THE COST OF THE GENDER GAP IN AGRICULTURAL PRODUCTIVITY IN ZIMBABWE
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<tbody>
<tr>
<td>AfCFTA</td>
<td>African Continental Free Trade Area</td>
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<tr>
<td>APM</td>
<td>Agricultural Productivity Module</td>
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<tr>
<td>COMESA</td>
<td>Common Market for Eastern and Southern Africa</td>
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<td>FAO</td>
<td>Food and Agriculture Organization</td>
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<td>GDP</td>
<td>Gross domestic product</td>
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<td>IMF</td>
<td>International Monetary Fund</td>
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<td>PICES</td>
<td>Poverty, Income, Consumption and Expenditure Survey</td>
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<td>ROESA</td>
<td>Regional Office for Eastern and Southern Africa</td>
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<td>SDGs</td>
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FOREWORD

UN Women continues to lay emphasis on the importance of agriculture, which employs a large proportion of women in the Sub-Saharan Africa and plays a vital role in addressing food security and family nutrition. This is particularly the case in Eastern and Southern Africa, where agriculture makes up a large share of local and regional economies, representing a critical source of income, food security and nutrition. Despite this significance reliance on agriculture, well-documented gender-based inequalities in access to and control of productive and financial resources inhibit agricultural productivity and hurt food security. Studies have shown that the link between women’s economic empowerment and other development outcomes, such as sustainable agricultural growth and economic development are inadequately reflected in agricultural policies and programs. Coupled with the changing climatic conditions in the region, the window of opportunity for action is closing fast. It is therefore prudent that climate-smart approaches to agriculture be utilised to build societal resilience to environmental and economic shocks, close gender gaps and promote women’s economic empowerment and promote inclusive economic development. This new study measures the economic costs of the gender gap in agricultural productivity in Zimbabwe and provides further evidence that reducing the gender gap can go a long way in poverty reduction and improving nutritional outcomes.

In recognition of the need for more quantitative evidence of the economic gains from addressing the gender gap, UN Women, jointly with United Nations Development Programme–United Nations Environment Programme Poverty-Environment Initiative collaborated on this study to measure the size of the gender gap in monetary terms. The report provides a unique quantification of the costs of the gap in terms of lost growth opportunities and an estimate of what societies, economies, and communities would gain if the gender gap in agriculture is addressed. The findings of this report are striking and send a strong signal to policy makers and development partners in Africa that closing the gender gap is smart economics. Closing the gender gap could assist in lifting 700,000 people a year out of poverty in Zimbabwe. This report also provides guidance on factors that must be targeted to close the gender gap and improve opportunities for women farmers. It concludes with a set of general policy recommendations on how women’s empowerment, agriculture productivity, and economic growth can be addressed in an integrated manner.

Sustainable Development Goals (SDGs) offer a historic opportunity to shift from development in silos to a more integrated approach. This work provides evidence and policy recommendations that can support the achievement of SDGs, especially but not limited to SDG 5. Achieve gender equality and empower all women and girls. In addition, it supports the objectives of the Comprehensive Africa Agricultural Development Programme (CAADP), which aims to help African countries eliminate hunger and reduce poverty by raising economic growth through agriculture-led development. It is our hope that the report will be used by policy makers and practitioners to propose and implement gender-sensitive and environmentally sustainable agriculture policies and programs.
1 INTRODUCTION:
THE GENDER GAP IN AGRICULTURAL PRODUCTIVITY

The Zimbabwe Government’s Vision 2030 policy places marked improvements in agricultural production and agricultural productivity at the centre of the country’s development process and its efforts to meet the SDGs. Since 2010, agriculture has contributed an average of only 8 per cent to the country’s gross domestic product (GDP). This is largely due to the precipitous decline in annual agricultural production, from a peak of US$2.9 billion in real terms in 2001 to US$885 million in real terms in 2008. This, in turn, reflected sharp declines in annual value-added per agricultural worker, from a peak of US$910.5 in 2001 to US$232.3 in real terms in 2008. Productivity, measured as output per hectare of land, declined both for staple crops such as maize and essential export-oriented cash crops such as tobacco. These declines occurred even as employment in agriculture rose. As a share of employment, agriculture rose from 61 per cent of total employment in 2001 to 67 per cent of total employment in 2018, demonstrating the growing importance of the farm economy in supporting livelihoods. In 2019, the bulk of this employment – some 60 per cent (67 per cent of women and 53 per cent of men) – was as own-account workers, primarily on subsistence-oriented, rain-fed, small-scale family farms. Around 37 per cent of rural men and 17 per cent of rural women were employed as waged labour.

For men, work on commercial and export-oriented farms was common. In contrast, rural women were more likely to supplement their incomes by performing seasonal part-time low-paid rural waged work. Just over 15 per cent of rural women and just under 10 per cent of rural men were employed as contributing family workers in petty processing, trading and other activities. Overall, small-scale farming is by far the single most important source of employment in rural Zimbabwe.

Gender-based differences in employment patterns in rural Zimbabwe, particularly in small-scale farming, suggest that gender relations might result in differences in agricultural production and productivity across small-scale farms. There have been numerous attempts to estimate whether there are gender-based ‘gaps’ in agricultural productivity, especially since the introduction of Living Standards Measurement Surveys in Africa and Asia in the late 1980s. Agnes Qiumbing provided an early survey in 1995. In 2012, Bina Agarwal published an overview that listed 25 country case studies from Africa and Asia. In 2014, the World Bank and ONE published ‘Levelling the field: improving opportunities for women farmers in Africa,’ which contained six country case studies. More recently, the UN Women Regional Office for Eastern and Southern Africa (ROESA), the UNDP-UN Environment Programme Poverty-Environment Initiative Africa, and the World Bank undertook a joint study in 2015 entitled...

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4 The data here and for the remainder of the paragraph comes from 3.
The study provides quantitative evidence of the links between agricultural productivity, economic growth and gender inequalities, estimating the costs, in terms of lost growth opportunities, of gender inequalities in agriculture. This study stood out from its predecessors as it assigned a monetary value to the gender gap in agricultural productivity. This provided an easy-to-grasp way to emphasize the importance of addressing gender gaps in agricultural productivity. This study demonstrated the potential benefits to communities, societies and economies of removing gender gaps in agricultural productivity and bringing the productivity of women plot managers up to that of men plot managers. It also showed how gender gaps in agricultural productivity can be closed through policies, programmes and projects that mitigate the key constraints facing women farmers on the plots of land that they manage. Under the auspices of UN Women, ROESA and the Poverty-Environment Initiative, the 2015 study methodology was subsequently implemented in Ethiopia and Rwanda, where it found strong evidence of the links between agricultural productivity, economic growth and gender inequality.

Cumulatively, these studies have demonstrated that gender gaps in agricultural productivity can be attributed to the structural and practical constraints faced by women in their small-scale farming activities on the plots of land that they manage. The structural constraints include women’s limited land ownership, tenure constraints and less engagement in markets than men due to discriminatory legal, social and customary norms, as well as power relations and decision-making at the household level. The practical constraints include access to and use of: productive farm inputs; timely and appropriate labour; information and extension services; and agricultural credit. The persistence of the gender gap in agricultural productivity has critical implications for food security, nutrition, poverty and economic growth. All these issues would be positively affected if the productivity of plots of land managed by women could be brought up to the levels witnessed on plots managed by men.

There has been no attempt to determine whether there is a gender gap in agricultural productivity in Zimbabwe. Therefore, in this report we estimate the current monetary value of the gender gap in agricultural productivity in Zimbabwe using data from the Poverty, Income, Consumption and Expenditure Survey (PICES) and two rounds of the Agricultural Productivity Module (APM) of the PICES conducted in 2017. These are the most recent data available. Box 1.1 presents a profile of women farmers in Zimbabwe based on APM data.

We then look at what the size of the gender gap in agricultural productivity means for GDP and poverty reduction. We estimate that eliminating the gender gap would increase annual GDP by US$79 million in Zimbabwe. These estimates can help Zimbabwean policymakers understand the scale of the gains that could be made from designing better and more inclusive policies to improve women’s ability to use agriculture in an environmentally sustainable manner. Not only would this help the women to lift themselves and their families out of poverty, but it would also enhance progress towards meeting SDG 5 and SDG 8. Moreover, closing the gender gap in agricultural productivity can contribute to reducing poverty, enhancing food security and confronting climate change, thereby contributing to meeting SDG 1, SDG 2 and SDG 13 (Box 1.2). It is important to stress, however, that these potential gains do not come without cost. Closing the gender gap in agricultural productivity will require both reviewing and strengthening existing policies as well as, in

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14 This is not to suggest that plots of land managed by men demonstrate optimal levels of agricultural productivity. Indeed, numerous studies have demonstrated ‘yield gaps’ between best performers, in terms of agricultural productivity, and farmers in sub-Saharan Africa. Differences in some countries can be viewed at www.yieldgap.org/web/guest/home (accessed 21 March 2022).
15 All dollars referred to in this publication are US dollars. Throughout this study, we express monetary values in terms of 2017 prices.
some instances, designing new policies. These policy changes may require additional resources, although we are of the view that the resources required to close the gender gap are relatively modest.

We then go on to estimate the costs associated with gender gaps in access to and returns from individual agricultural inputs. This evidence can help policymakers decide where efforts are most needed. For example, understanding that 62 per cent of the gender gap in agricultural productivity in Zimbabwe is due to women managing smaller plots of more fragmented land, or that 47 per cent of the gap is due to women’s lesser use of fertilizer, pesticides and herbicides on the plots they operate, can help decision makers better focus their efforts, thus boosting the economy in the long term.

Finally, we consider the broad outlines that might shape thinking among policymakers, particularly in the Ministry of Lands, Agriculture, Fisheries, Water and Rural Resettlement, about how they can learn from the lessons of this analysis. Unfortunately, existing knowledge of effective—let alone cost-efficient—policy instruments to resolve hurdles faced by women farmers is still in its infancy. For policies to work, especially in the context of potential climate shocks, it is crucial to recognize that both men and women may face different constraints that hinder them from improving their agricultural practices in a climate-responsive manner, and that it may be necessary to rethink, innovate, and make use of pilot projects to document what works and what does not. This is especially true in the wake of the COVID-19 pandemic, and its gendered impact upon rural lives and livelihoods.

The two main types of policy approaches that can close the gender gap in agricultural productivity are:

- **Making current agricultural policies more gender-responsive.** This may include refining existing policies, such as those regulating agricultural inputs, so that they better focus on the needs of both women and men.

- **Designing new agricultural policies that are gender-targeted.** Policymakers can design policies that focus specifically on the needs of women farmers, for example, by promoting gender-responsive and environmentally sustainable agricultural technologies. It is important to note that gender-targeted policies will not bring benefits only to women. Policies that focus on women will also impact upon men and young people because of women’s role as the providers of services that contribute to food security and sustainable livelihoods within the household.

