ASSESSMENT OF SMALL-HOLDER AGRICULTURE'S CONTRIBUTION TO THE ECONOMY OF ZIMBABWE: A SOCIAL ACCOUNTING MATRIX MULTIPLIER ANALYSIS

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Abstract

The economy of Zimbabwe has been in shambles since 1991. Output has declined in most of the production sectors, leading to many job losses. Current debates on the problems facing the economy have focused on poor government's incentives and excessive interventions as major constraints of economic development. The government of Zimbabwe, on the other hand has emphasized an agriculturally led economic recovery programme. Specifically, the government has undertaken land reform and investment policies aimed at promoting small-holder agriculture in Zimbabwe. Is this a justifiable action taken by the government? The answer to this question necessitated the use of the 1991 micro SAM for Zimbabwe to empirically analyze the impact of small-holder agriculture on the economy of Zimbabwe. The goal of this paper is to quantify small-holder agriculture's true contribution to the economy in general and poverty reduction in particular. However, to make a more detailed analysis, the other sectors are also included in the analytical framework. The study uses the traditional impact analyses to measure the incidence of a sector specific policy on the economy. The results provide evidence that investment in small-holder agriculture should be seen as investment in the entire economy. The study clearly shows that small-holder agriculture promotes sustainable development and the inclusion of rural communities especially the poorest in economic activities.

1. INTRODUCTION

Zimbabwe faces the worst economic crisis of its history. Its economic performance, weak since 1997, has further deteriorated over the last three years. The real Gross Domestic Product (GDP) contracted by six percent in 2000 and eight percent in 2001 and was expected to further deteriorate in the

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succeeding years (Economic Commission for Africa (ECA), 2002). Output in the agricultural, mining and manufacturing sectors declined substantially in 2001, leading to company closures and job losses. At least 25,000 jobs were lost in the manufacturing sector in the first quarter of 2001 (ECA, 2002). This poor economic performance in recent times has raised serious questions about the viability of government policies. The government therefore developed a strategy in 2000 for reversing the economic decline, code named Millennium Economic Recovery Programme (MERP). This programme was aimed at stabilizing the economy, by speeding land resettlement and reducing duties on all agricultural imports. Thus, the Government of Zimbabwe has emphasized agricultural development as the engine of economic growth. It has embarked on a land reform and redistribution programs, aimed at significantly altering the current structure of the agricultural sector in favour of small-holder farmers (Sithole, 1996). However, current debates on the problems facing the agricultural sector and the economy as a whole have tended to focus on poor incentives and excessive government intervention as major constraints. This initiative taken by the government to foster economic growth, income equity in Zimbabwe, by stimulating growth in small-holder agricultural activities through land redistribution, increased government investment in these activities, raises concerns about; i) the contributions of the agriculture and non-agriculture sectors to the economy of Zimbabwe, ii) the justification of the government's policy of an agricultural led development strategy for Zimbabwe and its policy of land reforms. These concerns necessitated a quantitative investigation of the contribution of the agricultural and non-agricultural sectors to the economy of Zimbabwe.

Bautista *et al* (2002) carried out Computable General Equilibrium (CGE) analyses of the Zimbabwean economy, using the 1991 Social Accounting Matrix (SAM). However, CGE analyses, in addition to complicated theoretical assumptions, require experts to interpret the computed multipliers and the simulation results. Hence, a more simplified technique that is easily understood and interpreted is necessary to analyze the economic contributions of the various sectors to the economy of Zimbabwe. Therefore, this study uses the more simplified SAM (Social Accounting Matrix) and Input-Output multipliers to investigate the contributions of the agricultural and non-agricultural sectors to the economy of Zimbabwe. Specifically, the study is designed to:

i) Compute the SAM based and input-output multipliers;
ii) Compare the inter-sectoral linkages;
iii) Compare the impact of sector specific policy changes on the economy; and
iv) Analyze the contributions of the various sectors to the economy in general and household income generation in particular.

For the study, the 1991 updated SAM for Zimbabwe, developed by Thomas and Bautista (1999) was used. Using this data source, the input-output and SAM tables were extracted by redefining the endogenous and exogenous accounts. The input-output and SAM based multipliers were computed and policy related simulations carried out using the definitions for endogenous and exogenous sectors. The results were used to determine the impact of changes in the agricultural and non-agricultural sectors on the whole economy. However, in the computations, the following were assumed: i) that the government sector, investment and the rest of the world are exogenous sectors in the SAM multiplier computations, ii) linearity and absence of substitution effects in production and demand relationships and iii) that the model is demand driven. These assumptions are consistent with the usual input-output multiplier analysis, hence; allow the simulation of the impact of exogenous policies on the endogenous sectors.

2. THE STRUCTURE OF THE 1991 SOCIAL ACCOUNTING MATRIX AND THE ECONOMY OF ZIMBABWE

The SAM used for the purpose of this paper was extracted from the 1991 micro SAM developed by Thomas and Bautista, (1999). The 1991 micro SAM has 36 activities and 30 commodities accounts, which are classified into 27 production sectors (15 agriculture, forestry and fishery; mining, 6 manufacturing, electricity and water, and construction and 3 other services), 9 primary factors of production (4 labour, 3 capital and 2 land categories), an enterprise account, 5 household groups, the government sector, which consists of 4 accounts (government transfer payments, direct taxes, indirect taxes and import taxes), investment and savings and the rest of the world. For this study, the 88 accounts in the 1991 Micro SAM were aggregated to 25 accounts, consisting of 7 production/commodities sectors (2 agriculture, mining, manufacturing, construction, electricity and water and other services), 9 primary factors of production (four labour, three capital and two land categories), 7 institutions (enterprises, 5 household groups and government), investment and the rest of the world sectors.

