



ZIMBABWE: farmers practice agroecology to overcome the adversities of climate change

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Introduction and overview

Zimbabwe is a low-income and landlocked country in Southern Africa, once known as the breadbasket of Africa. During the period from 2000 to 2008 the country experienced severe macroeconomic instability characterised by hyperinflation. Real GDP declined by more than 40% and agricultural output shrank (FAO, 2016). This resulted in a deep economic and social crisis, with the country becoming a net food importer and a large proportion of the population relying on food aid. At the beginning of the period in 2000, the then President launched the Fast Track Land Reform Programme (FTLRP), which redistributed about 20% of the country's total land through compulsory acquisition of white commercial farmers' land, and by creating small to medium-sized land holdings from what were previously large-scale farms. The land reform brought in significant changes in the agrarian sector, with the most notable being

shifts in agricultural production and marketing patterns. This period also corresponded with temperature increases, erratic rainfall patterns and recurrent drought, all of which exacerbated suffering, especially for people living in rural areas where approximately 62% of the population resides.

The period 2009–2012 was marked by an economic rebound, with growth rates averaging 10% per annum. However, after relative stabilisation, economic growth declined sharply (from 10.6% in 2012 to 3.8% in 2014) due to deteriorating terms of trade, a severe drought in 2012/13, and continued political uncertainty (FAO, 2016).

Zimbabwe still ranks as one of the poorest countries in the world, with 72% of the population living below the national poverty line. In addition to the high level of poverty, Zimbabwe also has a young population (with 67% aged 24 years and below) and the country

* We would like to thank **Haidee-Laure Giles**, for her valuable contributions to the desk research, proofreading and comments.

continues to face persistent levels of chronic malnutrition (FAO, 2016).

Zimbabwe has not been spared from the effects of global warming. The country lies in a semi-arid region with limited and unreliable rainfall patterns and temperature variations. Rainfall exhibits considerable spatial and temporal variability characterised by shifts in the onset of rains, increases in the frequency and intensity of heavy rainfall events, increases in the proportion of low rainfall years, decreases in low intensity rainfall events, and increases in the frequency and intensity of mid-season dry-spells (Unganai, 2009). Extreme weather events, namely tropical cyclones and drought have also increased in frequency and intensity (Mutasa, 2008).

This research looks at how small-scale and family farmers respond to the effects of climate change in Zimbabwe. The field study was conducted in Masvingo and Manicaland provinces where farmers are practicing agroecology as a transformative model of production while also “adapting” to the changing climate. By commissioning this research, La Via Campesina Southern and East Africa (LVC-SEA), Africa Kontakt (AK) and the Zimbabwe Small-holder Farmers Forum (ZIMSOFF) seek to highlight that small-scale and family farmers have not remained passive victims. Despite having limited access to resources and support from government, they are gradually taking practical steps towards building climate justice within their communities.

Zimbabwe Agriculture Sector

Agriculture is the backbone of Zimbabwe’s economy in as much as Zimbabweans remain largely a rural people who derive their livelihood from agriculture and other related rural economic activities. It provides employment and income for 60-70 percent of the popula-

tion, supplies 60 percent of the raw materials required by the industrial sector and contributes 40 percent of total export earnings. Despite the high level of employment in the sector, it directly contributes only 15-19 percent to annual GDP, depending on the rainfall pattern, and this is a statistic that understates the true importance and dominance of the agricultural industry. It is generally accepted that when agriculture performs poorly, the rest of the economy suffers¹.

The main agricultural products produced by communal farmers are maize (the staple food), groundnuts, other grains, beans, vegetables, meat, milk and fuel wood. Commercial farmers concentrate on cash crops such as tobacco, horticultural products, particularly cut flowers, coffee, maize, groundnuts, sorghum, soya beans, sunflowers, and cattle for slaughter, pigs, goats and sheep.

Since 2001, Zimbabwe has been experiencing a structural maize deficit, resulting in a reversal of its status from being the largest net food exporter in Southern Africa to that of a food deficit country. To satisfy the national requirement of about 1.8 million tonnes (for both human and livestock consumption), Zimbabwe has to rely on regional imports (mainly from South Africa, Zambia and Malawi), which have been increasing in recent years. However regional trade partners are also struggling with maize shortfalls and Zimbabwe has been constrained to turn to South America. Low regional maize supplies are also driving up prices, thus exacerbating food insecurity. Wheat production has also been declining since 2001 and currently the country imports about 95% of its estimated 450 000 tonnes per annum requirement. In terms of exports, the country continues to rely on a narrow export base mainly dominated by minerals (gold, nickel and diamonds) and tobacco (by far the most important export crop). Zimbabwe is currently the 6th largest tobacco exporter in

¹ Government of Zimbabwe. 2001. *The agricultural sector of Zimbabwe, statistical bulletin*. Harare.

the world (FAO, 2016).