In this light, it is important to recognize that in Zimbabwe women are disproportionately responsible for the provision of the unpaid care and domestic work. This includes cooking, childcare, cleaning and household sanitation, household health care, and informal education, among other activities. While more evidence is needed about women’s and men’s share of unpaid care and domestic, studies indicate that women perform more total work in a day than men. This means that policy approaches designed to address women’s constraints in farming should be based on reducing the unpaid care and domestic work that women are expected to perform, thus freeing up more of their working day for activities outside the home.

### Box 1.1
**The characteristics of female farmers**

Data from the 2017 APM indicates that female farm plot managers are older, more likely to be widowed, have lower levels of education and are more likely to be unwell. They tend to have a smaller than average family size but have more family members aged up to 10 or 65 and older. Female farm plot managers cultivate total amounts of land that are, on average, about 0.5 hectares smaller than that land managed by males, and this land is less likely to be rented. Female farm plot managers are far more reliant on their own labour than plots of land managed by men. They are far less reliant on male waged labour on their plots, but are more reliant on female exchange labour to supplement their own work on their plots. Female plot managers have less access to non-land and non-labour farm inputs, in particular purchased inputs, than male farm plot managers. Female plot managers cultivate fewer crops than male plot managers, but are more likely to utilize intercropping practices. All of these results are statistically significant.

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Box 1.2
Linking the gender gap in agricultural productivity to poverty, food security, climate action and environmental sustainability

In addition to impacts on overall national income, closing the gender agricultural productivity gap could reduce poverty (SDG 1) and improve nutrition (SDG 2) in Zimbabwe. The effect would be both direct — because agriculture is the principal occupation of the poor in Zimbabwe — and indirect — because higher agricultural output may increase income for people employed in sectors linked to agriculture. At the same time, higher agricultural output can lead to lower food prices. The combined impact of increasing the incomes and agricultural productivity of the poor and lowering food prices could help improve nutrition by enabling poor people to purchase more and better food, and by increasing their access to food from their own production.

At the same time, the agricultural sector in Zimbabwe is continually challenged by recurring stresses and shocks caused by worsening environmental degradation and accelerating climate change. These factors affect agricultural productivity for both men and women farmers. Between 1976 and 2020, annual mean temperatures in Zimbabwe rose from 20.52°C to 21.86°C; the increase in the 5-year smoothed mean temperature was greater.\(^\text{17}\) During the same period, average annual precipitation decreased from 785mm to 655mm, a decrease of almost 20 per cent.\(^\text{18}\) The frequency of droughts has also increased: mild, severe and extreme droughts were witnessed three times in the 1990s but eight times in the 2000s.\(^\text{19}\) The rain that does fall demonstrates increased spatial and temporal variability; there have been changes in the timing of the commencement of rains, while heavy rains have become more frequent and more intense.\(^\text{20}\) As a result, the start and end of the growing season have become more uncertain; longer and more frequent mid-season dry spells have impacted productivity, while declining rainfall and rising temperatures have increased evapo-transpiration, which negatively impacts crop maturation.\(^\text{21}\)

Climate change has thus been an important contributing factor in the decline in agricultural production and productivity witnessed this century. The decline has been exacerbated by agricultural practices that contribute to environmental degradation such as the use of slash-and-burn practices in some regions and an overreliance on pesticides for cash crop production.

Due to the gender gaps in the agricultural sector, climatic variations and shocks are likely to disproportionately increase the challenges faced by women and other marginalized farmers. In this regard, access to time-saving and climate-responsive agricultural technologies and tools is essential to close gender gaps and ensure the sustainable use of soil and land, for example, minimizing nutrient losses by increasing the recycling of biomass waste, which enhances the natural resources that underpin agricultural productivity. Such practices are consistent with SDG 13, which requires urgent action to combat climate change and its impacts, and to which the Government has committed.

\(^\text{20}\) Mushore and others 2021
\(^\text{21}\) Ibid.
2. FOUR TAKEAWAYS ON THE GENDER GAP IN AGRICULTURAL PRODUCTIVITY

Four key policy lessons emerge from the evidence presented in the remainder of this report. These lessons are discussed in detail in subsequent chapters.

A. The gender gap in agricultural productivity has an impact on the economy

Even with the conservative assumptions used in this report, we find that gains can be achieved if Zimbabwean policymakers, particularly in the Ministry of Land, Agriculture, Fisheries, Water and Rural Resettlement, address the gender gap in agricultural productivity effectively. Raising women plot managers’ agricultural productivity to that of men’s could increase annual crop output by 7.1 per cent. Taking into account the contribution of crops to total agricultural output, the size of the agricultural sector in the overall economy, and the spillover effects of higher agricultural output to other sectors of the Zimbabwean economy, we estimate the potential gross gains to GDP would be $79 million a year.\(^\text{22}\)

B. The potential economic gains from reducing the gender gap translates into poverty reduction

Increasing GDP by closing the gender gap in agricultural productivity has the potential to lift as many as 700,000 people a year out of poverty in Zimbabwe, or 7 million people over a ten-year period. Closing the gender gap could also result in additional improvements as these estimates do not capture the likely agriculture-nutrition linkages and other spillover effects, including the potential for positive environmental externalities to be captured. For example, increased income in women’s hands can reduce the intergenerational transmission of hunger and malnutrition, as women tend to spend more of their income on children’s health and education.\(^\text{23}\)

C. The benefits of closing the gender gap should exceed the Government resources needed to close the gender gap

While the overall impact on GDP of removing the gender gap in agricultural productivity might appear small compared to the size of the Zimbabwean economy, this is a function of agriculture’s relatively small share in aggregate GDP. There can be little doubt that lifting 7 million Zimbabweans out of poverty over a ten-year period by increasing GDP by less than one-half of one per cent a year would seem a sensible objective of Government policy. Therefore, while closing the gender gap would require some additional investments from the Government, the magnitude of these additional resource requirements is small enough – no more than 6.5 per cent of the Government budget – not to constitute a significant claim on Government resources, and in might be accomplished by budgetary reallocations rather than increased spending.

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\(^{22}\) The key empirical step we take to translate the estimated gross gains from closing the gap in agricultural yields between women and men plot managers into gains of aggregate value addition to GDP is to assume that the fraction of agricultural GDP associated with crop production would rise proportionally with the gains in total gross crop production. For more detail, see box 3.1.

D. Government should identify and focus on the constraints productivity that have the greatest economic impact

This report helps lay the groundwork for deeper investigation into the most effective and cost-effective policies. Our analysis finds the fact that women have less access to land than men, and that the land they work on is more fragmented, significantly and negatively impacts on their crop productivity. Closing the gap in access to land could yield gross gains of almost $50 million a year. At the same time, reducing the fragmentation of women’s plots could yield gross gains of more than $10 million a year. Women’s lesser capacity to purchase and use fertilizers, pesticides and herbicides is another important factor contributing to the gender gap in farm crop productivity in Zimbabwe, and this clearly has implications for environmental sustainability. Closing this gap could yield gross gains of close to $40 million a year. Increasing the use of intercropping, increasing the time spent by females in education, and increasing women’s ownership of animal-drawn tools and implements all have the potential to yield gross gains in excess of $5 million a year each. However, our knowledge of what works is far from complete. Further research should therefore be undertaken to look at the relative impacts and cost-efficiency of specific policies and interventions in order to quantify their net benefits.
3. THE CONTEXT: GENDER IN THE ZIMBABWEAN FARM ECONOMY

Real GDP in Zimbabwe grew at an average of 2.9 per cent per year between 2014 and 2018. This represented a trend improvement in economic performance, both over the period since 2000, when real GDP growth averaged less than 1 per cent per annum, but also over the period since the country’s independence in 1980, when real GDP growth averaged less than 2.5 per cent per year. In 2019, however, in the face of a severe climate-induced drought, the impact of cyclone Idai, foreign exchange and fuel shortages, and severe inflationary pressures, economic growth contracted by 8.1 per cent. In the wake of the COVID-19 pandemic, the economy further contracted in 2020. However, good rains meant that in the 2020/2021 growing season Zimbabwe had a bumper maize harvest, producing three times as much maize as in 2019/2020. Nonetheless, there can be little doubt that the challenges facing the country’s economy and its economic policymakers are severe. In this regard, agriculture has a critical role to play in improving the country’s economic performance, especially in light of the ongoing processes of climate change.

A. Rural households and livelihoods

While most men and women farmworkers combine small-scale agricultural work, waged work and participation in the informal economy (being involved in small-scale artisanal mining, trading and other activities) to produce a livelihood, small-scale farming remains the single most important source of employment in rural Zimbabwe. Yet small-scale farming and other activities are subject to gender-based differences, suggesting that gender relations could be a strong driver of agrarian dynamics. However, in some ways the composition of rural employment is an inadequate indicator of the gendered character of work patterns in the countryside because it fails to account for the ways in which household structure shapes rural employment. Zimbabwe has a rich variety of household structures. Most common are extended households, which comprise almost 40 per cent of households. Couples with children comprise just under 26 per cent of all households, and one-person households each comprise just over 12 per cent of all households. Nonetheless, there can be little doubt that the challenges facing the country’s economy and its economic policymakers are severe. In this regard, agriculture has a critical role to play in improving the country’s economic performance, especially in light of the ongoing processes of climate change.

With such diversity of household structures, it is clear that an understanding of rural livelihoods should incorporate the interactions between ‘productive’ work on the farm or for cash wages and ‘reproductive’ unpaid care and domestic work within the household and in the community. However, Zimbabwe has no statistically-representative data on and the time spent on unpaid care and domestic work. In 2017 a non-representative survey of 1,079 mostly rural and mostly low-income households in

24 All data in this and the following paragraph comes from the online World Development Indicators, available at https://databank.worldbank.org/source/world-development-indicators (accessed 21 March 2022). There are small differences between this data and those provided by the Zimbabwe National Statistics Agency.
five districts in Zimbabwe found that women were spending 4.7, 5.8 and 10.8 hours a day on primary care, secondary care and all care, respectively. Primary care refers to activities such as cooking that directly contribute to well-being. Secondary care activities, for example, childcare, also contribute to well-being but can be combined with other activities. In contrast to women, men were spending 0.8, 1.2 and 3.1 hours on primary care, secondary care and all care, respectively. Some 66 per cent of men did not engage in any primary care activities at all. As is common in many societies, women’s disproportionate responsibility for unpaid care and domestic work reflects gender-based social norms and expectations that women take principal responsibility for cleaning, cooking, fetching water, and collecting firewood, as well as taking care of the sick, the young and the old. In the Zimbabwean data just noted, women’s time use was heavily shaped by meal preparation, cleaning, preparing clothes, water collection and childcare. Men’s principal unpaid care and domestic work consisted of meal preparation and fuel collection.

As a result, it was estimated that, while rural Zimbabwean men worked 7 hours a day (of which 6.2 hours was in income-generating activities and the rest was in primary care), rural Zimbabwean women worked 8.4 hours a day, of which 3.7 hours was in income-generating activities and 4.7 hours in primary care activities. Women’s income-generating activities and all care activities in 2017 are consistent with figures from the mid-1990s; evidence from the mid-1990s indicated that women worked between 16 and 18 hours a day, but spent only half their time on agricultural activities. In this light, it is clear that responsibilities for unpaid care and domestic work result in women having significantly less time to engage in ‘productive’ activities such as farming, waged labour or enterprise development. Moreover, with one estimate suggesting that some 70 per cent of all farm labour in the communal areas of rural Zimbabwe was provided by rural women, it is reasonably clear that the Zimbabwean rural economy must be approached as a gendered structure.

