

The Impact Of Farmer-Led Irrigation On Zimbabwe's Model A1 Land Reform: A Review

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Abstract- This article acknowledges that land reform is critical in the development and transformation of economies especially in Sub Saharan Africa. (SSA). Land reform is a planned purposive change in the way land tenure is held or owned. It also includes the methods of cultivation that are employed and in a way, defines the relation of agriculture to the rest of the economy. Like most economies in Sub Saharan Africa (SSA), agriculture in Zimbabwe plays an important role in the country's economy and also on the livelihoods of the rural populace whose quest for food security and nutrition, income and expansion of their rural economies is embedded in agriculture. This is clearly spelt out in the economic blue print, National Development Strategy One (NDS1) where agriculture forms the important enabler for the country's transformation by the Second Republic of Zimbabwe. The skewed nature of land distribution at independence that was in favour of a few white commercial farmers triggered the onset of the Fast-track Land Reform Programme (FTLRP) in 2000. This programme was implemented under two models namely the A1 and A2 Model. The A1 Model is the smallholder variant where the beneficiaries were allocated 3 to 6 hectares purely reserved for arable purposes while the A2 Model is the commercial model where the land sizes vary from 30 to 2000 hectares and is dependent on the agro-ecological region in which that the farm is situated. In a sense land and water are two natural resources that can enable land reforms to attain their intended goals. Chief among these goals is the goal of increasing crop productivity that invariably enhances small holder farmers' livelihoods. Rainfall agriculture has proven to be unreliable in the face of climate change. Debates on the appropriate scale of irrigation under land reform have been ongoing in Zimbabwe. Farmer-led irrigation concept has strongly emerged in this debate. The hypothesis informing this review is that farmer-led irrigation is key if Zimbabwe is to enhance smallholder farmers' livelihoods. This new emerging narrative should also be captured in the Zimbabwe's new land policy. This article focuses on farmer-led irrigation in Zimbabwe as it unfolds and other parts of Africa and how livelihoods of smallholder farmers can be enhanced. The theoretical framework informing the nexus between land reform and irrigation is also reviewed in the context of smallholder farmers.

Index Terms- farmer-led irrigation, land reform, livelihoods, Zimbabwe, crop productivity

I. INTRODUCTION

The global pandemic of COVID-19 currently affecting all countries in the world is another indicator on how human kind has become very vulnerable to the forces of nature. Global economies have been badly shaken, big or small. From the global super powers like the United States of America, the European giants under European Union (EU) banner to developing countries in Africa like Zimbabwe. Economies have been on lockdown for the over two years and the question of recovery post COVID-19 is so important for all global governments. Before these economies could recover, the Ukraine-Russian war has also added to global economic misery. In this regard the degree of how much people's livelihoods have been affected depends on the economic strength of different nations before the onset of the economic lockdowns. For agro-based economies, agricultural planning for a quick recovery will be very critical.

The case of Zimbabwe that from the year 2000 embarked on a massive land reform programme code named the Fast-track Land Reform Programme (FTLRP) provides an interesting case on how the new normal is likely to shape up. This is made more importantly by the fact that small holder farmers under the A1 Model have been adversely affected by the two global pandemics. The same resettled A1 farmers if given the right conditions will also be able to improve their livelihoods and those of others who depend on agriculture.

According to Grebrewot, Mesfin and Nyseen (2015), the engagement of small holder irrigation is an essential developmental policy meant to eradicate poverty and improve livelihoods for farmers that depend on agriculture as the case with many farmers across the continent of Africa. This is further supported by Magaramombe (2017) who asserts that in Zimbabwe irrigation increases crop production and in that manner supports rural smallholder livelihoods and ensures that they are also food secure.

Chazovachii (2016) further posits that smallholder irrigation allows farmers to practise crop production throughout the year. Smallholder irrigation has been proven to be viable attractive option for poor resourced farmers in most developing countries (Woodhouse et al., 2017).