The Zimbabwe Agenda for Sustainable Socio-Economic Transformation (ZimAsset, 2013–2018) was adopted in 2013 as the new economic development blueprint. ZimAsset has the objective of driving Zimbabwe's economic recovery until 2018. In ZimAsset, the agriculture sector is identified as one of the key drivers of growth and employment creation. The ZimAsset policy on agriculture aims at ensuring food and nutrition security at the household and national level, as well as increasing agriculture production, productivity and quality.

In Nov 2013 Zimbabwe signed the Comprehensive Africa Agriculture Development Programme (CAADP) Compact and developed the Zimbabwe Agricultural Investment Plan 2013–2017 (ZAIP) to align investments in the agricultural sector to the CAADP principles. However, the ZAIIP has not yet been implemented owing to the lack of buy-in from the main multilateral and bilateral partners (FAO, 2016). Currently, Zimbabwe does not have a long-term agricultural policy; because of the changes produced in the agriculture sector by the land reform programme adopted in 2000, the Agricultural Policy Framework 1995–2020 is no longer valid. A new Comprehensive Agricultural Policy Framework (2012–2032) was developed in 2012 with assistance from FAO, but it remains a draft and has yet to be adopted (FAO, 2016).

Climate Change

According to the Zimbabwe Meteorological Service, daily minimum temperatures have risen by approximately 2.6°C over the last century while daily maximum temperatures have risen by 2°C during the same period (Brown et al, 2012). This has seen the country experience extremes of weather over the past two decades, including dealing with 10 droughts, decreased freshwater and destroyed biodiversity (Chakwana, 2015).

According to Zimbabwe Power Company, the water levels in Zimbabwe's main lake, Lake Kariba, have dropped to below 30%, and this is seriously affecting power generation in the country. Hydropower contributes a significant proportion to the country's electricity generation. Episodes of drought in the past few years coupled with changing rainfall patterns within the country have led to the decrease in Kariba's water levels. The rains have become so erratic in some districts of the country that the United Nations Development Programme predicts agricultural production – Zimbabwe's main livelihood source for nearly three quarters of the population – could decrease by up to 30%, which could lead to an increase in hunger and poverty (Chakwana, 2015). Western and southern parts of Zimbabwe are projected to experience drying up, leaving millions of Zimbabweans to face the resulting hunger and poverty.

In terms of agriculture, generally, according to the projections from the IPCC (2007), maize suitable areas will decrease by 2080, while cotton and sorghum suitable areas will increase by 2080. In the southwestern parts of the country, sorghum and maize will become increasingly vulnerable to climate change while cotton will become less vulnerable. In the north central and eastern parts of the country, maize, sorghum and cotton will become less vulnerable (Brown et al, 2012).

Smallholder farmers and their families are particularly vulnerable because they have few assets to fall back on and limited ability to recover from climate extremes. Increasing the resilience of smallholder farmers especially women is therefore a matter of urgency. Climate change undermines poverty reduction and development gains as well as threatening food security and sovereignty and women's livelihoods. Issues to do with uncertainties in rainfall patterns characterized by low rainfall patterns and droughts affecting crop productivity, killing livestock due to lack of drinking water and grazing land and also affecting



peoples livelihoods who depend on agriculture for survival, employment and income as well as their food sovereignty and nutrition status. There is need for mainstreaming of climate adaptation throughout national and regional development projects targeting agriculture².

The research found out that other adverse effects include violent storms and floods resulting in the destruction of people's shelters, livestock kraals, schools, hospitals but above all fields are swept away with rivers and dams as well roads and bridges being washed away. The negative impact of climate change in Zimbabwe is likely to stall the country's development, pose a serious risk to food security, nutrition and adaptive capacity. In this regard, there is need for mainstreaming of climate adaptation throughout national and regional development projects targeting agriculture. One of the important practices regarding climate change mitigation is to implement resilient practices that SHFs have been doing over the years. These include agroecology, conservation agriculture and sustainable land use and water management.

Evidence has highlighted that the rural population comprises of smallholder farmers and peasant farmers and are the ones mostly affected by harsh climatic conditions because they do not have adequate resources for adaptation and resilient mechanisms.

Smallholder farmers in Zimbabwe have been implementing practices aimed at mitigating and adapting to climate change issues in the region with the objectives of promoting food and nutritional security, promote resilience, increase stability, deal with adverse impacts of climate change, and encourage sound natural resource management (i.e land and water) mostly in rural communities. Most notable practices that have been implement-

ed include agroecology, conservation agriculture, aqua-culture, reforestation and livestock production³.

A study by the International Fund for Agricultural Development (IFAD) entitled *Small farms, big impacts: mainstreaming climate change for resilience and food security* highlighted that Climate change threatens the natural resource base across much of the developing world. Climate change accelerates ecosystem degradation and makes agriculture more risky resulting in smallholder farmers who are so crucial to global food sovereignty, nutrition and food security, are facing more extreme weather. Small-scale peasant farmers especially women and youth are impacted more immediately by droughts, floods and storms, at the same time as they suffer the gradual effects of climate change, such as water stress in crops and livestock, coastal erosion from rising sea levels and unpredictable pest infestations.