The gendered character of the country’s rural economy is reinforced by structural and institutional factors that continue to marginalize women. Girls are likely to have lesser levels of education than boys, with implications for skill development and access to ‘productive’ work in the labour force. Institutional factors, such as lesser access to finance and agricultural extension services, hinder women’s entrepreneurship. These structural and institutional factors can reinforce and be reinforced by gender-based norms and expectations in the rural economy.

B. Rural poverty

Poverty in Zimbabwe remains a predominantly rural phenomena, which means that the principal occupations of poor Zimbabweans are small-scale farming. Using a food poverty line of US$1.83 per person per day, in early 2019 38 per cent of the population lived below the poverty line, a figure that had steadily increased over the 2010s. Using a ‘lower-bound’ national poverty line of US$2.80 per person per day, 57 per cent of the population lived below the poverty line. Again, the figure rose over the 2010s. However, poverty in the countryside was worse. In early 2019, 51 per cent of those living in the countryside fell beneath the food poverty line and 72 per cent beneath the ‘lower-bound’ poverty line. Econometric simulations indicated that these figures rose in the latter half of 2019 because of rapid food price inflation. It is difficult to envisage things improving during the COVID-19 pandemic, especially as – notwithstanding an excellent maize harvest in 2020/2021 – food price inflation has continued in the wake of the pandemic. Extremely poor people continue to live mostly in rural areas, in large households, work on their own farms, and tend to have low educational attainment. Rural poverty is also pervasive: 50 per cent of rural households are either moderately or severely food insecure.

THE COST OF THE GENDER GAP IN AGRICULTURAL PRODUCTIVITY IN ZIMBABWE
There are gender dimensions to poverty in general and to rural poverty in particular in Zimbabwe.女性主导的家庭在津巴布韦的食品支出比男性主导的家庭要高43。The human development index for females in Zimbabwe is also less than that of males。44 About one-third of poor people live in a female-headed household, and female-headed households have a significantly higher mean food expenditure than male-headed households。45 Moreover, female household heads are more likely to be constrained by social norms and expectations in what they do. This limits their capacity to seek income-generating work to cope with food insecurities, resulting in reduced consumption。46 Social norms surrounding the role of women in supporting children mean that, when women have access to a cash income, they are more likely to spend it on their family’s needs, for example, food, health expenses, educational costs, or out-of-pocket household expenses. It is also probable that gendered rural poverty is experienced through nutritional and food insecurities, and micronutrient deficiencies。Early motherhood, for example, is a key driver of malnutrition。47 Finally, given women’s socially-ascribed responsibilities to provide a household’s basic needs, rural women in the home are the first site of anti-poverty social protection in Zimbabwe。48

C. Gender and land reform in Zimbabwe

Gendered rural livelihoods and rural poverty in Zimbabwe affect, and are affected by, other dimensions of gender inequality in farm production. Foremost among these is access to the principal rural asset, land. The gendered nature of land access is, in turn, affected by the country’s agrarian structure, which has been significantly impacted by changes in the policy environment。At independence in 1980, Zimbabwe had a bimodal agrarian structure。Communal areas – land reserved for Africans under the discriminatory settler-colonial regime- constituted 42 per cent of land。The large-scale commercial farming sector, which was dominated by settler-colonialists, controlled 75 per cent of so-called ‘prime’ agricultural land。46 While land reform was on the agenda, during the 20 years following independence, efforts at reform fell short of actually redistributing land, in particular prime agricultural land, the vast bulk of which continued to be controlled by large-scale farming。Zvokuumba provides extensive sources to support his argument that land reform during this period marginalized gender equity concerns。47

In 2000, the Government introduced the Fast Track Land Reform Program (FTLRP), which allowed it to compulsorily acquire without compensation prime agricultural land for redistribution to farmers that were to be resettled。Thus began a change in policy emphasis to support small-scale farming。In 2005, the Constitution was amended to nationalize all farmland。Since the onset of the FTLRP, forms of land tenure include: (1) freehold ownership; (2) occupancy rights to land in communal areas; and (3) leases of land granted by the Government through redistribution and resettlement schemes。Freehold ownership is dominated by a small number of large-scale commercial farms, although some small-scale commercial farms exist, which are mostly a remnant of the pre-independence period。The property rights assigned to freehold ownership following the nationalization of land have been legally unclear。Communal areas are dominated

43 Available at www.researchgate.net/publication/340429304_Analysis_of_household_food_expenditure_patterns_A_case_of_Shamva_district_Zimbabwe (accessed 21 March 2022)
46 The information in this and the following paragraph comes from www.land-links.org/country-profiles/zimbabwe/summary (accessed 21 March 2022)
47 Page 54 in https://ujcontent.uj.ac.za/vital/access/services/Download/uj.journals@sorce/J_view_true (accessed 21 March 2022)
by small-scale family farms. Occupancy rights in communal areas have not been formalized, and ownership of such land is legally vested with the President. Resettlement land is classified as A1 or A2 land. Land classified as A1 is allocated in villages and in small, self-contained parcels up to 6 hectares. A1 land is allocated to small-scale farmers and is inheritable, but cannot be sold. Land classified as A2 is intended for medium- and larger-scale commercial farming. Leases are generally granted for periods of 99 years.

The FTLRP has led to a reconfiguration of the bimodal agrarian structure in Zimbabwe. Over 70 per cent of agricultural land is held by small-scale farmers in the communal areas, in A1 resettlement areas, and in peri-urban informal settlements. About 13 per cent of agricultural land is held by a range of middle-scale farmers, on A2 model commercial farms that hire labour. Only 11 per cent of land is held by large commercial farms and agroindustrial estates.48 If larger-scale farms are defined as large commercial farms and agroindustrial estates along with A2 farms, and if small-scale farms are defined as A1 farmers and farmers working in the communal areas, Zimbabwe continues to have a bimodal agrarian structure. However, differentiating larger-scale and small-scale farms is not simply about differences in the amount of land under cultivation, but also about their technical coefficients of production and their outputs. Small-scale farms use proportionately fewer purchased inputs, rely primarily but not exclusively on family labour, and consume a higher share and market a smaller share of their output than larger-scale farms. Indeed, small-scale farms purchase only 2.4 per cent of total intermediate inputs in the economy, which demonstrates their weak backward linkages to the rest of the economy, especially when compared to larger-scale farms.49 In terms of the comparative size of these two sub-sectors, however, the value-added of larger-scale farming accounts for 6.6 per cent of gross output, while the value-added of small-scale farming accounts for 81.9 per cent of gross output.50

There is a widespread perception that the FTLRP has been responsible for declines in agricultural production and agricultural productivity. However, field evidence belies this narrative. An astute observer of rural Zimbabwe who has led multi-site rural research teams in the country for more than two decades, suggests that: “it is the large numbers of land reform farmers, often farming on relatively small areas (around 5 hectares of arable) in the so-called A1 areas, who... are the major contributors to the harvest success (in 2020/2021). Twenty years on, they have settled into a rhythm of successful, small-scale production, with selective use of inputs but on areas significantly larger than their communal area counterparts.”51 In other words, the FTLRP has boosted agricultural productivity on small-scale farms and enhanced food security.

The Constitution of Zimbabwe provides a right to property for all citizens and prohibits discrimination on the basis of sex. However, it nonetheless effectively permits discrimination against women in the terms and conditions governing land access by deferring to customary law in matters related to adoption, marriage, divorce, and inheritance. Common law reflects this constitutional deference. As a result, from the limited research that is available, there would appear to be a significant gender bias in the access and control of land. Under the FTLRP, women could apply for land in resettlement areas, and indeed there is a 20 per cent quota for single women to be allocated A1 and A2 land.52 However, during the first five years of FTLRP, women’s land rights were peripheral to the land redistribution process,53 with only 18 per cent of A1 beneficiaries and only 12 per cent of A2 beneficiaries being women.54 Granted, the implementation of the FTLRP in the 2010s led to names of both spouses being included on leases.55 Nonetheless, the continued prevalence of customary practices means that many rural women may not know of their rights.

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50 It is not clear why this does not sum to 100: www.wider.unu.edu/sites/default/files/Publications/Working-paper/PDF/wp2018-159_o.pdf (accessed 21 March 2022).
52 The quota is the result of political advocacy and mobilization by Women and Land Zimbabwe over a number of years.
54 Table 1 in https://journals.sagepub.com/doi/10.1177/227796014530225 (accessed 21 March 2022).
under the FTLRP; that they tend to be discouraged from applying for land in their own name; and that quota requirements are not always enforced by government officials at the local level. As a result, the permits for land leases tend to be in the name of the male head of household and, in both the communal areas and in the resettlement areas, women access land only through their husbands, fathers or other male relatives.

Thus, while women are legally able to access and control land in Zimbabwe there appears to be a significant gender bias in land ownership. This is demonstrated to a degree in Table 1. While the data in Table 1 are from 2010, they remain useful in the absence of more recent data.

D. Gender and farm production

Beyond land, surprisingly little is known about gender and farm production processes, in part because “there has been no data on the gender dynamics in crops production”.58 It is known that female-headed households face different constraints from their male-headed counterparts. De jure female-headed households have similar asset bases to male-headed households except for livestock and equipment. De facto female-headed households have fewer productive assets than male-headed households.59 These differences would affect farm production processes and rural livelihoods. Little is also known about decision-making processes in farming households. One recent study of irrigated farms in Zimbabwe, which are quite atypical, found that women played a more important role than men in farm decision-making, but this was probably because men were absent from the farm.60

Rural livelihoods in Zimbabwe are mostly dependent on rain-fed crop production, livestock and fisheries. The country’s main farm products are maize, sorghum, millet, wheat, cassava, cotton, tobacco, coffee, sugarcane, peanuts and livestock. Production is sensitive to temperature and precipitation changes, and so is affected by the weather-related stresses and shocks that are driven by climate change. In addition, the availability of inputs such as improved seeds, fertilizers, chemicals, machinery and electricity has an impact on production, although, for many people, poverty limits their use. In this light, it comes as little surprise that, beyond land, the principal input into farm production on most small-scale farms is labour. While men and women both participate in most agricultural jobs, they undertake different tasks, as work is gender-segregated. Men dominate land preparation, ploughing and pest control, while women are primarily engaged in watering, planting, fertilizing, weeding, harvesting, and marketing.

At the same time, women’s crop and input choices

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are not necessarily the same as men’s. Women are responsible for ensuring the food security of the household, while men make decisions about the marketing and sales of cash crops. Women tend to be disadvantaged in terms of access to working capital, tools and equipment, infrastructure and financial institutions. A lack of adequate access to financial resources, on manageable terms and conditions, hampers women’s capacity to meet their subsistence production requirements. Lack of access to adequate finance is a consequence of a lack of collateral, a lack of education, and a lack of access to institutions, among other reasons. Moreover, due to their lower levels of education, women’s capacity to adopt improved labour-saving production practices and technologies is constrained even if they can afford them.

