008) op cit.
- <sup>45</sup> Tougiani et al. (2008:13) World Resources (2008) op cit.
- <sup>46</sup> Rinaudo, T., Yaou, S. (2009) ***Agricultural Task Force Report: World Vision Niger Agricultural Development*** World Vision p.4; See also  
Holt J, et al. (2009) ***Understanding Household Economy in Rural Niger*** Save the Children
- <sup>47</sup> Rinaudo, T and Yaou, S. World Vision op.cit. p.4
- <sup>48</sup> In addition to the sources such as the World Bank, and independent researchers cited in the endnotes, see also United Nations  
Development Programme, United Nations Environment Programme, World Bank, World Resources Institute. (2008). ***Turning back the desert. How farmers have transformed Niger's landscapes and livelihoods.*** (In World resources 2008: ***Roots of resilience - growing the wealth of the poor*** (pp. 142-150). Washington DC: World Resources Institute.) Retrieved September 25, 2008, from <http://www.wri.org/publication/world-resources-2008-roots-of-resilience>; and Chris Reij, Gray Tappan, and Melinda Smale. ***Millions Fed. Proven successes in agricultural development.*** Chapter 7 - Re-Greening the Sahel: Farmer-led innovation Burkina Faso and Niger <http://www.ifpri.org/publication/millions-fed>
- <sup>49</sup> Trees in the Sahelian context are critical for a) enhancing soil fertility while combating soil erosion b) reducing damaging winds c) providing for the fodder requirements of livestock d) income generation through sale of wood and non wood products, and d) human food, medicines, honey and other tree products.
- <sup>50</sup> Cited in Rinaudo, T and Yaou, S. World Vision op.cit p.9
- <sup>51</sup> Rinaudo, T and Yaou, S. World Vision op cit. p10
- <sup>52</sup> World Bank (Oct 2010) ***Niger Strategic Program For Climate Resilience*** p11-12. See also Botoni, E. et Reij, C. (2009) ***Silent transformation of environment and production systems in the Sahel: impacts of public and private investments in natural resource management.*** (CILSS et Université libre d'Amsterdam)
- <sup>53</sup> Haglund E. Ndjeunga J., Snook, L., Pasternak, D. (2009) ***Assessing the Impacts of Farmer Managed Natural Regeneration in the Sahel: A Case Study of Maradi Region, Niger*** (draft) p.27
- <sup>54</sup> Rinaudo, T and Yaou, S. World Vision op cit. p.10
- <sup>55</sup> Haglund E et al. Op cit. piii
- <sup>56</sup> Ibid p.26
- <sup>57</sup> Ibid p 27
- <sup>58</sup> Tougiani et al. (2008:13). See also Toumieux (2005) cited in World Resources (2008) op. cit.
- <sup>59</sup> Reij (2006:2); IPCC (2007:444, 447-48) Tougiani et al. (2008:16) in World Resources (2008) op. cit.
- <sup>60</sup> World Resources Institute (March 2012) ***Building Climate Smart Agriculture and Resiliency in the Sahel.*** <http://www.wri.org/event/2012/03/building-climate-smart-agriculture-and-resiliency-sahel>
- <sup>61</sup> Linking agriculture with nutrition involves not only addressing land fertility issues and yields, but assessing what crops are grown. There is much evidence that shows that increased agricultural growth and reduced malnutrition as not always positively correlated. The type of growth can strongly impact nutritional outcomes. Growth that focuses on export led large scale farming tends not to reduce malnutrition of poorer households. Delphine Valette, Save the Children UK (personal communication)
- <sup>62</sup> In this report, I refer to the livestock-keepers in the drylands as “pastoralists”, which also encompasses agropastoralists who practise cropping to a greater or lesser extent. The division between the two is often arbitrary and fluctuating, depending on changes in weather and fortunes from year to year
- <sup>63</sup> Davies J. (2008) ***Turning the tide: Enabling sustainable development for Africa's mobile pastoralists*** Natural Resources Forum Volume 32, Issue 3, pages 175-184, August 2008
- <sup>64</sup> Lance W. Robinson, L.W., Berkes F. (2010) ***Applying Resilience Thinking to Questions of Policy for Pastoralist Systems: Lessons from the Gabra of Northern Kenya.*** Human Ecology, 38:335-350.
- <sup>65</sup> Sandford, S. (2007). ***Too Many People, Too Few Livestock: The Crisis Affecting Pastoralists in the Greater Horn of Africa.***  
Report for the *Too many people, too few livestock: pastoralism in crisis?* series. Future Agricultures Consortium, Brighton, U.K
- <sup>66</sup> Williams P, & Funk, C. (2011), ***A westward extension of the warm pool leads to a westward extension of the Walker circulation, drying eastern Africa*** *Climate Dynamics*, DOI: 10.1007/s00382-010-0984-y
- <sup>67</sup> IFPRI 2012 [Enhancing resilience in the Horn of Africa: an exploration of alternative investment options](#). This paper

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addresses the question of where public resources should be invested.  
<sup>68</sup> IFPRI 2012 op cit.

<sup>69</sup> COMESA (2009) **Policy Framework for Food Security in Pastoral Areas** Consultative Draft

<sup>70</sup> Behnke, RH, Scoones, I and Kerven, C. (eds) (1993) **Range Ecology at Disequilibrium: New Models of Natural**

**Variability and Pastoral Adaptation in African Savannas**, Overseas Development Institute, International Institute of

Environment and Development, Commonwealth Secretariat, London

<sup>71</sup> Little, P.D & Dube S. (2011) **Center Commissioned External Review of Pastoral Systems** ILRI

<sup>72</sup> IFPRI 2012 op cit.

<sup>73</sup> Devereux, S., and Scoones, I. (2007). **The Crisis of Pastoralism: A Response**. Report for the *Too many people, too few livestock: pastoralism in crisis?* series. Future Agricultures Consortium, Brighton, U.K. p9

<sup>74</sup> *Yacob Aklilu, Yacob, and Andy Catley, Andy (2010) Livestock Exports from the Horn of Africa: An Analysis of Benefits by*

**Pastoralist Wealth Group and Policy Implications** *Feinstein International Center, Tufts University*

<http://www.celep.info/wp-content/uploads/2012/08/2010-Aklilu-Catley-Livestock-Exports.pdf>

<sup>75</sup> Bekele, G. and Dr. Jeremiah Akumu, J, (December 2009) **Impact Assessment of the Community Animal Health System in Mandera West District, Kenya.**

<sup>76</sup> Ibid

<sup>77</sup> Ibid.

<sup>78</sup> Future Agricultures Consortium (March 2012) **Pastoralism in the Horn of Africa: Diverse livelihood pathways** FAC CAADP Policy Brief 06

<sup>79</sup> IFPRI 2012 op cit.