Under the new agrarian transformation in Zimbabwe, Scoones et al. (2019) poses three critical questions about what types of irrigation will be appropriate for the smallholder A1 farmers. His questions infer to what type of irrigation technology will be appropriate inclusive of the appropriate financing options and governance regimes in respect of land and water. As shown in other studies in Africa, farmer-led irrigation is more flexible in approach and highly adaptive in approach for use by small-scale farmers despite the fact that it is sometimes less recognized (Scoones et al., 2019, Woodhouse et al. 2017; Beekman, 2014) In Zimbabwe despite its extensive practice in smallholder sector, farmer-led irrigation is not readily realized by both policy makers and planners alike (Scoones et al., 2019).

This article will dwell on the issue of how farmer led irrigation is likely to impact on the livelihoods of resettled smallholder farmers under A1 schemes of the FTLRP. Examples of farmer led irrigation initiatives and literature reviews will be used to highlight the impact that farmer-led irrigation can have on land reforms across Africa.

II. STATEMENT OF PROBLEM

The progress of Zimbabwe's Fast Track Land Reform Programme (FTLRP) of 2000 has been varied in terms of progress (Njaya, 2015). The initial causes and the resultant consequences of the FTLRP have been debated widely and now significant body of literature of the programme exists (Masiwa, 2004; Moyo, 2000, 2004; Njaya, 2016; Richardson, 2004; Sachikonye, 2003; Scoones, et al., 2010, 2019; Zikhali, 2008). The programme is credited with addressing the historical land imbalances and broadened the base of economic participation (Mukodzongi, 2017). Despite being credited with the overhauling the racial inequalities in land ownership in Zimbabwe, the program is associated with losses in agriculture production and economic collapse (Richardson, 2004). The negative impacts often highlighted create a negative picture of the FTLRP. However, there has been lack of solid empirical research on how such an extensive land redistributive programme has impacted on the livelihoods of smallholder farmers especially those that have gone on to engage in farmer-led irrigation farming (Njaya, 2016) and how this has affected the livelihoods of the resettled smallholder farmers.

III. METHODOLOGY

This paper relied on secondary data from land reform experiences in Zimbabwe, Government of Zimbabwe land documents like the Utete (2003) commission and Rukuni commission (1994) reports together with land audit Reports of 2006 and 2020. Analysis of case studies of how farmer led irrigation has been taking place in Zimbabwe Mozambique, Tanzania, Ghana helped in analysing the current farmer led

irrigation initiatives taking place under the A1 model of the FTLRP. Studies that dealt with the Asian experience under the Green Revolution experience helped analyse the African context.

III. REVIEW OF RELATED LITERATURE

A *The fast track land reform and agrarian changes in Zimbabwe*

This paper starts off by dealing with the land issue in Zimbabwe. According to Masello, Oates and Jobbins (2017), Zimbabwe's political matrix and economic prosperity and invariably that of its population has over time immemorial linked to the land issue. Rukuni (1984) further posits that the issues of land and water are the two most important issues that have shaped Zimbabwe's history. In this regard to Mosello et al. (2017) posit that it would be economic for Zimbabwe to start from the land perspective to bring about those changes that deliver on the National goals of food security and nutrition, poverty reduction and improvement of rural economies considering that Zimbabwe is a country with a higher population that is currently living below the national poverty line and it is projected that 4.3 million people in Zimbabwe will be food insecure in 2022 (ZIMVAC, 2022).

In Zimbabwe, before 1890, land belonged to the black people of Africa, who practised crop rotation and animal husbandry on rotation basis (Maruve et al. 2019).. According to Weiss (1991), during the colonial period blacks were removed from Zimbabwe's fertile soils for the benefit of the white settlers who wanted productive farms. Oppressive Acts like the notorious Land Apportionment Act of 1931 and the Land Tenure Act were used to displace blacks of their more fertile lands in favour of whites (Moyo 2011). As a result, a dualistic economy was created that mainly favoured the whites. This continued well after independence in 1980.