Men also dominate livestock ownership and production, which may contribute as much as 40 per cent of agricultural GDP, making decisions on livestock management, use and disposal. There is also a gender imbalance in the types of livestock: 45 per cent of men own cattle compared with 23 per cent of women, while 63 per cent of women own poultry compared with just 13 per cent of men. It would be useful to know whether, where women do have control of livestock, their herds are a similar size to those of men.

These differences suggest that there may be profound differences between women’s and men’s farming activities, in particular in terms of production objectives and processes. These differences would be key factors in determining women’s capacity to shift into more highly-capitalized and/or higher value-added activities, their vulnerability to changes in product and labour markets, and how women and their communities cope with climate change events.

E. Gender and climate change in rural Zimbabwe

Agriculture in Zimbabwe is particularly exposed to processes of climate change. The Intergovernmental Panel on Climate Change forecast in 2014 that crop yields of staples in southern Africa could decline by as much as 20 to 50 per cent because of climate change. This expectation is already being witnessed in Zimbabwe; between 2000 and 2015, maize production experienced increasingly volatile variability, while maize productivity declined in output per unit of land. Both changes correlated with droughts or with prolonged mid-season dry periods. Climate-induced reductions in agricultural productivity lead to a reduction in household incomes, a lack of food, and limit the ability to procure inputs for the next season. They also have a negative impact on holdings of livestock.

As a result of the gender-differentiated farm activities noted above, women and men have distinct engagements with the environment, natural resources and climate change. Moreover, it should not be assumed that women and men share the same knowledge and experience of the natural environment, resources and their management. Indeed, gender-differentiated farm activities would suggest that women and men have different experiences and knowledge of the natural environment. As a result, ongoing processes of climate change are likely to impact differently on men and women farmers, who may then adopt different coping, adaptation and mitigation strategies in response.

As a result of differences in the knowledge, ownership and control of resources, and in particular land, men are more likely than women to be able to adapt to risks emerging from climate variability, and its associated natural disasters. Thus, women’s limited time, their limited explicit and implicit rights as a result of institutional and social norms, and their limited access to resources can increase their vulnerability to climate change. If women manage more fragile lands, their plots are more likely to be affected by floods and the resulting soil degradation and erosion. At the same time, because of their lower incomes, they cannot afford the fertilizers that might partially compensate for soil degradation. Moreover, women

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may experience restricted access to the agricultural information needed to adapt to climate change because of their limited interaction with extension workers.66

In terms of coping, adaptation and mitigation strategies, these too can be gendered. Due to unequal bargaining power within households, men are more likely to influence the coping, adaptation and mitigation strategies adopted within male-headed farming households. Thus, as a result of frequent and prolonged dry periods arising from climate change, farms may increasingly move away from growing traditional cash crops, such as tobacco, and toward more reliable, drought-resistant, early maturing food crops that can be sold for cash, such as maize. However, this can contribute to food insecurity as the cash from crops grown for sale is passed from the hands of women to the hands of men, making it less likely that it will be used to purchase food.

In terms of livestock, as noted, women are more likely to control small livestock. If a climate-induced hazard occurs, and the household opts to undertake an asset-stripping strategy, it is small livestock that are usually sold first, as they are easy to sell. At the same time, as a consequence of climate change, men may have to go further away to look for pasture for their livestock, while women may have to walk longer distances for water and firewood, limiting their time for agricultural and food production.67

Indeed, it has been suggested that climate change in Zimbabwe can increase women’s unpaid care and domestic work burdens beyond that of collecting water and fetching firewood, because of the impact of climate change on intra-household morbidity, young people’s access to education, and intra-household food security.68

F. Gender and social norms

Gender roles in Zimbabwe are first defined within the family. Family systems are patriarchal: men have authority and women play a subordinate role, serving and working for their husbands, and bearing children. Families are often large, with children, grandparents and the children of relatives often co-residing. The legal age for marriage is 16 years for women and 18 years for men. However, early-marriage is common in the countryside, and the man’s family pay a bride price to secure a wife. Polygamy is widespread.

As has been demonstrated, men control the majority of the resources and services used in productive activities. In a ‘typical’ household, husbands commonly consult with wives in making decisions on the acquisition, use and benefits from resources and incomes. For example, a survey by Care suggested that more than 84 per cent of women make their own or joint-spousal decisions on health care, household purchases, and visits to family and relatives.69 However, women in polygamous marriages have less access to and control of resources and incomes, since these are shared across large families and multiple wives. Nonetheless, it is commonly the case that men have the final say when it comes to important decisions.

Clearly, women’s abilities to participate in the rural economy and in their communities, as well as to cope with, adapt to, and mitigate the impact of climate change, are often mediated by men, who play a key role in structuring rural women’s lives. It is, unfortunately, all too often the case that men’s role in structuring the lives of women is predicated on the use of force. Notwithstanding the Zimbabwe Government’s commitments under international and regional human rights instruments, 37.6 per cent of women in Zimbabwe can be expected to experience intimate partner violence during their life and 19.9 per cent have experienced it within the last 12 months.70 Zimbabwe has, at 32.4 per cent, a high incidence of child marriage,71 as a result of which there is a high rate of early pregnancy and a low rate of secondary school completion among women. Reproductive health services do not

71 Available at Ibid.
adequately target young women, and 54 per cent of adults and children living with HIV/AIDS are female. Finally, notwithstanding the presence of a legislated quota for women in the bicameral parliament, women’s representation in the Zimbabwe National Assembly stood at just 32 per cent following the 2018 elections. Cumulatively, women’s status is evidenced by the Gender Inequality Index of the United Nations Development Programme, in which ranked Zimbabwe 129 out of 162 countries in 2019.

G. Gender, the rural economy and economic growth

The gendered character of the Zimbabwean rural economy implies that rural gender relations might have important implications for economic growth and poverty reduction. However, it is hard to determine the scale of that importance. It is well established that agricultural productivity growth, defined as increases in value-added per worker, is a key precondition of agricultural growth, and hence poverty reduction. Social accounting matrices are used to determine the growth relationships between agriculture and its subsectors and the wider economy. A recent social accounting matrix produced for Zimbabwe in 2018, based on 2013 data, did not estimate sectoral growth multipliers. This means that the latest set of sectoral growth multipliers for Zimbabwe were published in the 1990s. These demonstrated that agricultural output growth had a strong causal impact on economic growth more generally: for every US$1 of growth in agricultural incomes, economic growth increased by an additional US$0.71. The multiplier effects of economic growth driven by increased incomes among small-scale farmers was even greater, standing at 2.23.78 If these dated estimates provide even a rudimentary guide to the relationship between agricultural growth and economic growth, it is very discouraging that the value-added per worker in agriculture has been declining, as this demonstrates that the sector is not becoming more productive.79

Moreover, if the rural economy of Zimbabwe has a gendered structure, the benefits of increasing agricultural productivity, agricultural growth and poverty reduction, when they occur, may not be equitably shared between women and men. Indeed, it should not be assumed that improvements in agricultural productivity are the same for women farmers and men farmers. It has already been suggested that the agricultural contributions of women commonly go unrecognized because of a failure to incorporate the extensive contribution of unpaid care and domestic work into an understanding of rural economic processes and dynamics. Since women and men across sub-Saharan Africa have different levels of access to land, water, improved seeds, fertilizers, pesticides, labour, credit, and other factors of production, it is not surprising that there are well established gender-based differences in agricultural productivity.80 At the same time, the impact of environmental degradation, natural resource depletion and climatic variation on farming in Zimbabwe should not be assumed to impact uniformly on the productivity of women and men farmers.

These issues have a very important implication: if the sources of agricultural productivity improvements are gender-differentiated, this will have a direct impact upon growth and poverty reduction. This means, in turn, that closing gender-based gaps in agricultural productivity between women and men farmers could result in increased growth and poverty reduction. If so, closing these gender gaps by addressing the interlinkages between agricultural productivity, gender and climate would be extremely important for policy and programming.

In this light, more knowledge about the factors driving any gender-based gaps in agricultural productivity could help drive the development of policies, programmes and projects that directly address those gaps. As such, they could contribute not only to enhancing women’s position within the

75 Available at www.ifad.org/pub/rd (accessed on 21 March 2022).
77 Figure 4.3 in http://ebrary.ifpri.org/utils/getfile/collection/prt%7B%7Dcore/id/1255667/filename/1255698.pdf (accessed 21 March 2022).
agricultural sector in particular and in society more generally, but also to improvements in agricultural productivity, economic growth, and poverty reduction. Moreover, addressing gender-based differences in agricultural productivity would be consistent with meeting Zimbabwe Government’s commitments to the SDGs, and its efforts to achieve Vision 2030.
4. MEASURING THE COST OF THE GENDER GAP IN AGRICULTURAL PRODUCTIVITY

This section presents estimates of the foregone income (total GDP and agricultural GDP) and poverty reduction potential that results from the gender gap in agricultural productivity in Zimbabwe. Box 3.1 outlines the methodology, which is presented in more detail in appendix A.

In order to make these estimates, we compute the unconditional and conditional values of the gender gap in agricultural productivity between women plot managers and men plot managers. In this report, agricultural productivity is defined as the value of output per hectare. The difference in this measure between women and men farm plot managers constitutes the unconditional gender gap, as described in Box 3.1. But this unconditional gender gap does not take into account the fact that, on average, women work on smaller plots than men. Generally, farmers are more productive on smaller plots; one reason postulated for this is that they are able to use physical and labour resources to cultivate their plots more intensely.81 Despite cultivating smaller plots relative to men, women are still less productive; this implies that the gender gap would be even larger if we take the smaller size of their plots into account. We do this by calculating the conditional gender gap, which is conditional on plot area and agroecological conditions. The unconditional gender gap is 18.6 per cent, and is statistically significant. The conditional gender gap is much less, at 5.3 per cent, and is not statistically significant. We therefore focus upon the unconditional gender gap.

Because two thirds of the Zimbabwe labour force is in the rural areas of the country, and because the epicentre of poverty in the country is in rural areas, increasing agricultural production and productivity can make an important contribution to reducing poverty. Moreover, improvements in the agricultural sector may have considerable spillover effects for other sectors of the economy. Therefore, the analysis presented here extends to outcomes related to poverty. We define poor people as those living on less than $1.90 purchasing power parity a day. Note that low agricultural productivity can also lead to more intense farming, resulting in overcultivation, soil erosion, and land degradation. These problems further undermine agricultural productivity and environmental sustainability, which can in turn be exacerbated by climate change processes.

We treat the plot of land as the unit of analysis, and identify the gender of the plot manager or decision maker.82 This identification was made possible by the data structure of the APM; see Box 3.2 for more detail. Using this gender-disaggregated, plot-level data allows us to capture differences in agricultural productivity even among women and men who belong to the same household but cultivate different plots. The main advantage of this level of analysis is that it explicitly measures the productivity of women farmers, who are frequently neglected in analytical work that considers the gender only of the household head.