National strategy and policy framework

Zimbabwe was among the first countries to ratify the United Nations Framework Convention on Climate Change (UNFCCC) in 1992. It is also a signatory to other major environmental laws governing climate change, namely the Kyoto Protocol ratified in 2009 and the Paris agreement ratified recently in Aug 2017. Climate change issues were also broadly included within national law in the 2009 National Environmental Policy (NEP) as a contribution towards GHG stabilisation. The NEP, however, does not address climate change as a standalone issue. Instead it is implied in strategies and activities that result in GHG emissions. Alongside the NEP are various environmental policies that also address climate change issues. These policies include: The Environmental Impact Assessment Policy

² Olushola Fadairo; Climate change projects aren't working because communities are left out; Thursday 20 April 2017

³ Olushola Fadairo; Climate change projects aren't working because communities are left out; Thursday 20 April 2017



(1997), the National Environmental Education Policy and Strategies (2003) and the National Fire Strategy and Implementation Plan (2006). Other policies related to GHG stabilisation include: The National Energy Policy (2009), the Zimbabwe Agricultural Policy Framework (ZAPF), which gives a 25 year horizon (1995-2020), the Water Policy and the Science and Technology Policy.

However, although these policies collectively refer to mitigation and adaptation measures, they lack specific reference to climate change and therefore remain insufficient in light of the projected impacts of climate change and the scale and scope of vulnerability. Climate change is widely treated as a secondary issue in policy and therefore does not receive adequate emphasis in terms of policy direction or resource allocation. With the view of addressing this policy gap, the GoZ started developing the National Climate Change Response Strategy (NCCRS) in 2011, promulgated in 2014. The NCCRS enacts a National Action Plan for mitigation and adaptation, providing a framework for a comprehensive and strategic approach on aspects of mitigation, adaptation, technology, financing, as well as public education and awareness. It aims at “mainstreaming climate change in all sectors of the economy” (NCCRS, 2014) and further opened a policy dialogue on the need for an independent policy on climate change.

In light of this, the GoZ embarked on drawing a climate change policy in early 2015. The policy embraces a mitigation trajectory, mainly targeting the energy sector, and intend to climate-proof the country’s sensitive socio-economic development sectors. The government is pushing for what it calls climate smart agriculture (CSA). However, taking note that the impacts of climate change are mostly affecting the local the poor communities due to their low adaptive

capacity due to lack of finances to implement adaptive programmes, the Government of Zimbabwe (GoZ) has developed a National Climate Change Response Strategy (NCCRS) to guide national response measure in addressing the impacts of climate change. Reports of the Inter-governmental Panel on Climate Change (IPCC) state that Africa will suffer the most from the impacts of climate change. The global nature of climate changes requires the widest cooperation and participation in an effective and appropriate international response comprising mitigation and adaptation measures based on the principles of the Climate Change Convention (CCC).

Zimbabwe’s National Climate Change Response Strategy (NCCRS) was launched in 2011 and it recognizes the impacts of global climate change and variability are becoming more evident with increased incidences of droughts, floods, hailstorms, more hot days and heat waves. Climate change is one of the biggest threats facing global development with the developing countries being more vulnerable due to their low adaptive capacity. The NCCRS will guide national response measure in addressing the impacts of climate change and further provide guidance on the integration of climate change issues into national development planning processes at national, provincial, district and local levels and ensures coordinated activities⁴.

The GoZ regards climate change as one of the threats to the country and its people and is also of the view that climate change has the potential to undermine many of the positive developments made in its meeting the country’s development goals. Both climate change and policies to minimize its effects have enormous socio-economic and environmental implications⁵. The challenge for the country is how to develop ground up adaptation strategies that can reduce and mitigate

⁴ Zimbabwe’s National Climate Change Response Strategy, GOV, 2011

⁵ Zimbabwe’s National Climate Change Response Strategy, GOV, 2011

the diverse and complex impacts of climate change. The NCCRS is a response to this challenge and also aims to contribute towards achieving Zimbabwe's Agenda for Sustainable Socio-Economic Transformation (Zim Asset) 2013-2018 and beyond.

The ZimAsset recognises that the country is susceptible to perennial droughts and floods caused by climate change emanating from global warming. It also notes that climate change affects the country's agro-based economy whose livelihoods largely depend on rain-fed agriculture, livestock production and natural resources. Thus, the government has created a Ministry of Environment, Water and Climate in recognition of the importance of climate and climate change to the country's development.

This was followed by the development of the 2013 Draft Zimbabwe Climate Change Policy that is yet to be finalized.

The United Nations Framework Convention on Climate Change launched the Special Climate Change Fund (SCCF) projects relating to: adaptation; technology transfer and capacity building; energy, transport, industry, agriculture, forestry and waste management; and economic diversification. This fund should complement other funding mechanisms for the implementation of the Convention.