The current resettlement phase code named Fast Track land Reform (FTLRP) started in the year 2000 but was formally acknowledged to have begun with the land acquisition Act of 2002 (Mukonzongi and Lawrence, 2019). The Government of Zimbabwe adopted two implementation models under the FTLRP namely the A1 scheme and A2 schemes The A1 Model was undertaken as a villagized model or self-contained unit. The villagized model allocated each resettled farmer between 3-6 hectares set aside for arable purposes and between 16 to 30 hectares of communal grazing. Half a hectare was allocated for housing development (Ministry of Lands and Rural Resettlement, 2019). The A2 Model was intended for those that were able to mobilize their own resources. (Ministry of Lands, Agriculture, Fisheries, Water and Rural Development 2022). The A1 Model was simply a modification of the original Model (A) adopted by the Government of Zimbabwe after independence and implemented under the Phase one land reform model while A2 is the commercial model that was meant to create a new cadre of farmers who could engage in commercial farming using their own resources. Under the A1 Model, twenty percent of all A1 Model allocations were reserved for war veterans of the liberation struggle (Government of Zimbabwe, 2003).

The land redistribution programme in essence was geared towards ensuring food security and improvement of livelihoods for the resettled farmers (Magaramombe, 2010).

B Viability in the context of A1 model under FTLRP

According to Scoones and Cousins (2010), the term 'viability' has become a key term in land reform debates and policies in Southern Africa, Zimbabwe included. The understanding of viability has also influenced state policies on land reform as a result. To understand how the A1 Model was conceptualised by the Government of Zimbabwe, it will be prudent to interrogate historical happenings in the agricultural sector of Zimbabwe in the last century.

As noted by Cousins and Scoones (2010), in Southern Africa debates of viability tend to focus on two aspects of levels of farm productivity and farm economic returns. The preferred model in this regard is the commercial large-scale farms despite the fact that other scales of farming could be accommodated. Viability in this regard is defined as technical recommendations that include 'minimum farm' sizes, economic units and carrying capacity. A case in point is Zimbabwe Statutory Instrument 288 of 2000 that gives the maximum farm sizes for A2 farm based on Zimbabwe's agro-ecological regions I to IV. The range of land allocations stretches from 150 hectares in agro-ecological I to 1000 hectares in natural agro-ecological region V. For the A1 Model the standard is 3-6 hectares reserved for arable land and 16-30 hectares of communal grazing. This is a standard across all agro-ecological regions.

These farming models give a picture of the policy narrative that deems the A2 Model as a commercially viable enterprise and the A1 Model as an expansion of communal areas where the concern is only on food security. According to Cousins and Scoones (2010), the key ideas in the Zimbabwean policy is one based on welfare concerns for model A1 and commercial viability concerns for model A2. This article notes that the overarching views on agricultural development have been influenced by the concept of modernisation. Farmers got identified as modern or progressive and as a result farming was to be a linear model of economic development that involves transitioning from agro based economies to industrial economies (Rostow, 1960, Schultz, 1964). "Scientific farming practice according to Scoones and Kholmer (2002) became a preserve of the A2 Model.

In the historical perspective, the A1 Model can be viewed as subsistence and framed for subsistence farming. There are striking similarities between colonial prescription on modern agricultural development that emphasized on the need to modernise and the more recent narratives about the need for a new business model driven commercial agriculture to replace older smallholder subsistence models (World Bank, 2010).

In Zimbabwe the FTLRP at policy level, there remains a clear distinction between a household food security objective for A1 schemes and business targeted commercial objective for the A2 Model (Scoones et al., 2010). The events however happening

on the ground that policy seems not aware of is that owing to the adoption of irrigation under the A1 Model, the narrative of viability farming in Zimbabwe is fast changing.

This article further deals with the emerging narratives that outline the importance of irrigation on livelihoods for rural farmers.