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81 See, for example, Carletto, Gourlay, and Winters 2013 for robust evidence on this inverse relationship for several African countries.
82 Managers of land are not the same as owners, as wives can manage land that is formally jointly owned with their husbands.
The motivation for plot-level analysis rests on the assumption that women farmers face different (and possibly larger) set of constraints relative to men farmers, which may hinder them from accessing inputs and using output markets to a similar degree, or at the same prices, as men. If households were to act as a single unit that allocates resources to maximize overall welfare, these market imperfections might not matter as much. If, however, we consider a collective household model in which individual preferences matter, it becomes imperative to conduct analysis at the plot level, with the identification of the plot manager. The economic literature provides multiple examples suggesting that the collective household model may indeed be the more appropriate approximation of reality; these include evidence that the gender of the recipient of cash transfers has an impact on household-level outcomes.

To express the gender gap in monetary terms and to put these numbers into perspective relative to the GDP of Zimbabwe, this study makes an additional set of assumptions. One key assumption is the absence of general equilibrium effects. For example, in the calculations presented, the increased productivity of women farmers affects neither male farmers’ productivity nor agricultural prices. While there are good reasons to believe that general equilibrium effects such as these exist, the direction of these effects can be positive or negative. For instance, while standard economic theory would predict lower prices when an increased supply of agricultural produce meets unchanged demand in a closed economy, household nutrition may benefit from both the price and the income effect of increased agricultural productivity.

In Zimbabwe, the unconditional gender gap is estimated to be 18.6 per cent. The costs of this gap equate to:

- 7 per cent of current crop production
- $67 million of agricultural GDP
- $79 million of total GDP, including the multiplier effects of benefits to other sectors in the economy
- More than 704,000 people being lifted out of poverty

We do not provide similar estimates for the conditional gender gap because it is not statistically significant.

It is reasonable to conclude that closing the gender gap by increasing women plot manager’s productivity to the same level of men plot managers would increase total GDP by at least $79 million and lift more than 700,000 people a year out of poverty. While the overall figures might appear small compared to both the size of the Zimbabwean economy and the number of poor Zimbabweans, lifting 700,000 Zimbabweans out of poverty by increasing GDP by slightly more than 0.4 of one per cent through improving the productivity of women plot managers would seem to represent a sensible objective of Government policy.

83 Such as Duflo and Udry 2004.
84 Crop output accounts for 45 per cent of agricultural GDP in Zimbabwe.
85 The poverty-agricultural growth elasticity used is 1.78.
Box 4.1
Methodology: Measuring the economic costs of the gender gap in agricultural productivity

A. Traditionally, agricultural productivity is measured based on household-level analysis. In contrast, we look at the plot level and identify the plot manager, measuring the difference in productivity between plots cultivated by women and men. We convert the agricultural output produced by female and male farmers on their plots into monetary values by multiplying the output (in kilograms) obtained per unit of land with the median unit and crop-specific price in the respective enumeration area (or at a higher level of aggregation if needed). We then aggregate the total value of all crops per unit of land associated with each gender. The difference in this value between women's and men's plots constitutes the unconditional gender gap in agricultural productivity. This is the first step in estimating the national income that is foregone due to the gender-based agricultural productivity gap.

B. As a next step, we calculate the fraction of land cultivated by women and men. In the APM, the average amount of land managed by male plot managers is 1.81 hectares, while the average amount of land managed by female plot managers is 1.27 hectares. Women constitute 35.5 percent of all plot managers. Thus, women manage only a fraction of the land that men manage. Combining this fraction with the estimated gender gap in agricultural productivity, we compute the percentage difference between the value of output in two scenarios. In the first scenario, we assume that there is no difference between men's and women's agricultural output—that is, agricultural productivity of women's plots is equal to that in plots cultivated by men. In the second scenario, we use the actual productivity estimates obtained in the first step to calculate the value of output obtained from women's plots in the presence of the gender gap. The difference between the 'no gender gap' scenario and the 'gender gap' scenario gives the additional output value that could be achieved by closing the gender gap in productivity.

C. The final step includes computing the size of the gap relative to agricultural GDP. To do this, we first need to know what fraction of agricultural GDP comes from crop production. Second, we need to know what proportion of overall GDP is agricultural GDP. Because growth in the agricultural sector influences other sectors of the economy, the cost of the gender gap is likely higher than just the foregone agricultural GDP. To take this into account, we use an estimate of the contemporary multiplier between agricultural sector growth and the rest of the economy provided by an independent observer of the Zimbabwean economy who has produced such estimates since the 1990s.86

A more technical description of the methodology is given in appendix A.

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86 Davies, Kwaramba and van Seventer 2018.
### Box 4.2
Data used for costing the gender gap in agricultural productivity

For our analysis, we use data from the Zimbabwe National Statistical Agency. Specifically, the analysis presented here uses data from the PICES survey, which is conducted every five years, and from two rounds of the APM of the PICES conducted in 2017. These surveys are framed within the larger World Bank Living Standards Measurement Study: Integrated Surveys on Agriculture project. In this project, national statistical agencies develop closed-question, representative-sample surveys specifically focused on the agricultural sector. While not identical across countries, the surveys do generate comparable data. Thus, the data used in Ethiopia, Malawi, Tanzania, Uganda and Zimbabwe have a set of similar variables, are also linked to a larger household survey, and allow the construction of a similarly-structured data set.

PICES is nationally representative and, through the APM, links welfare, agriculture, and income. The data is disaggregated at the plot level and contains information on which household member makes agricultural decisions about each of the farm plots cultivated by the household. Plots can be managed by women only, by men only, or by women and men jointly. In this study, we consider the difference in crop output obtained between women-only managed plots and all other plots. This is because, while there is no one-to-one correspondence between plot management and household headship, it is expected that the household head is likely to have a disproportionate influence on plot-level decision-making on jointly managed plots, and in the vast majority of instances of joint plot management, the household head will be a man.

All other macrolevel statistics, such as agricultural GDP and national GDP, are obtained from the World Development Indicators, available online.

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In this section, we provide the results from decomposition analysis to identify which constraints to women’s agricultural productivity contribute most to the gender gap in agricultural productivity in Zimbabwe. This information can help Government in general, and the Ministry of Lands, Agriculture, Fisheries, Water and Rural Resettlement more specifically, to prioritize those policies that are likely to have the biggest impact on closing the gap in agricultural yields.

The decomposition analysis (see Box 5.1) extracts the importance of specific determinants of agricultural productivity in terms of potential gross gains to GDP.\(^8\) We study a broad set of potential determinants, including manager characteristics, household demographics, household wealth, plot characteristics, crop choice, farming techniques and technologies, labour inputs, and integration into markets. Policy implications are framed by these determinants, which are based on data available in the APMs of the PICES survey, as explained in Box 4.2.

Table 5.1 provides an overview of those determinants that stand out in terms of their potential impact on the gender gap. It is recognized that a number of these determinants are proximate causes that can be linked to ultimate causes of the gender gap, as explained in Box 4.2. A key challenge for future research is to understand how proximate causes reflect specific ultimate determinants. Note that the policy implications discussed in this section have not yet been rigorously and specifically evaluated.

### Table 5.1
Key drivers of the gender gap in agricultural productivity in Zimbabwe

<table>
<thead>
<tr>
<th>Determinant</th>
<th>Percentage of gap</th>
<th>US$, millions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lesser amounts of plots of land</td>
<td>62.3</td>
<td>49.1</td>
</tr>
<tr>
<td>Lower use of any fertilizers</td>
<td>25</td>
<td>19.7</td>
</tr>
<tr>
<td>Lower use of any pesticides and herbicides</td>
<td>22.4</td>
<td>17.7</td>
</tr>
<tr>
<td>Lower use of chemical fertilizers</td>
<td>19.7</td>
<td>15.5</td>
</tr>
<tr>
<td>Number of plots managed</td>
<td>14</td>
<td>11.1</td>
</tr>
<tr>
<td>Intercropping</td>
<td>10.7</td>
<td>8.5</td>
</tr>
<tr>
<td>Years of education</td>
<td>9.9</td>
<td>7.8</td>
</tr>
<tr>
<td>Ownership of animal-drawn implements</td>
<td>7.8</td>
<td>6.1</td>
</tr>
<tr>
<td>Sell more than half the household’s production</td>
<td>7.7</td>
<td>6.1</td>
</tr>
<tr>
<td>Exchange labour</td>
<td>6.8</td>
<td>5.3</td>
</tr>
</tbody>
</table>

Note: All results are statistically significant. GDP values are 2017 dollars. Percentages will not sum to 100 because a number of determinants are negative.
A. Levels of access to land and land fragmentation

A substantial part of the gender gap can be attributed to women’s lack of access to land and the fact that the land women do have access to tends to be more fragmented than land managed by men. These drivers of the gender gap are probably linked to several other factors, including the gender segregation of tasks, different crop choices, different use of plant protection technologies, women’s limited access to time-saving infrastructure, the expectation that women perform unpaid care and domestic work (which might result in a need for less land), and rural women’s limited voice and agency.

One key reason for women’s poor land access and higher levels of land fragmentation is that, notwithstanding commitments under the Fast Track Land Reform Programme, on farms jointly managed by husbands and wives, husbands tend to make decisions about plot operations. Rural social norms can then make it difficult for women to alter the distribution of land, even where a change would be beneficial to their husbands, in terms of higher levels of production. Indeed, it is quite possible that some widows became plot managers entirely because they acquired a head-of-household status. High rates of widowhood mean that women have fewer people in the household to draw on for the farm labour their plots need. Moreover, with a higher number of people over 65 and less than 10 years of age in these households, women must perform additional unpaid care and domestic work, reducing the amount of time available for working on their plots of land. Closing the gap in access to land for women plot managers would alone lead to gains of over 62 per cent in agricultural productivity in Zimbabwe, or just under $50 million in 2017 prices. Reducing land fragmentation on the plots that women manage would lead to gains of just over 14 per cent, or just over $11 million.

B. Women use less fertilizer, pesticides and herbicides, reinforcing their disadvantage

Female plot managers are more reliant on self-provided fertilizers (which are not chemical so are less damaging to soils than other types of fertilizer) to maintain levels of soil nutrients on their plots. However, they use less self-provided fertilizers than male plot managers, which means that female-managed farm plots are less productive than their male-managed counterparts. Notwithstanding the environmental benefits, more than 25 per cent of the gender gap between in farm crop productivity can be attributed to women’s lesser use of fertilizers. Closing this gap has the potential to raise GDP in Zimbabwe by almost $20 million. Indeed, this is probably a conservative estimate because of the environmental spillover effects derived from using non-chemical fertilizers to maintain soil nutrients.