Infrastructure, gender and participation

Lack of irrigation infrastructure

Zimbabwe is a semi-arid country and its agriculture is mainly rainfed. Because most of the country receives limited and erratic rainfall, irrigation is a prerequisite for successful crop production. The country has an untapped

irrigation potential of nearly 1.5 million ha, whereas the area equipped for irrigation is estimated at approximately 200 000 ha (Zawe, 2015). Zimbabwe has a great number of underutilised small and medium-sized dams and dilapidated small irrigation schemes. Similarly, many irrigation facilities on former commercial large-scale farms are in a state of disrepair. The government has clearly pointed out the need for increasing investments in irrigation, particularly in the rehabilitation of the existing facilities. However, even if the budget allocated to irrigation has increased over the years, it remains very low (accounting for less than 3 percent of the total agricultural budget) and inadequate (FAO, 2016). There are currently a number of ongoing projects to rehabilitate irrigation infrastructures, with funding mainly from the government as well as multilateral and bilateral donors. In 2015/16, the government allocated US\$7 million to irrigation development, which complements the US\$8.6 million allocated by development partners. Moreover, the government is currently implementing the Climate Resilient National Water Resources and Irrigation Master Plan, which aims to integrate climate change modeling with development and management of water resources and irrigation infrastructure.

Gender and cross cutting issues

Climate change interventions can be a critical entry point for promoting women's equality in terms of land rights, economic and cultural rights, access to decision-making processes and political participation⁶. Women have less access to knowledge and decision-making processes. Men dominate climate-change decisions, policymaking and local planning that affect women's immediate lives. When women fight for their families' and communities' health and well-being, they also fight for the health of the Earth. This is because women depend on land for their agricultural

⁶ www.worldbank.org/ Women in Agriculture: The Agents of Change for the Global Food System; March 7, 2017

activities.

Although women (and children) are expected to be disproportionately affected by climate change, they remain largely absent from decision-making processes on climate change adaptation and disaster risk reduction. Chagutah (2010) highlights that gender has been absent from policy frameworks involving the management and protection of environment and natural resources in Zimbabwe. Aside of fostering ongoing gender inequalities, this affects the effectiveness of policy, considering that women often play central roles in adaptation and post-disaster recovery. Since the NCCRS has endeavoured to remedy this omission by calling for mainstreaming of gender. Climate change is said to be “exacerbating existing inequalities” (NCCRS, 2014); gender is thereby reduced to women’s issues. Furthermore, in the same document the government also admits that “gender disaggregated data on climate change, its impacts and adaptation strategies are still limited in Zimbabwe” (NCCRS, 2014), which tends to imply that further detailed work is needed to see the strategy fully implemented in this aspect.

Absence of meaningful participation of smallholder farmers in policy making

The Zimbabwe Environmental Law Association (ZELA) emphasises the fundamental importance of public participation and stakeholder involvement in the development of future climate change legislation (Brown et al, 2012). The Environmental Management Act states that every person “has a right to access environmental information and right to participate in promulgation and implementation of legislative, policy and other measures that prevent pollution and environmental degradation” (EMA, 2002). According to Dodman&Mitlin D (2015), there is active civil

society involvement on the issue of climate change: the Zimbabwe Climate Change Working Group has more than 30 civil society organisations as members and meets regularly; and the Zimbabwe climate change youth network coalition was formed in 2009 with a view to raising youth awareness on climate change and enhancing their participation in national, regional and international climate change agendas. The drafting of the 2014 NCCRS led to extensive public consultations to input into the process of developing a comprehensive action plan on climate change issues. However, this process was lengthy and it remains to be assessed how much smallholder farmers, as opposed to selected NGOs, were consulted. There is a danger that national adaptation strategies formulated without the participation of those intended to adopt the practices will limit rather than facilitate adaptation and potentially cause maladaptation.

Lack of recognition of existing local practices

The research further found out that smallholder farmers have also devised their own practices of being climate change resilient that include producing drought tolerant crops such as small grains that include sorghum, millet, ground nuts, cow peas, sesame and round nuts as well as cassava. The farmers have also shifted to small livestock such as goats, sheep, pigs, ‘village chickens’⁷ and guinea fowls, in times of erratic rainfall patterns. SHFs have also now practicing sustainable water management such as water harvesting such that involve digging earth dams and pit holes to capture the scarce water.

Shashe area is a classic case study on how smallholder farmers have been able to build their capacities to adapt and be resilient on the impact of climate change such as through water harvesting, crop and livestock diversification and production of small grains such

⁷ Village chickens are the type of chickens that are bred through being fed of produce from the unprocessed farm produce and allowed to roam around the homestead in search of food.



as millet, rapoko, sorghum, ground nuts, cow peas just to name a few.

The research unearthed that the policy processes and programmes to deal with climate change in Zimbabwe are not in line with what smallholder farmers who are members of ZIMSOFF and LVC are promoting. The government and policy making bodies have failed to recognize the important role smallholder farmers have been playing in climate change mitigation and resilient practices. These practices range from agroecology, food sovereignty, crop diversification, crop rotation, agro-forestry, conservation agriculture and water harvesting practices including sustainable water and soil management practices. The GoZ and the global institutions have also failed to recognize the importance of indigenous seeds and the production of small grains (Pulses) as another way of climate change resilient practices. The GoZ keep on pressurizing smallholder farmers to implement conventional forms of agriculture based on CSA, utilize hybrid seeds especially maize and synthetic fertilizers.