C livelihoods under irrigation

Studies globally have shown that smallholder irrigation systems are critical in increasing land productivity and sustain livelihoods in semi-arid regions (FAO, 2015). Mutiro and Lautze (2015), further contend that improvements in agriculture at any given scale and enhancing the productivity of the land through small holder irrigation is one of the key path ways for alleviating poverty and improving the livelihoods of rural communities in agro based economies. The majority of the poor resourced smallholder depend directly or indirectly on agro systems. Food Security concerns are the main imperatives that have driven the construction of small-scale irrigation schemes in many of the less developed economies particularly in SSA. (Muzerengi and Mapuranga, 2017). In addition, it is argued that smallholder irrigation schemes for smallholder farmers in Zimbabwe is a mitigatory measure especially against climate change induced droughts and mid-season dry spells where moisture stress severely affects crop growth (Chazovachii, 2016).

In Zimbabwe the policy imperative of pre-independence smallholder irrigation was mainly focussed on enhancing the food supply matrix particularly in the drier regions of IV and V (Chazovachii, 2016). The need to allocate the fertile lands to the commercial white farmers led to a policy shift in the 1960 where irrigation was to be established for black people removed from the fertile lands (Hughes, 1974). With the onset of the land reform programme at Independence, the irrigation model of small-scale producers were created on the same line as the communal schemes to supplement dry land farming (Scoones et al., 2019). These schemes were initially run by the Department of Rural Development (DERUDE). The Government of Zimbabwe provided financial support for the development of irrigation infrastructure and Ministry of Water provided irrigation water. Under the Fast-track Land Reform Programme only two models were operationalised that are the A1 Model and the A2 Model. Unlike the communal areas where donors were willing to finance irrigation projects, the 'new lands' under A1 and A2 were considered 'contested lands' and were not eligible for funding. With the Government of Zimbabwe under economic sanctions, treasury support to irrigation has been very minimal from the start of the FTLRP.

Evidence on the ground in Zimbabwe points to a picture where farmer led irrigation initiatives are taking place without formal government support under the FTLRP. The concept of farmer-led irrigation is far more extensive in Zimbabwe than is recorded by policy makers and irrigation planners, (Scoones et al., 2019). According to Woodhouse et al. (2017), farmer-led irrigation is as a process where smallholder farmers assume a driving role in improving their water use for agriculture purposes in the process bringing about changes in their knowledge

production, technology use, investment patterns and market linkages for their agricultural produce and the same time dealing with governance issues of land and water.

In sub Saharan Africa, many studies have pointed to sizeable potential for further increase in the area under farmer-led irrigation and this has the potential to increase crop yields and generate additional household revenues (You et al. 2011, Giordano et al. 2012, Xie et al. 2014).

Farmer-led irrigation has been taking root in the new transformed agrarian landscape taking place in Zimbabwe after the FTLRP. A study in Masvingo district, Zimbabwe by Scoones et al. (2019) indicates that farmer-led irrigation is taking more root than previously recorded.

D Crop yield improvements under irrigation

Crop yield improvement from smallholder irrigation in SSA have been found to increase by 141 to 195 percent compared to rain-fed yields based on ex cute smallholder irrigation technology assessment (Domenech and Ringler, 2013).

Table 1- Potential yield improvement from agricultural water management investments in SSA

Crop	Low Input- Rain-fed Yield (t/ha)	High input- irrigation yield increase
Maize	1,4	140 – 195
Groundnuts	0,7	235 – 251
Sweet potatoes	4,3	200 – 212
Tomato	20	76 – 79

Source: Giordano et al. (2012)

Domenech and Ringler (2013) also posit that the type of crops farmers grow will also change with irrigated agriculture.

D Investment in Smallholder Agriculture

The general view is one that it is only the more secure commercial farmers that invest in irrigation is challenged by studies from the region. According to Woodhouse et al. (2017), there is evidence that contrary to the general held belief, small holder farmers invest in irrigation. The following gives a summary of farmer investment in agriculture according to studies carried out on the continent (Woodhouse et.al. 2017)

a) Small holder farmers invest substantially in irrigation initiatives

Farmers are known to invest in irrigation at both household and aggregate level (Woodhouse, 2017). The small investments at household level have a major effect on overall small holder irrigation development in Africa. According to Woodhouse et al. (2017), a case in point is that of the Fadama irrigation development in Ghana that was further supported by the World Bank. Wamare et al. (2014) indicate that the official importation data in Ghana showed that over USD8 million was used to import over 65000 pumps and accessories between 2003 and 2010. This investment

figure was at par with the official figure in large-scale irrigation investment.