At the same time, women farmers have less access than men to modern plant protection technologies that might improve their productivity in the short term. This inability to access modern technologies is driven by women’s lower levels of income and wealth, which constrain women’s ability to make purchases of modern plant protection technologies in cash. Admittedly, these technologies are only a short-term solution. Chemical pesticides, herbicides and fertilizers denude the soil of essential micronutrients, so can have significant negative environmental consequences. It is therefore important to evaluate their use and, in particular, the trade-offs between short-term gains and long-term consequences. Nonetheless, women’s lesser use of pesticides and herbicides is responsible for more than 22 per cent of the gender gap between women and men in farm crop productivity. Closing this gap has the potential to raise GDP in Zimbabwe by almost $18 million. More than 19 per cent of the gender gap between women and men in farm crop productivity can be attributed to women’s lesser use of chemical fertilizers. Closing this gap could raise GDP in Zimbabwe by more than $15 million. Again, these short-term benefits have to be considered alongside the long-term environmental consequences of the increased application of chemicals to soils.

C. Five policy implications

1 Designing policies that directly reduce inequality in access to land for women plot managers can take two avenues. One option is to strengthen the gender equality stipulations of the Fast Track Land Reform Programme, and use advocacy to ensure that such stipulations are enforced.
A second option is to tackle the constraints that limit women’s access to land within the household. This solution would require policies to reshape social norms around the management of plot operations, in particular through education and awareness campaigns that stress the benefits to husbands of the increased production and productivity that would be generated by increasing women’s management of plots of land. Finally, policies to reduce land fragmentation in general will bring specific benefits to women plot managers.

The most important policy implication arising from women’s disadvantages in accessing farm production technologies, is that women’s low levels of incomes and wealth preclude them from allocating discretionary income to the purchase of soil and plant protection technologies. This is also the case for the use of animal-drawn implements. At the same time, larger and more dependent households mean that discretionary spending per household member is lower for female plot managers than for male plot managers. This reduces the women’s capacity to use soil and plant protection technologies and animal-drawn implements.

In other words, women’s lower productivity is constrained by their lower use of environmentally beneficial and climate-responsive soil and plant protection technologies and animal-drawn implements because of their lower incomes. In this regard, an expansion of government-funded, cost-effective agricultural subsidies, transfers, and/or rural social protection measures, such as loans targeted at women plot managers, has the potential to offset gender-based differences in income and wealth and to create the preconditions needed to increase access to soil and plant protection technologies and animal-drawn implements. At the same time, effective utilization of soil and plant protection technologies requires field-based learning, which is discussed below.

Interestingly, the descriptive statistics derived from the analysis demonstrate that women plot managers rely on their own on-farm labour, the labour of other female members of the household, and receiving ‘exchange labour’ from women in their community, the latter being a significant cause of lesser agricultural productivity on women-managed plots. They receive less labour from men who are members of the household or from hired labour, which is predominantly made up of men. This may be because of social norms that make it difficult for women to hire men and mean that male members of the household are unwilling to work on plots of land managed by women. In any event, policies that use education to highlight the mutual benefits of enhancing cooperation between husbands and wives in the application of labour on the plots they respectively manage has the potential to increase agricultural productivity. So, too, do policies that more generally reduce the social stigma attached to men who work on plots managed by women.

Enhancing access to gender-responsive, climate-responsive and environmentally sustainable agricultural extension services for female and male plot managers is an important interlocking thread that together connects the policy implications derived from the analysis of the gender gap in agricultural productivity. Gender-responsive, climate-responsive, environmentally sustainable agricultural extension services are necessary to enhance the capacity of plot managers to not only adopt appropriate soil and plant protection technologies in the face of a changing climate, but also to manage any transfers or loans received for the adoption of appropriate soil and plant protection technologies. Agricultural extension workers can affect crop mix choices, which can have implications for environmental sustainability and climate responsiveness. Agricultural extension workers can also undertake efforts to shift social norms by demonstrating to husbands the economic benefits of greater land access for their wives, along with the benefits of co-operative labour arrangements between husbands and wives on the plots that they operate. Clearly, agricultural extension services must recognize and address the different and specific needs of male and female plot managers, not only in terms of farm production or social norms but also in relation to differential knowledge of local environmental conditions and the ability to manage, cope and adapt to climate change.

A key contributing factor to women’s lower productivity on their farm plots is the greater number of dependents that require their attention. The result is that women face more unpaid care and domestic work than do men. Policies...
to reduce the unpaid care and domestic work required in households with many dependents, through public infrastructure provision that saves labour in the household, particularly in the form of water and energy, will allow women to allocate more time to their plots and make up for some of the shortfall in labour requirements that they face. So too would policies that support the increased use of labour-saving technologies on plots managed by women, aided by the gender-responsive, climate-responsive, environmentally sustainable agricultural extension services just noted. Increasing women’s access to labour-saving technologies in this way would enhance the productivity of women’s plots of land.

As the technical analysis presented here can answer only some of the possible reasons for the gender gap in agricultural productivity in Zimbabwe (see Box 4.2), the results contained in the analysis need further investigation, in order to be substantiated.

**BOX 5.1**

**Quantifying the benefits from narrowing the gender gap in agricultural productivity by specific determinants**

Plots managed by women may be less productive than those managed by men due to observable factors, such as differences in experience and education, land access and quality, quantity and quality of agricultural inputs used, and the choice of crops grown. However, an agricultural productivity difference could persist even when women and men have similar observable characteristics and use the same quantity of inputs, as women may derive lower returns from using these inputs. The Oaxaca-Blinder decomposition approach\(^{89}\) pioneered by Evelyn Kitagawa (1955) has been widely used in other areas of economics literature, such as in studies analysing the wage gap between male and female workers.\(^{90}\) This method can be employed to determine how much of the gender gap in agricultural productivity arises from the different levels of agricultural inputs used and how much arises from the lower returns that women plot managers obtain from using these inputs. For more details on the Oaxaca-Blinder decomposition method, see Appendix B.

**Box 5.2**

**Statistical inference and policy implications**

The analysis contained in this report is based on data collected for the APM of PICES 2017. The APM offers a much-improved evidence base by which to substantiate policy implications, which in all economic policy analysis can only be based upon the statistical significance of the data analysis. However, as with any statistically-representative survey, the evidence in the APM is a function of the questions that are asked in the survey. If a question is not asked, it cannot be part of the data set, nor of the policy implications that can be statistically inferred from the data set. For example, the APM asks no direct questions about the impact of climate change on farm production. As a result, the APM cannot be used to substantiate policy implications for climate change. Of course, in the case of Zimbabwe, this does not mean that climate change is not important to policies around agricultural production and productivity. It simply means that evidence about the importance of climate change is not found within the relevant data set.

Moreover, it is important to distinguish between statistical significance and economic significance. The statistically significant finding that beer consumption rises when the weather is warmer is not economically significant. Therefore, while the statistical significance of the data analysis is the basis on which policy implications can be substantiated, the policy implications must also have economic plausibility to be meaningful. Together, these constitute important limits to the analysis contained within this report.

\(^{89}\) Blinder 1973; Oaxaca 1973

\(^{90}\) See, for example, World Bank 2011.
6. FINDING THE BIGGEST BANG FOR THE BUCK: COST-EFFECTIVE POLICY INTERVENTIONS

Now that we know the costs of the gender gap in agricultural productivity between female and male plot managers in Zimbabwe, as well as the factors that contribute the most to this gap, it is critical to identify the most cost-effective policies to address it. There may be many policy options available based upon a statistical analysis of the data, but these options may not be economically practical if their implementation is more costly than the value of the benefits that they are able to achieve. By identifying some of the policies that may have the highest benefit-to-cost ratio in terms of potential impact on GDP or potential impact on women’s economic empowerment, we hope to provide a useful starting point for further analysis that could offer practical guidance for policymakers who need to work out how to respond to the gender gap while making the best use of limited resources.

This report has highlighted that access to smaller plots of land that are more fragmented, lower usage of non-labour technological inputs, lesser use of men’s labour, crop choices and extent of market orientation, and girl’s education all contribute to the gender gap in agricultural productivity in Zimbabwe. It is important to stress the connections between the constraints facing women plot managers. For example, crop choice can be linked to the size of plot, with certain crops requiring larger and less fragmented plots. Similarly, the smaller size of plots managed by women results in a lack of access to subsidized inputs, which can also be linked to crop choice.

In the remainder of this section, we outline some plausible policy priorities that could address these constraints. These policy options are summarized in Table 6.1. The next step for policymakers in Zimbabwe is to engage with this cost-benefit analysis to identify where the benefit of closing the gender gap outweighs the cost of the respective policy option. Naturally, the relative cost-benefit ratio of various interventions should also be weighed against other factors, such as ease of implementation and the cultural and social context, both of which affect the plausibility of the policy priorities.
Table 6.1. Summary of potential policy options for addressing the gender gap in agricultural productivity in Zimbabwe

<table>
<thead>
<tr>
<th>Policy priority</th>
<th>Policy intervention</th>
<th>Potential GDP gain</th>
<th>Research priority</th>
</tr>
</thead>
</table>
| Access to land and its fragmentation | 1. Increase size of plots managed by women | • Advocate to enforce and increase women’s quotas during land redistribution exercises and the provision of 99-year leases  
• Advocate and influence change in policies and laws on land redistribution to ensure their gender-responsiveness  
• Tackling social norms through education, agricultural extension, and awareness-raising of the economic benefits of including women in plot and farm management | Very high | • Understand social norms that hinder women’s access land  
• Conduct a desk review of the policies and laws that govern land tenure and control to understand gender-based gaps in those policies and laws and their implementation |
| | 2. Reduce fragmentation of plots managed by women | Advocate and influence change in policies and laws addressing land fragmentation in a gender-responsive manner | Moderate | Conduct a gender-responsive and comparative desk analysis of the economic benefits of addressing land fragmentation |
| Access to farm production technologies | 3. Increase use of fertilizers on plots managed by women | • Training and support by gender-responsive climate-responsive environmentally sustainable agricultural extension workers | Moderate (if combined with 4: high, in the short term but negative in the long term) | • Understand women’s needs to access gender-responsive, climate-responsive, environmentally sustainable farm production technologies  
• Understand local needs for gender-responsive, climate-responsive, environmentally sustainable agricultural extension services |
| | 4. Increase use of pesticides and herbicides on plots managed by women | • Advocate for the Government to provide free or heavily subsidized inputs to women farmers  
• Support women’s access to loans for farming inputs provided through the social protection system | Moderate (if combined with 3: high, in the short term but negative in the long term) |  |
| | 5. Increase use of animal-drawn implements on plots managed by women | Encourage communal ownership by women through cooperatives and women’s self-help groups | Low (if combined with 3: high; if combined with 4: high, in the short term but negative in the long term) |  |
| Access to labour | 6. Increase use of men’s labour on plots managed by women | Encourage men through men’s engagement programmes and raise awareness through agricultural extension services workers | Moderate | Understand social norms that hinder women’s access to men’s labour and how such norms might be shifted |
| | 7. Reduce use of women’s exchange labour on plots managed by women | • Agricultural subsidies for women  
• Encourage women to use labour-saving technologies that replace manual labour | Low |  |
| | 8. Increase use of labour-saving technologies on the farm and in the home | • Increase access to agricultural subsidies  
• Provide agricultural cash vouchers  
• Awareness-raising on the use of, and benefits from, labour-saving technologies | Moderate | Understand women’s technological needs, preferences, and barriers to adoption |
| | 9. Increase girls’ years of education | Raise community awareness of the importance of education of girls | Low in the short term High in the long term | Understanding the context-specific barriers to access to education for girls |
A. Policy priorities

Table 6.1 demonstrates the range of policy interventions that can erode the gender gap in agricultural productivity and increase GDP. In most instance, these measures will also enhance women’s economic empowerment. In this context, women’s economic empowerment is defined as: increasing women’s ability to participate equally in existing markets; increasing their access to and control over productive resources; increasing their access to decent work; increasing their control over their own time, lives and bodies; and increasing their voice, agency and meaningful participation in economic decision-making at all levels from the household to international institutions. Many of the policy interventions identified in Table 6.1 directly contribute to these changes, while the remainder indirectly contribute.