What is disheartening is the marginalization of the smallholder farmers in policy making process to deal with climate change issues especially rural women and youths; with poverty, inequality, high unemployment levels and climate change threat still being prevalent.

Policy makers continue to push for policies that do not adequately address climate change needs of smallholder farmers in the rural areas especially women and youth. Organizations such as ZIMSOFF with their membership to the LVC and other like-minded organizations have been pushing for agricultural practices that meet the needs of the poor farmers such as agroecology, food sovereignty, crop diversification, crop rotation, agro-forestry, conservation agriculture and water harvesting practices including sustainable water and soil management practices, promotion of indigenous seeds and promotion of small grains (Pulses).

The GoZ and policy making bodies have failed to recognize the important role smallholder farmers have been playing in climate change mitigation and resilient practices as highlighted above. These practices range from The GoZ has also failed to recognize the importance of indigenous seeds and the production of small grains (Pulses) as another way of climate change resilient practices but keep on pressurizing smallholder farmers to utilize hybrid seeds especially maize.

Findings, debate and conclusion

The political movement of agroecology endorsed by La Via Campesina has allowed farmers across the world to extend their networks through farmer to farmer learning (Rosset et al., 2011). This allows farmers to learn from each other and to adopt the practices they find helpful, rather than having policies imposed from above which don't take into consideration local environmental, social, or political context. The movement puts forward a political climate change narrative, encouraging farmers to see beyond the purely natural aspects of climate change, and attempting to spread an understanding of the socio-economic drivers that contribute to their vulnerability.

An important objective for LVC is to increase the ability of constituents to identify actors and practices that are detrimental to climate justice and farmer ability to cope with the effects of climate change, as well as the concomitant learning of practices that enhance adaptive capacity and resilience, specifically agroecology. The extent to which constituents of member organizations of LVC embody the political movement of agroecology is what this fieldwork was geared towards uncovering.

Research sites

The fieldwork that informed this paper is done in collaboration with ZIMSOFF - Zimbabwe Small Holder Organic Farmers Forum,



an organization with 19 000 members. The results detailed below were obtained through a series of semi structured interviews, as well as topic focused interviews with a total of 12 farmers, members of ZIMSOF, over a period of four days. It was carried out in May of 2017, in the two provinces of Manicaland and Masvingo, located in the Central/Southeast of Zimbabwe. Masvingo lies within region 4-5 and Manicaland in region 5 (FAO) and the two regions vary between “rainfall subject to frequent seasonal droughts and severe dry spells during the rainy season” to “very erratic rainfall” (ibid). There are five natural regions in Zimbabwe. The amount of rainfall is high in region 1 with decreasing to region 5. Region 4 is a semi-extensive farming region and region 5 is an extensive farming region. Despite the area being too dry for crop production, farmers grow grain crops for food security and some cash crops such as cotton. Maize alone accounts for 40-50 % of cropped areas in both regions. In both regions crop yields are extremely low, and risks associated with farming is high.

Experiences with climate change

A major point of focus evident from all interviews was the unpredictable weather patterns. The problem was of rains arriving belatedly, not lasting enough, or coming before expected which meant that traditional planting habits were undermined. On an average year, drought frequency has increased throughout the region with the common consequence of yields being significantly lowered. Most of the interviewees placed the start of the problems at about a decade ago, although some remember it starting before. One of the headmen of the sites visited stated that “Rainfall is no longer reliable. Since about 2000. Sometimes you plant early and the plants fail. Sometimes late and crops do not reach maturity. More and more unreliable.” He recalled how the people of his ward would face hunger and would need to rely on food aid. Additionally, he mentioned

how significant drought in one year could kill livestock. They needed to lead their livestock to distant water sources, a journey that, cattle particularly, could not survive. This has also led to a significant decrease in the price of livestock, according to the headman.

Adaptation

Due to the significant water shortage in the face of climate change, water retention has become essential. As such, farmers interviewed noted the importance of using crops that required less water, as well as using conserving practices. One such practice was to avoid burning grass, as is done traditionally, because grass in the fields helps to retain moisture in the soil and reduces runoff. The use of intercropping in agroecology was another technique used to conserve water.

An important strategy that one farmer took on recommendation of ZIMSOF regarded livestock. Poor farmers often hold financial capital in livestock such that the death of cattle is economically destructive. One of the farmers has said that he has dealt with this along with fellow farmers by collectively acquiring goats, which require less water to sustain and are therefore more resilient to drought. Additionally, both of these livestock provide manure, which can be used to fertilize their fields. This is important as chemical fertilizers bought in shops are expensive and have to be used year after year if farmers are to avoid soil degradation. According to one farmer, *“If I use fertilizer today, and then don’t have money, then I won’t be able to use the fields tomorrow.”* Degraded soil from use of chemical fertilizers can be reversed if manure is used, but according to farmers the process of restoration to achieve good yields can take up to three years.