In Mozambique, about 110,000 hectares of unregistered farmer-led irrigation initiatives may exist in the country (Beckman, Veldwish and Bolding, 2014). This figure would officially double the recorded national statistics on irrigable land in Mozambique that in 2013 stood at 118 000 hectares (Beekman, Veldwish and Bolding, 2014). The same scenario also obtains in Tanzania and Zimbabwe. In a study in Zimbabwe, Scoones et al. (2019) found out in their study of FTLRP farms, that farmer-led irrigation development was three times more than the official irrigation statistics thereby challenging the national figures for the same presented by Manzungu et al. (1999).

b) Farmer interactions with the external actors and influence on rural economy

Woodhouse et al. (2017) posit that a dichotomy between what they termed ‘outside’ and ‘inside’ investments need to be substituted by an understanding of smallholder irrigation initiatives at a mix of interactions between government and non state actors. In this regard, investments by small holder farmers rarely happen in isolation but are influenced by the broader socio-economic environment. Investments by farmers are not guided by what Woodhouse et al. (2017), term agro-ecological potential or irrigation potential but by economic factors. Production for the market may also be accompanied by food security considerations for smallholder irrigators (Woodhouse et al. 2017). This view however locates farmer led irrigation within increased household food security matrix and increased income throughout the year (Hope, 2014). Issues like reduced taxes from government and increase in access to markets have all influenced farmers’ investment on irrigation initiatives. Increase in lift pumps in Burkina Faso has been associated with the existence of more than 100 reservoirs in the country. These had been built by government and developmental partners. (Verox and de Fraiture, 2012). This shows the importance of synergies between smallholder farmers and government in developing smallholder farmer led irrigation initiatives.

Access to markets is also very critical in farmer-led irrigation development. These market networks may not be formal or state registered. As was noted by Nkoka, Veldwish and Bolding (2014), farmer-led irrigation initiatives increased rapidly in Tsangano area near Mozambique’s northern border with Malawi as a result of sale of potatoes in neighbouring countries.

Labour mobility is another critical aspect of rural economies. According to Hill (1963) and Swindell (1978), migrant of labour has in the past played a key role in extensive development of agriculture in Africa. The following are cases in point, Gezira in Sudan (Robertson, 1987), the Delta of the Senegal River (Engerhart and Ben Abdallah, 1986). Large number of immigrants made irrigation construction in farmer-led irrigation development possible e.g. Zimbabwe immigrants in Penhalonga in Mozambique (Beekman et al., 2014

c) *Registered Formal land tenure is not a pre-requisite for small scale irrigation development*

Land tenure issues have been subject of intense debate in Zimbabwe. These issues have been mostly directed at the A2 commercial model scheme. The prevailing paradigm is one that formalized registered land rights are a pre-condition for smallholder irrigation investment (World Bank, 2010). To the contrary, agricultural intensification was not affected by traditional land holding rights. Studies on farmer-led irrigation initiatives across Africa also support this view (Beekman et al., 2014). In Ghana peri-urban agriculture is expanding despite lack of secure land rights mainly due to threat of construction projects in these areas in countries like Kenya where petrol pumps are used in farmer led irrigation initiatives on rented land (Woodhouse et al., 2017). In countries like Mozambique, farmers acquire land outside of traditional governing of land tenure rights (Bolding, 2010). This situation is however different in Zimbabwe where the Fast Track Land Reform availed over 10 million hectares on a free lease basis to over 185 000 farmers under both the A1 and A2 schemes (Ministry of Lands, Agriculture, Fisheries, Water and Rural Development, 2022).

d) *Agricultural Innovation in broad socio-technical networks and agricultural systems*

In developing irrigation systems, farmers are influenced by maintenance and operation costs and whether the farmer should operate as an individual or within a small group. According to Woodhouse et al. (2017), this has led smallholder farmers developing irrigation initiatives on agricultural land which is on steep slopes, using small streams or wetland areas also called dambo and *bani* in Southern Africa. This in a way shows the technological and irrigation acumen without the help of trained engineers is possible contrary to the widely held view that irrigation planning is a highly specialized field for engineers.