Policy priority 1: Reduce the gender gap caused by smaller plots and fragmentation

A key finding of this report is that women operate smaller plots of land, and that their holdings are more likely to be fragmented. Together these issues significantly contribute to lower levels of agricultural productivity. This suggests that women have not benefited from the country’s Fast Track Land Reform Programme as much as men, even though the Programme’s guidelines stipulate specific quotas for improving women’s control of land. Smaller holdings of land also probably contribute to several other gender-based constraints on agricultural production. For example, because they cultivate smaller holdings of land and are responsible for
the production of food crops that meet household needs, women are less likely to cultivate cash crops that would generate an income. Moreover, because women cultivate smaller plots, they may be less motivated to make climate-responsive investments in the land they operate.

There is ample evidence that land fragmentation reduces farm productivity.\textsuperscript{91} There is also ample evidence that equalizing land access between women and men results in increased production and productivity.\textsuperscript{92} Moreover, improved land access for women farmers is consistent with existing Government policy. Therefore, reinforcing and strengthening policies that contribute to improving women’s land access needs to be prioritized in efforts to enhance farm production, increase economic growth, and cut poverty.

Policy priority 2: Increase women farmers’ access to and use of gender-responsive climate-responsive environmentally sustainable non-labour inputs in agricultural production

When it comes to policies designed to improve women’s adoption of non-labour inputs in agricultural production, more is known about what does not work than what does work. For example, it is known that providing free chemical fertilizers to women farmers does not necessarily increase farm profits. This is because chemical fertilizers usually require spending on complimentary inputs, which in turn require access to disposable cash that women may not have.\textsuperscript{93} Providing vouchers for chemical fertilizers can also result in low uptake by women, not only because of cash requirements for complementary inputs but also because of a lack of training in the use of such inputs.\textsuperscript{94} Finally, chemical fertilizer subsidies may not improve utilization rates by women if the inputs are not available when they are most needed.\textsuperscript{95}

At the same time, the environmental consequences of chemical non-labour agricultural inputs need to be very carefully considered when promoting their increased use. Many farmers, both women and men, have already had to adapt to the consequences of climate change in their farm production practices. Increasing the use of environmentally sustainable non-labour inputs can build on existing practices and enhance the climate-responsiveness of farm production practices. Here, dissemination of locally-adapted seeds, fertilizers and other soil and plant protection measures and farm practices, through the use of information and communication technologies and women’s self-help groups, can facilitate the adoption of gender-responsive, climate-responsive, environmentally sustainable non-labour inputs. Training programmes built around sustainable use of these inputs can be scheduled at a time that fits with women’s household and farm duties, in order to improve the uptake of available technologies. Locally-adapted experimentation with gender-responsive transfers and subsidies that are made available at an appropriate time in the farm production cycle can offset the negative experiences noted above.

Policy priority 3: Narrow the gender gap in agricultural productivity caused by a lack of access to labour

Little direct evidence exists of policies that directly help remove labour shortages that women may face. However, in many places in the region, prevalent social and cultural norms may prevent women from requesting assistance from their spouses or from hiring male waged labour, especially when specific on-farm tasks are socially-designated to be the domain of women. In these instances, awareness and sensitization campaigns should be reinforced by demonstrations of the economic benefits that accrue from more co-operative labour arrangements between husbands and wives.

At the same time, women’s labour productivity can be increased by enabling them to access labour-saving technologies for use on the farm or in the home. For example, in the home, ensuring women have access to electricity eliminates the need to spend time collecting firewood, while improving access to wells or standpipes reduces the amount of time spent fetching water. Both of these free up time to be spent managing farm plots. On the farm plot, price discounts for labour-saving machinery may free up time, although the effectiveness of such a programme would have to

\begin{itemize}
\item For India, see \url{www.sciencedirect.com/science/article/pii/S0264837712001470?casa_token=52BwgtrC3zIAAAAA:Qqn9WD4wGom4dfGMGwwjtovt40IBkYeJIczoswVZzYbnllAed7h4KG2nubbcBlkx-HflyvB3Cqiw} (accessed on 21 March 2022); for China, see \url{www.sciencedirect.com/science/article/abs/pii/S0164472519600073} (accessed on 21 March 2022). There are numerous case studies available for sub-Saharan Africa.
\item Beaman and others 2013.
\item Carter, Laajaj and Yang 2013.
\item Duflo, Kremer and Robinson 2009.
\end{itemize}
be very carefully piloted in order to ensure that the interventions bring about the intended benefits. Moreover, gender-responsive training programmes would have to be developed, in order to improve the uptake of such technologies.

**B. Beyond the results**

As noted in Box 4.2, technical analysis of the kind contained within this report can produce results that have statistical significance but which reflect the limitations of the Agricultural Productivity Module of PICES 2017. It is, therefore, necessary to go beyond the boundaries of the analysis when considering a range of possible policy options, because pre-existing policy arrangements, agroecological conditions and data limitations can all shape the final determinants of the gender gap that emerge from the data. Five particular sets of policy intervention seem important to consider in the context of rural Zimbabwe:

- Policy interventions that significantly expand publicly-financed gender-responsive irrigation, as this is the most important driver of increases in agricultural productivity more generally. This was not significant in the analysis, but that can be explained by the extremely low level of irrigation in the country.

- The introduction of gender-responsive technologies into farming should include not only the aforementioned access to improved seeds, environmentally sustainable fertilizers and other soil and plant protection measures but also small-scale appropriate environmentally-responsive mechanization, which was not relevant to the analysis because of a lack of data, which probably reflects the low level of mechanization in the country.

- The analysis suggested that increasing sales of output from plots managed by women could increase agricultural productivity, but that women’s capacity to do this is constrained by their responsibility for household food security. As implied in Table 6.1, one solution is the introduction of policies that facilitate diversification into higher-value crops that can be used both for household food security and to sell on markets when surpluses are generated. This issue was not part of the survey on which the analysis is based.

- The introduction of policies that take advantage of female-specific farm knowledge to foster innovations that enhance food crop productivity more generally. This issue was not covered by the survey on which the analysis is based.

- Policies to improve female access to education. This might appear tangential to agricultural productivity but it proved important in the analysis and its economic impact was probably underestimated because of non-quantified multiplier effects.

It is clear that, despite the diversity of analytical and evaluation work that has been carried out, much remains to be learned about which policies work. For example, information and communication-based nudges, in the form of cellular phone reminders, could be tried. Similarly, packaging fertilizer and other environmentally sustainable soil and plant protection measures in smaller quantities (to prevent spoilage and make it more convenient for female farmers to use on their smaller plots) could be piloted to see if such an intervention would improve uptake. Needless to say, these policies should be formulated and evaluated with careful consideration of the larger constraints within which women farmers operate, such as a lack of access to farm finance, mobility-related challenges that may prevent women’s ability to reach input dealers and output markets, women’s risk-taking abilities given their responsibility for food security, the lack of gender-responsive agricultural extension and training services, and the social norms that structure women’s lives in relation to other members of their household.
7. MOVING FORWARD

This report has highlighted the importance of fully including women in the agricultural development process. It is a move that is central to the Zimbabwe Government’s Vision 2030 policy. The report has focused upon establishing and quantifying the gender gap in agricultural productivity between female and male plot operators in Zimbabwe. This report has identified the monetary costs of the gender gap, as well as the factors that contribute the most to this gap. Yet the Government is aware that we know very little about what might work in narrowing the gender gap, and how much it would cost to do so in Zimbabwe.

The report has highlighted that the major contributors to the gender gap are women’s lack of access to land, fragmentation of land managed by women, and lack of access to soil and plant protection technologies as. Women’s crop choices are also a contributing factor. Women’s lower levels of education compared with men undoubtedly exacerbate this gap. It has also been suggested that the distribution of unpaid care and domestic work may contribute, as it reduces women’s time for work on their plots, but this suggestion is not based on the data. Clearly, climate change is an important contributing factor to gender gaps in agricultural productivity, but this, too, is not found in the available data. Finally, it has been noted that, in a number of areas, it is necessary to recognize how existing policy, agroecological conditions and data availability can shape the apparent determinants of the gender gap.

The next step for policymakers within Government, and particularly those in the Ministry of Lands, Agriculture, Fisheries, Water and Rural Resettlement, is to find cost-effective solutions through combining the implementation of innovative pilot interventions with careful evaluation. The basis on which these measures might be prioritized was noted in Table 6.1. The gender gap in agriculture operates within the broader context of the bigger gender gap in Zimbabwean society, so it is important that policymakers, donors, and development partners carefully consider their understanding of which problems women face, why particular policies might work, and what operational challenges they may face when trying to implement policies. Moreover, because the gender gap has a deeply cultural and societal basis, it is imperative that policymakers use a combination of economic and behavioural shifts to narrow the gender gap in agriculture.

While the overall figure for the cost of the gender gap and the poverty impact of its removal might appear small compared to both the size of the Zimbabwean economy and the number of poor Zimbabweans, there can be little doubt that lifting more than 700,000 Zimbabweans a year out of poverty by increasing GDP by less than one-half of one per cent would seem a sensible objective of Government policy. Therefore, closing the gender gap is likely to demonstrate a favourable cost-effectiveness that justifies the investment.

So, what would be some characteristics of good and cost-effective policies that would narrow the gender gap in agriculture?

A. Good policies work on improving choices

If the aim of development policy is to ensure that women become more productive and are lifted out of poverty, then policymakers should carefully consider whether women are operating out of choices that they want to make or constraints that they face. Since there can be a thin line between the two, agricultural gender policy should be conscious of how female farmers make their agricultural decisions, and how those decisions can differ from those made by male farmers. Various policy instruments affect women’s constraints and choices differently.
**B. Good policies are built on refined and redefined problems**

Investing in carefully diagnosing and refining the scope of problems can significantly reduce implementation costs and ensure that policies are cost-effective. Lessons can be learned from experiments and research in other development efforts. For example, lack of access to clean water was identified as one of the factors leading to a high number of cases of diarrhoea among children in rural Kenya. One intervention covered water springs at the source in order to avoid contamination. Yet the intervention only moderately helped improve the quality of water at home. Closer diagnosis revealed that the problem was, in fact, the contamination of the water at home. Similarly, West Africa has ample examples of interventions designed to improve women’s economic empowerment that, in fact, resulted in the increased authority of men within the household as a result of not correctly diagnosing the character of gender relations between women and men.