All of the farmers interviewed repeated the importance of crop diversification against mono cropping e.g. maize, the staple crop in the region. Different crops were noted to have

different advantages, with the advantage of diversification being one of spreading out the risk of a bad year. Finger millet has the advantage that it can be kept for up to 9 years. Additionally, it takes a short time to mature meaning it is not as susceptible to shortened periods of rain. Some of the farmers explicitly mentioned the cultivation of finger millet as adaptation to climate change: *"We are coping with climate change by growing more finger millet, because it can last for some years."* The other crops that were cultivated due to their higher tolerance for lower rainfall included sorghum and pearl millet. One farmer said *"the first line*

of defence is to grow a wide range of food crops." and *"maize is very susceptible to drought."* showing how diversification is used to increase resilience. This sentiment was reiterated numerous times by farmers with a further disadvantage of maize being that it had the least storage time out of all the crops; about 1 year, without using costly "chemicals". Additionally, it was noted as being more susceptible to pests. The advantages of maize were also mentioned. In the years when weather patterns were not as unpredictable it was feasible and desirable to grow maize as it is the least labour intensive crop to process.

Upenyu Ivhu water harvesting innovation

18 members of Upenyu Ivhu smallholder farmer organization participated in the survey (12 females and 6 males). The survey was held in Murowa area of Runde district; where this community are householdse largely practicing water harvesting, organic agriculture and keeping a diversity of livestock. The members worked with the late Zephaniah Phiri, another innovative farmer well known as 'the Water Harvester', to set up the Hupenyu Ivhu (Life is Soil) Farmer Innovators' Group in 1989.

During these times of erratic rainfall patterns, the smallholder farmers are practicing water management techniques such as water harvesting that involve digging earth dams and deep dead level contours to capture the scarce water. "We don't allow water to just run through our fields; we keep every drop of water. We harvest rain water which flows from the rocks, the road and also as it rains, into contours which we have built" said one farmer.

The earth dams have also enabled farmers to embark on fish farming that is contributing to household diets and income thus enhancing their local economies and livelihoods. This is a farming initiative that was previously not possible in the area which receives low and infrequent rainfall but in this case local solutions have had the answer by simply seeing a threat as an opportunity.

According to one farmer the process of building the contours is done progressively and one contour can take up to a year to build depending on the size, however the process is worth the effort in affording farmers local and alternative solutions to counter the effects of inadequate rainfall affecting their livelihood.

The dammed and contained water ensures recharge of underground water and thereby raising the water table and retains moisture, such that crops in the surrounding fields are able to grow to full maturity despite lack of consistent rain in the area. The water harvested also ensures that farmers can grow their vegetable gardens throughout the year thereby compounding the diverse nature of their food system.

Cultivating exclusively for selling to the market was in general seen as a vulnerability enhancing move, expressed in terms of dependence on the market. Mono-cropping is seen as financially risky with one farmer saying: *"The farmer becomes a worker for industry, only farms to pay loans."* According to our interviewees, most of these farmers who farm for the market cultivate tobacco and cotton, and therefore cannot sustain themselves in a bad year. *"In high rainfall areas, people tend to be cash crop oriented, they have no other crops such as ground nuts, pearl millet, finger millet, cowpeas just to name but a few. They monocrop, this is a threat to household food sovereignty."*

The important point as noted by farmers is that in times with uncertainties in weather patterns and levels of rainfall, subsistence must be the priority, as farming for export using cash crops is too risky. The aversion to the market seen in the eschewing of products that needed to be purchased every year such as chemical fertilizers and hybrid seeds was also evident in that many farmers chose to save excess harvest in a good year rather than selling it. A few farmers also explained how they would give it away to neighbors who had less fortune, demonstrating a rejection

of the idea that food should necessarily be commodified.

Fighting for Seed Sovereignty

The staple status of maize can be partly explained by the pushing of this crop by government extension officers, who have been encouraging the planting of maize since the 1960s according to one farmer. The same farmer noted however, that with the increasing impacts of climate change, this seems to be in the process of changing. Interviewing an extension officer confirmed this; he said that maize was important but that you have to grow a variety of crops. He also stressed the importance of growing short-season varieties and that maize takes a shorter time to mature. Incorporating diversification into his teaching the extension officer is demonstrating how farmer practices can influence what government recommends. It was also clear that smallholder farmers are experimenting on a lot of innovations working towards achieving food sovereignty that are contributing to their influence on extension officers and their adaptation narrative, like one farmer made clear that: *"currently extension officers have this focus because we are pushing them."*

The CHIEHA SFO struggle for climate justice

Chiredzi Masvingo District. The area stretches along the Save river bank which demarcates Chiredzi from Checheche of Manicaland hence this smallholder farmer organization has become part of the Eastern cluster for ZIMSOF. The smallholder farmer organization is located about 91km East of Chiredzi Town. It lies in the agro-ecological farming region 5 (five) where very low rainfall that is below 300mm is received per farming season. The group has got a membership of 36 of which 26 are women.