These different case studies highlight that irrigation innovations are integral part to social networks that involve landholders, pump owners, traders, mechanics and agents from governmental and international organisations, knowledge brokers in knowledge on irrigation systems as farmers copy water management technologies. In countries like Ghana, pumps can be leased for a day (Wamara et al, 2014).

e) *Positive and negative impacts of farmer-led irrigation initiatives*

It has been noted that as farmers benefit from the concept of farmer-led irrigation, other farmers may be negatively affected especially in what Woodhouse (2003) defines as customary land tenure rights and water rights assume a new meaning and contested. Woodhouse et al. (2017) define three types of negative impacts that are downstream effects, reduced food prices and benefits accruing to the household as a results of irrigation.

The widely held belief that irrigation can only be feasible with state or donor support is highly disapproved by events on the ground in most of SSA. Farmers are investing even in areas where there is no security of land tenure. This may be explained in part with the high returns from irrigation agriculture compared to dry land irrigation. Smallholder farmer led Irrigation conditions allow

households to grow crops throughout the year giving the land a high productivity value (Dube, 2016).

E THE NEXUS BETWEEN IRRIGATION AND SUSTAINABLE LIVELIHOODS

The disruption of livelihoods during the COVID-19 pandemic has been felt globally. The effects have been more pronounced in Africa where economies were already shaky owing to a plethora of external and internal induced economic knocks like poor governance and corruption. In the same economies, the rural folk and smallholder farmers have been worst hit. Global remittances that used to be their safety nets have ceased to flow owing to job losses induced by COVID-19.

In this regard African governments where most economies are agro-based, irrigation offers a 'silver bullet out of this pandemic. The need to deal with people's livelihoods is therefore very critical. Academics highlight that intensive farming is made possible by farmer led irrigation initiatives that in turn increases land productivity and subsequently crop output per given unit area (Dube, 2016). Smallholder farmer led irrigation allows a degree of crop diversification that cannot be achieved using rain-fed agriculture. (Liao, Zhang and Bengtson, 2008, Mwaba, 2013). The need to increase productivity in Zimbabwe is a priority after two consecutive dry years from 2018/19 season to 2021/22 farming seasons. Infrastructural Development becomes very important as a result. Rukuni and Eicker (2006) reiterated that since independence in 1980, the government has undertaken a host of initiatives in the communal areas. These include infrastructure development, increased irrigation funding and crop price guarantees.

Besides the common cereal crops grown under most communal irrigation schemes, smallholder farmers under A1 Model may venture into horticulture, tobacco production and fruit production.. Tobacco production from irrigated Model A1 plots in the Mvurwi area of Mashonaland Zimbabwe have been show to attain higher and better paying grades that tobacco grown under dry land in the same area. Dube (2016) posits that irrigation farming is also an income source for the disadvantaged rural people. This is a category of irrigators who use buckets to irrigate their gardens and Scoones et al. (2019) terms this typology of irrigators as homestead irrigators. This group forms the biggest group of former farm workers whose livelihoods was affected by FTLRP when their jobs were terminated after the eviction of their former pay masters. Equally more affected by COVID-19 pandemic and historical injustices associated with the FTLRP, irrigation is the only hope for them to build their livelihoods. Sachikonye (2003), estimates that their number at the start of the FTLRP was around 350 000 workers supporting around 1.8 million other family members. Smallholder irrigation schemes have been known to curtail migration owing to the wide range of livelihood benefits. Chitsiko (1999), argues that small-scale irrigation schemes are important in communal areas of Zimbabwe in controlling rural to urban migration. In his study of Hama Mavhaire irrigation schemes in Masvingo, Zimbabwe, the scheme provided a source of income and livelihoods to youths who felt that there was no need to migrate to towns.