Similarly, it is quite possible that the gender gap in agricultural productivity is not caused by a lack of access to fertilizers and pesticides and herbicides *per se*, but to a lack of fertilizers, pesticides and herbicides marketed in small enough quantities that the price makes them affordable for women to use on their smaller plots. Carefully refining and redefining policy scope is critical to maximizing benefits from closing the gender gap.

**C. Good policies may have to shift cultural norms**

Government agencies, donors and development practitioners work within embedded social and cultural norms. Attacking the problem of the gender gap in agricultural productivity begins with shifting the mindset through which policy is framed and implemented. It requires making it acceptable for women to manage the same size plots as men, for husbands to assist wives in the cultivation of the latter’s plots, for women to cultivate crops they can sell, and for female plot managers to use a range of productive agricultural technologies. It means that men must come to realize that enhancing women’s plot productivity is better for them, as well as for their wives and children. Tools that may be particularly useful here are behavioural policy instruments such as identity cues and framing, microincentives, and reminders. Policymakers, donors, and international agencies must carefully, clearly and realistically assess the realities under which they frame agricultural policies.

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96 Ahuja, Kremer, and Zwane 2010.
8. APPENDIX

Appendix A: Methodology for quantifying the cost of the gender gap in agriculture

We estimate agricultural productivity in terms of gross value of output (in local currency) per unit of land (in hectares). We obtain the quantity produced of each crop on each plot and multiply total crop quantity by the median crop sale value per appropriate unit in the respective enumeration area. If village-level unit sale prices are not available for some crops, we use the prices for the next higher-level geographical area. Next, we add the values of output of all the crops grown on the plot and divide the aggregate value of output by the plot size, in order to obtain the gross value of output per hectare.97 The difference in the values of output per hectare obtained on male- and female-managed plots constitutes the unconditional gender gap in agricultural productivity.

Based on the identified gender gap in agricultural productivity and the estimate of the share of land under women’s control, we can monetize the gender gap in terms of potential gains in agricultural production and total economic output. To do this, the following formula to estimate the total quantity of output obtained by women and men at the national level is useful:

\[ Q = Y^*A \] (A.1)

Here \( Q \) is the total harvested output (in local currency units for the year of the survey), \( Y \) is the mean harvest value per hectare, and \( A \) is the total arable land.99 These figures can be obtained from the World Bank’s World Development Indicators.100 We express the mean harvest value per hectare on male plots (male productivity, \( Y_m \)) in terms of the mean harvest value per hectare on male-managed plots (male productivity, \( Y_m^* \)) using the estimate of the gender gap—say, an unconditional gap of 18.6 per cent in Zimbabwe—in the following manner:

\[ Y_f = 0.814 Y_m^* \] (A.2)

Total harvested value obtained from women’s and men’s cultivated land at the national level is expressed as follows:

\[ Q = Y^*PA + Y_m(1-P)A \] (A.3)

Here \( P \) represents the proportion of land controlled by female managers based on the fraction of plots controlled by women. This fraction is based on the average area of their plots relative to the average area of men’s plots. In Zimbabwe, for example, women’s plots are, on average, 0.54 hectares smaller than men’s plots, and thus the proportion of area under women’s control is far less than that of men. Substituting equation A.2 into equation A.3 gives the total harvested value, \( Q \), in the presence of the identified gender gap in agricultural productivity. We term this scenario the baseline. We can also obtain the potential harvest value, \( Q^* \), under the scenario of no gender gap in agricultural productivity, that is, when \( Y_f = Y_m^* \).

The additional output from closing the gender gap in agricultural productivity, as a proportion of the baseline harvest value, is expressed as follows.

\[ \Delta = \frac{Q^* - Q}{Q} \] (A.4)

In the case of Zimbabwe, closing the unconditional gender gap will lead to an increase of 7.1 per cent in the total crop harvest.

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97 Ideally, plot size data measured by global positioning system (GPS) should be utilized.
98 FAO 2011.
99 Arable land includes land under temporary crops (double-cropped areas are counted once), temporary meadows for mowing or pasture, land under market or kitchen gardens, and land temporarily fallow. For more information, see the World Development Indicators table notes (available at http://data.worldbank.org/Docs/WDI%20definitions.pdf). Since arable land includes plots that are temporarily fallow, it may be useful to adjust the estimate by obtaining an estimate of fallow land from the microlevel surveys and subtract that fraction from the total arable land to better estimate cultivated land. Often, farmers’ reports of fallowing are rather low.
To link the increase to agricultural GDP and total GDP, we need a few more pieces of information. First, we need to know what fraction of agricultural GDP comes from crop production. For example, in Zimbabwe, crop production forms 64 per cent of total agricultural GDP. This 7.1 per cent higher crop output translates to a 4.6 per cent higher agricultural GDP, which is roughly $67 million in 2017 prices.

Because of the many economy-wide spillover effects from the agricultural sector to the rest of the economy, we would expect total GDP to increase by more than the $67 million. We need an estimate of the multiplier between the agricultural sector and the rest of the economy. Here, we draw on estimates provided by a recognized expert in producing economy-wide models for Zimbabwe. He has calculated that the current multiplier for Zimbabwe is about 1.18, implying that each additional dollar generated in the agricultural sector leads to an additional $0.18 in benefits in the non-agricultural sector. Consequently, closing the agricultural gender productivity gap results in a total benefit of $79 million added to total GDP. Overall, total GDP will be higher by 0.41 per cent if the gender gap in agricultural productivity is closed.

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101 Agricultural GDP includes forestry, hunting, finishing, livestock, and crop production (again, see the World Development Indicators’ table notes available at http://data.un.org/Docs/WDI%20definitions.pdf).

102 Davies, Kwaramba and van Seventer 2018.
Appendix B: Methodology for costing the factors of production contributing to the gender gap in agricultural productivity

Plots managed by female farmers may be less productive due to observable factors including inequalities in manager attributes (such as experience and education), plot characteristics, agricultural technology and input use, and crop choice. A gender gap may persist even after accounting for these factors. For example, after controlling for manager characteristics, plot characteristics and size, input use, and geographical features, the gender gap in Zimbabwe decreases to 5.3 per cent and is no longer statistically significant at any level. The portion of the gap that cannot be explained by observable factors may be due to differences in the returns associated with using these factors of production on women’s plots as compared to men’s. To determine exactly how much of the gap is due to levels of inputs used and how much is because of the returns of those inputs, we employ an Oaxaca-Blinder-type decomposition, which was pioneered by Evelyn Kitagawa (1955). The central piece in the Oaxaca-Blinder decomposition approach is the following production function:

\[
\ln(Y_i) = C_0 + \alpha F_i + M_i Y + X_i \delta + \ln(l_i) \eta + \ln(L_i) \theta + \lambda + \epsilon_i
\]  

(B.1)

Here \(i\) denotes the plot planted by a member of household \(h\); \(Y\) is the value of agricultural output per unit of land (hectare); \(F\) equals 1 if the plot is managed by a woman, and 0 otherwise. \(M\) is a vector of explanatory variables pertaining to other characteristics of the plot manager; \(X\) is a set of plot-level characteristics including size and quality; \(L\) is a vector of plot-level controls for non-labour input use; \(l\) is a set of plot-level controls for labour inputs; \(C\) is a vector of indicator variables accounting for whether the primary crop cultivated on the plot is a cash crop; \(\epsilon\) is an error term. The term \(\lambda\) captures community and geographical characteristics.

The Oaxaca-Blinder decomposition attempts to explain how much of the mean outcome difference between two groups (female- and male-managed plots) is accounted for by group differences in the predictors. The aggregate decomposition follows from the linear model specified below:

\[
Y_i = X_i \beta + \epsilon_i, \quad E(\epsilon_i) = 0 \quad (B.2)
\]

where \(I \in \{f, m\}\) and stands for female-managed plots \((f)\) or male-managed plots \((m)\).

\[
Y_f = X_f \beta_f + \epsilon_f, \quad E(\epsilon_f) = 0 \quad (B.3)
\]

where \(E(\epsilon_f) = 0\).

Using algebraic manipulations, the expression in equation B.3 can be rewritten into one part of the differential due to differences in the levels of the predictors and one part due to differences in the coefficients associated with the predictors. The latter part is often referred to as the discrimination component, especially if it is linked to an immutable characteristic such as gender.

\[
R = E(Y_m) - E(Y_f) = E(X_m) \beta_m - E(X_f) \beta_f \quad (B.4)
\]

The expression in equation B.4 provides a twofold decomposition:

\[
R = Q + U \quad (B.5)
\]

where:

\[
Q = (E(X_m) - E(X_f)) \beta^* \\
U = (E(X_m)'(\beta_m - \beta^*) + E(X_f)'(\beta^* - \beta_f))
\]

This approach is the following production function:

103 The primary crop is identified by the respondent of the survey.

104 Under male-managed plots, we also included jointly managed plots.

105 Fortin, Lemieux and Firpo 2011.
is the residual or unexplained part that results from unequal returns to the predictors (structural effect).  

The non-discriminatory vector of coefficients $\beta^*$ can be estimated in a number of ways. Here $\beta^*$ is estimated from a pooled regression over all plots, with a dummy variable identifying group membership (plots managed by a woman versus plots managed by a man as suggested in.

The primary focus from the decomposition results is on the contribution of differences in the levels of factors of production to the gender gap. The main goal is to estimate how much additional output could be obtained from closing the gender gap in accessing the various factors of production that contribute most to the gender productivity gap. For example, if differences in fertilizer, pesticide and herbicide usage explain a significant fraction of the gender gap in agricultural productivity, then we discuss how much of the benefits associated with closing the gender gap could be achieved by closing the gender gap in access to fertilizer, pesticide and herbicide. While equitable access to production factors such as land and physical inputs may have benefits beyond increasing agricultural productivity, the approach taken here focuses only on the benefits obtained from improved agricultural productivity by equalizing access to these factors.

108 Ibid.
REFERENCES


UN WOMEN IS THE UN ORGANIZATION DEDICATED TO GENDER EQUALITY AND THE EMPOWERMENT OF WOMEN. A GLOBAL CHAMPION FOR WOMEN AND GIRLS, UN WOMEN WAS ESTABLISHED TO ACCELERATE PROGRESS ON MEETING THEIR NEEDS WORLDWIDE.

UN Women supports UN Member States as they set global standards for achieving gender equality, and works with governments and civil society to design laws, policies, programmes and services needed to ensure that the standards are effectively implemented and truly benefit women and girls worldwide. It works globally to make the vision of the Sustainable Development Goals a reality for women and girls and stands behind women’s equal participation in all aspects of life, focusing on four strategic priorities: Women lead, participate in and benefit equally from governance systems; Women have income security, decent work and economic autonomy; All women and girls live a life free from all forms of violence; Women and girls contribute to and have greater influence in building sustainable peace and resilience, and benefit equally from the prevention of natural disasters and conflicts and humanitarian action. UN Women also coordinates and promotes the UN system’s work in advancing gender equality.