CHIEHA is a community based conservation and development farmers' organization established in 1998 in rural South Eastern Zimbabwe. CHIEHA is a 2004 United Nations Equator Initiative Prize Winner recognized for its outstanding effort in contributing to simultaneously conserving biodiversity and reducing poverty: <http://www.undp.org/equatorinitiative/secondary/2004-finalists.htm> The 36 farmers (26 women and 10 men) interviewed through this survey are part of CHIEHA and from different surrounding wards. The farmers detailed their efforts to avert the effects of climate change through use of indigenous seeds that can withstand harsh climate conditions, in Zimbabwe and the

region, sustainable water and soil management practices, crop diversity as they struggle for food sovereignty. Most of the farmers have begun growing food organically; they are producing small grains which are drought tolerant. They are applying kraal manure, humus and compost on their soils in order to keep their soils alive and retaining the little moisture they are receiving year after year. Where there is successful water harvesting others are maintaining orchards .g. banana, avocado, mangoes, just to name but a few.

Unique to this community is their struggle for climate justice. They feel that their proximity to the Greenfuel ethanol plant established in Chisumbanje that is adjacent to them is a pollutant to their environment as they are a community that is facing the reality of a changed climate. Attached to the impact of climate crisis is the dispossession of land without compensation when such projects are established when there is forcible relocation of farming communities to very dry areas that are not of their choice. Worse still the members also predict possible toxic chemicals contamination of water sources such as the Save River that is currently the main source of water for domestic use, livestock and environment. "For us we see the causes of climate change from Marcdom and ARDA that we have observed contaminating our water that in turn we believe is one of the causes killing livestock and leaving us with no more grazing land for our livestock here.

We have engaged our local authorities on the challenges we are facing but there hasn't been any change or improvement for our situation; in fact it has just worsened" Said one farmer. We however continue to engage policy makers on these issues whilst setting up good practices of land management that is contributing to our evidence. We really practice evidence-based advocacy so that we are able to prove the facts. Besides we are influencing more people to be advocates of change towards sound policies that respect the will of the affected. We are envisaging a community where basic smallholder farmers' rights such as access to clean food, clean air and water are respected.

However, the insistence on the use of hybrid varieties could signal a limitation to the extent of influence that is possible. The fight for community seed systems was mentioned by one farmer who, while discussing seed certification and the costs involved said: "that is what we are fighting. We are fighting for seed policies that protect our indigenous seeds." This alludes to the fight for Seed Sovereignty. Indeed, when the extension officer was asked where the government gets maize to distribute he said it was bought from "companies." When asked whether he promoted hybrid maize he confirmed that he did, and he understood this to be not compatible with agroecology, demonstrating a more technical (depoliticized) understanding of agroecology. So despite the gradual shift of the government to promoting local varieties, maize is

still the crop most promoted by extension officers. One of the problems noted by the farmers was that "government only supports the production of hybrid maize. It can only be used once." This refers to the hybrid varieties that are being pushed by government, which include modifications to resist drought, and to shorten time to maturity. This kind of government support to research and development of these foreign seed varieties particularly of maize led a farmer to claim that "maize has become politicized".

Farmer to farmer learning and the political aspects to agroecology

Through this research we have noted that many of these practices were learned through farmer to farmer training and exchanges,

which was enabled through being a member to ZIMSOFF. This kind of learning was highly valued by the farmers interviewed, with many saying that the organization should continue to facilitate such workshops. One farmer noted: *"If you stick to your own way, you will suffer. What we have learned we share with other people. The Shashe Agroecology School members invited us to learn from them."* (Shashe Agroecology School refers to a 184ha block that was developed to an agroecology learning center by landless farmers during the GoZ Fast Track Land Reform Program in Masvingo province, Zimbabwe (La Via Campesina, 2015).

One of the farmers appreciated the promotion of crops that can grow in less than 200mm of annual rainfall. Another noted the importance of crop rotation was learned from one of these training workshops and exchanges, and all of the farmers interviewed owed practices such as no longer burning grass and switching to smaller livestock from their participation in ZIMSOFF organized workshops or schools. Additionally, the narrative of La Via Campesina and ZIMSOFF was used substantially, with all the farmers being

aware of issues revolving around climate change and fair and unimpeded access to resources such as land. This was evident in the language used by the farmers.

The vast majority of interviewees knew the terms such as agroecology and food sovereignty, whilst a minority knew the term climate justice. When talking about agroecology, the majority emphasized the *practices* described above: the use of manure rather than chemical fertilizer, conserving biodiversity on the farm including preserving grasses, trees, and intercropping, water harvesting etc. When talking about food sovereignty, the more political aspects relating to control over the crops planted and consumed by the household came out. Planting varieties of crops was seen in the light of health benefits of a varied diet, an important motivator for farmers who saw monocropping, hybrid crops, and industrial agriculture in general as damaging not only to the environment, but also to their health and that of consumers (who might be farmers who choose to cultivate cash crops, for example), although only one farmer interview put it in those terms.