Irrigation is a known economic avenue to rural economy expansion. Chazovachii (2016) noted that a crop income earned from small-scale irrigation in Zimbabwe was far more than what is earned from dry land farming or from a non-skilled worker. As a result, irrigators were better positioned to invest in capital assets compared to non-irrigators. Rural infrastructure like clinics, shops and roads have been developed as a result of irrigator's income.

Food security and nutrition besides been areas of emphasis under Sustainable Development goal 2 where Zimbabwe is also a signatory will be an area of higher concern post COVID-19.

F Theoretical frameworks informing irrigation efficacy on land reforms

This article will review three important theoretical frameworks that inform studies dealing with the nexus between smallholder farmer led - irrigation and livelihoods of resettled farmers under redistributed lands of Zimbabwe. The neo classical frame work deals with the question of how efficient production is on resettled land and then addresses returns to factors of production such as land, labour and capital while the new institutional economics deals with the factors and conditions that influence the efficiency of different scales of production under land reforms. It emphasises the issue of small-scale farm efficiency, distribution of income, poverty impacts and growth multipliers. The sustainable livelihood frame work identifies the various sources of livelihoods for farmers resettled under Zimbabwe's land reform. It also deals with issues that affect food production and welfare of households under redistributed lands of Zimbabwe.

Neo classical economics.

The main concerns of neo classical economics are properly functioning markets and the *pareto optimal* efficiency outcome that are assumed to be achievable if market failures and market distortions are minimized (Scoones and Cousins, 2010). Government planning and interventions are viewed as being accompanied by corruption (rent seeking) especially in Africa and therefore inefficient (Scoones, 2010). This is true and evident in African governments. The major motive under neo classical economics is profit, where the concept of modernization of utility is paramount and evident in smallholder farmers who produce commodities for self-consumption (subsistence farming) or for sale (commercial purposes). These operate as a firm (farm) in order to maximize profit. Efficiency is very important as is evaluated by assessment of factor productivity. This is further defined as the how productivity the land, labour and capital are. In this article irrigation whether formal or informal (traditional) is perceived to increase efficiency of land acquired through the land reform program especially at small-scale holding. The interconnectivity of the same land to other factors of labour and capital implies they are effectively affected the same by the irrigation factor.

New institutional economics

The view by new advocates of institutional economics which is however contested is one that neo classical paradigm and its associated policy prescriptions are inadequate in addressing the issues of power and institutions assume a much more central role

in dealing with power relations. In this view, all categories seen as rational decision markers. Real markets assumed to being absent or thin because of inadequate information or high transaction cost e.g. cost of enforcing contracts (Lipton, 1993). To reduce these risks that are associated with lack of information and high transaction costs, institutions such as rural money markets and share cropping come into being (Lipton, 1993: 641). In this regard, Engle et. al (2007) posit that the humans are not like machines when it came to problem solving and instead of focussing on processing available information will resort to actions that provide the greatest utility. People will then rely on given rules and roles when deciding what to do on a given situation. They may resort to bring in information technology or expects to provide advice (Lipton, 2003)

Livelihoods Framework. (LF)

According to Cousins and Scoones (2009) the livelihood thinking to development has framed policy formulations with regards to land reform, as well as the informing of many non-governmental donor policies on land reforms. The policy emphasis is mostly on reducing vulnerability of the rural poor households by allowing them to have access to productive assets and resources (2009). Here land reform is strongly associated with development initiatives the Sustainable Development goals (SDGs). A key concept in the LF approach is various and diverse livelihoods pathways that combine diverse range of smallholder farmer capabilities, assets and farming activities in order to stresses and shocks such as climate change induced droughts. (Chambers and Cornwall, 1992).

In this article irrigation under the A1 scheme of the FTLRP enhances a household's capabilities to use irrigation as an asset to deal with climate change. This is made more relevant by the advent of climate change in the farming sector that has made rain-fed farming riskier. Ellis (2004) asserts that positives of the livelihoods approach includes its holistic and integrative aspects in its approach that has made it more suitable in comparison to other approaches that deal only with crop production and household income.

Table 2: Summary of Theoretical framework for informing the viability of land Reform.

	Neo classical economics	New institutional Economics	Livelihoods
Central Focus of framework	Well-defined and functioning markets compared to non-functional markets.	How equity and productivity are inter connected	Development based on livelihood improvement and dealing with poverty
Key informing concepts	Efficiency in factors of Production.	Reduction of Transaction cost,	Multiple and diverse livelihoods of smallholder farmers.
Land and agriculture in a global context	Role of agriculture under globalisation and agro food markets.	Economic growth can be constrained by skewed land distribution	Growth initiated by Agriculture with the aid of. Globalisation
Land Reform Policies advocated for	Market led reform is best coupled with property rights.	Market assisted land reform has bias towards large scale commercial farmers	Subsidies can aid production.
Intended Beneficiaries	All productive farmers at all scales of production.	Efficient smallholder farmers who maximize returns to land and labour	The smallholder rural farmers with multiple livelihoods.
Assumed Measure of validity	Farm efficiency and rate of return on investment.	Farm efficiency and Poverty impacts on smallholder farmers.	Improved Livelihoods for smallholder farmers.
Key informing questions	How efficient is production on redistributed land?	What are the factors and conditions which influence the efficiency of different sizes of farms under the land reform models?	What are the various sources of livelihoods options for land reform beneficiaries?

Adapted from: Cousins and Scoones (2009)

IV. CONCLUSION

The issues of water control for sustainable and successful agriculture are very critical under Zimbabwe’s land reform. The Fast-track Land Reform Programme (FTLRP) in Zimbabwe was implemented against a backdrop of understanding that commercial agriculture under the A2 Model would drive the economy. This paradigm was informed by colonial and immediate post-independence era where commercial agriculture was the backbone of the economy. This position had influenced agriculture planning in Zimbabwe for the last century. The new emerging issues under the A1 Model of Zimbabwe’s FTLRP makes a strong case for those smallholder farmers (Model A1) as has been the case in Asia and other parts of Africa where land reform has taken place, can drive economies and enhance smallholder livelihoods. After all, the tag of ‘ regional bread basket’ attained by Zimbabwe in the early 80’s was as a result of massive maize and cotton production by smallholder farmers under the communal areas and new resettlement areas under land reform phase one.

Case studies on farmer-led irrigation have shown cases of improved and diversified crop production scenario under the smallholder sector. This has led to improved livelihoods of smallholder farmers and the enhancement of the local economies in the respective countries and localities. In the same case studies, smallholder farmers have been shown to invest in irrigation in situations where commercial farmers because of fear of insecure land tenure would have failed to invest. The context of what financing options smallholder farmers would resort to, is an

important issue in Zimbabwe’s land reform considering that international donors have ceased to finance all land related projects under FTLRP as it is considered ‘contested land’. The government of Zimbabwe cannot fill in the financing gap as it alleges that under the current sanctions all its lines of credit have been closed down and this has rendered its treasury incapacitated.

In order to effectively irrigate under the new land reform, policy makers and irrigation engineers should not be guided by the modernist views and the theoretical engineering underpinnings that have gone to define what a standard in irrigation is. In fact, these experts should be pragmatic and appreciate the new reality on the ground where farmers have taken the initiative to adopt farmer-led irrigation initiative. The developments on the ground should also assist in drawing out the new irrigation policy that captures the reality on the ground. This article therefore dealt with the case studies that inform the importance of appreciating what farmer-led irrigation can do in transforming livelihoods under different land reform scenarios and the FTLRP in Zimbabwe is no exception.

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