The farmer to farmer training methodology at Shashe Agroecology Centre

The Shashe Agroecology School refers to a 184ha block that was developed to an agroecology learning center by landless farmers during the GoZ Fast Track Land Reform Program in Masvingo province, Zimbabwe. The field trip visited site where 30 members (21 females and 9 males) participated in discussions and interviews. The Shashe Agroecology School is part of the LVC's network of over 40 Agroecology schools around the world. Shashe area is a classic case study on how smallholder farmers have been able to build their capacities to adapt and be resilient to the impact of climate change through farmer to farmer training and exchanges. Twelve are developing what are dubbed "centers of excellence" with good practices of water harvesting, manure making, agro forestry, crop and livestock diversification and production of small grains such as millet, rapoko, sorghum, ground nuts, cow peas just to name but a few.

The School promotes farmer to farmer training and exchange of experiences imparting knowledge and skills vertically and horizontally, along the process disseminating agroecological and sustainable smallholder agricultural practices as local solution to climate crisis. The members have organized to facilitate farmer-to-farmer "look and learn" visits, group meetings and workshops, together with seed

fairs and other exchange meetings as a way of exchanging knowledge and information in the ZIMSOFF central cluster. The farmer leaders are currently coordinating the implementation of the "Seed, Soil and Culture" project that targets to share its learning with others around the world. The members believe that in all corners of our beautiful planet, there are smallholder women and men farmers who sow and conserve local seeds, and manage their land as a living soul. They grow their crops with hard work, trust in traditional knowledge, and believe in deeply-rooted spiritual values thereby building own resilience.

Through organizing and facilitating farmer to farmer training and exchanges in the central cluster of ZIMSOFF, the Shashe Agroecology School is promoting the production of pulses that can also withstand harsh climatic conditions. The family farmers have devised their own ways of being climate change resilient through developing living examples of soil and water management, agro forestry and bio cultural diversity conservation. Responding to their control over food systems; the members are producing drought tolerant small grains that include sorghum, millet, ground nuts, cow peas, sesame and round nuts as well as cassava. The farmers have also shifted to small livestock such as goats, sheep, pigs, free range local chickens and guinea fowls.

Some family farmers within the School are now trying to grow rice in a dry area that receives about 400-600 mm rainfall in good seasons. One of the members introduced an innovation in 2002, that focused on developing water harvesting infiltration pits to collect and retain rain water around the crop fields to fight climate change related droughts and, at times, floods. In 2016, after experimenting with and improving the innovation, the farmer dug more pits and increased area under the innovation. As a result the water level of the adjacent areas has increased allowing the farming family to try rice growing. The grass growing around the pits has increased and is used it to feed their animals and as bedding during rainy season when the cattle kraal becomes water logged (reducing incidence of diseases and also increasing manure). Most important the farmer was awarded the 2017 national prize for the Energy globe Award.

The impact on gender relations was spoken of by the farmers interviewed, in terms of the benefits that agroecology had in relieving pressures on the gendered responsibilities of women. In other words, providing for the family became easier as agroecology minimized the dependence on money, and assured women the food necessary. Access to money has been monopolized by men in the areas interviewed. As such, when households moved more towards subsistence from cash crops, women interviewed indicated relief and security. However, whilst being concerned with the impact of climate change on women, this kind of feminism was not one that questioned the validity of gendered roles in the household, which are at the origin of gendered problems

such as unequal control over money when this plays a bigger role in household livelihoods. This unequal control surfaces when this factor is present, but it is not the problem so much as it is a symptom of the problem. It should be considered in what other, possibly less obvious ways these gendered roles (more responsibilities within the household, for example) can disadvantage women disproportionately when it comes to suffering the impacts of climate change.

Concluding remarks on the data

Generally speaking, the issues surrounding climate change and the political nature of adaptation were emphasised by the farmers.



Although to varying degrees, the majority detailed practices that dealt with climate change impacts in a manner that is alluded to the political and the practical being co-constitutive of their adaptation. Alone, few of these practices can be deemed overtly political, but taken as a bundle; the political impetus for them becomes clear. For example, taken by it, the practice of intercropping is not political; it serves a practical adaptation purpose (soil conservation, or hedging bets on crops). But when considered along with the fight for seed sovereignty, defending smallholder farmer control and the way of life (seed exchanges, seed saving, and the society and culture built around these), we see how it can represent a rejection of a market system that seeks to simplify and commodify (monocropping with a focus on maize, or cash crops such as tobacco). This is further confirmed with anti-market rhetoric coming directly from peasants, as the quotes above show.

Smallholder farmers farm for themselves and their community, understanding that commodification is detrimental to them, especially in the context of an increasingly unpredictable climate. The extent to which this shows an understanding of capitalist agriculture and its role in climate change debatable. But what can be said is that, in this case, a political understanding of climate change and adaptation has helped smallholder farmers to delineate practices and narratives that exacerbate the political origins of climate change from those that seek to defy them.

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