As stated in the last paragraph, the micro SAM shows 15 agricultural commodities account and 24 activities accounts. The activities accounts reflect the dualistic nature of agricultural sector. These accounts were aggregated into two activities/commodities accounts (large scale and small-holder agriculture). The manufacturing sector consisted of 6 commodities and 6 activities accounts in the micro SAM (grain milling, other food processing, textiles, other light manufacturing, fertilizer and agro-chemicals and other manufacturing). These were aggregated to commodity/activity manufacturing. Similarly, the services

sector comprises trade and transport services, public and private services in the micro SAM. The mining, electricity and construction accounts were maintained

2.1 Agriculture sector

The agricultural sector plays an important role in the development of the Zimbabwean economy, through its impact on the overall economic growth, households' income generation and food security (Mlambo and Zitsanza, 2001). It provides income and employment for about 70 percent of the population, 60 percent of the raw materials required by the industrial sector and is the largest export earning sector, by contributing about 45 percent of total export in most years (Bautista *et al*, 2002). The sector accounts for 25 percent of the total workforce in formal employment while contributing an average of 17 percent of Gross Domestic Product (Tekere and Hurungo, 2003). The composition of the agricultural exports is highly diversified ranging from crops, cereals to horticultural and meat products. The major agricultural exports include tobacco, cotton, tea, coffee, beef, sugar, horticultural products and maize depending on the rainfall pattern. Tobacco is the single largest foreign currency earner, accounting for about 50 percent of total agricultural export earnings.

The Zimbabwean agricultural sector is dualistic, comprising large and small scale-farmers. Until recently, the large scale sector comprised about 4000 large scale farmers with sophisticated production systems and occupying 11 million hectares of land primarily located in the areas of high agricultural and economic potential (Tekere and Hurungo, 2003). The communal and small-holder farmers on the other hand occupy areas of lower natural potential in agriculture in terms of rainfall, soils and water for irrigation (Sithole, 1996). Generally, the communal farmers produce mainly for home consumption while the large-scale farmers produce for commercial purposes. As a result, while the main agricultural produce from the communal or small holder farmers include the staple maize, groundnuts, cotton, beans, vegetables, meat and milk, commercial farmers concentrate on cash crops such as tobacco, horticultural products particularly cut-flowers, coffee, maize, groundnuts, sorghum, sugar, soybeans, sunflower, cattle for slaughter, pigs, goats and sheep.

Based on the dualistic nature of agriculture in Zimbabwe and the 1991 micro SAM, the sector was divided into two sub-sectors; large scale and small-scale agriculture. The large-scale agriculture consists of crops, livestock and forestry activities and small-scale agriculture consists of the same activities, but carried out by small holders, mostly for home consumption. These production activities contributed immensely to export earnings in Zimbabwe. The sub-divisions in

the agricultural sector helped to identify the agricultural activities that contribute more to growth in income generation and economy-wide production.

2.2 Non-agriculture

The non-agriculture sectors of the SAM include mining, six manufacturing (grain milling, other food processing, textiles, other light manufacturing, fertilizers and other manufacturing), electricity and water and three services (trade and transport, public services and private services). The mining sector contributes only four percent to the gross output and five percent to the GDP. The manufacturing sector contributes 33 percent to gross output and 27 percent to the GDP, while electricity, construction and services contribute two percent, seven percent and 41 percent to the gross output and three percent, three percent and 47 percent respectively to the GDP (Based on 1991 micro SAM data).

2.3 Primary factors

The three primary factors identified are labour, capital and land. For further factor analyses, labour is sub-divided into large-scale unskilled labour, formal unskilled labour, informal small-holder unskilled labour, and skilled labour. The skilled labour includes both agricultural and non-agricultural skilled workers. Large-scale unskilled labour is predominantly made up of unskilled farm workers. Informal unskilled labourers are the small-holder farmers and the non-agriculture informal workers. The formal unskilled labourers are the unskilled workers who reside in urban areas.

Capital is sub-divided into large-scale farm capital, small-holder farm capital, and non-agriculture capital. Land is sub-divided into large-scale commercial land and small-holder land. The study assumes that land is extensively used for agricultural activities. Therefore all income accruing to land is termed agricultural income. The sub-divisions help to ascertain the proportion of payments from the production sectors to each of the factor inputs. This helps policy makers/advisers design policies that will stimulate higher economic growth and poverty reduction. Payments to factors of production go to households and institutions. For example payments to unskilled labour mostly go to poor rural households, while payments to capital go to enterprises owned by urban or rich households.

2.4 Institutions

Three institutions are identified; enterprises, households and government. By assumption, government expenditure is exogenously determined. This has some impact on the production and total impact multipliers.

There are five distinctive household groups; three rural and two urban. The three rural household groups are large-scale owners/managers, large-scale farm-workers and small-holders. These distinctions are made based on the social and economic characteristics of the two farming systems. The two urban households identified are urban high and low-income households. This urban household distinction reflects the differences in the sources and levels of income.

2.5 Rest of the world

This account identifies flows between the domestic and foreign sectors, of which the main components are imports and exports of commodities. It receives additional income and incurs additional expenses in the form of remittances and grants. It is the net balances that are reported in the SAM.

3. THEORETICAL FRAMEWORK AND MODELING PROCEDURE

Input-output and social accounting matrix models have been extensively used in the early literature to analyze growth linkages between various economic sectors, especially to investigate the role of agriculture and industry as engines of economic growth (Hassan and Olbrich, 1999; Bautista *et al*, 2002; Delgado, *et al*, 1998). The analysis of this type of interaction among sectors and institutions require economy-wide frameworks (Sadoulet and de Janvry, 1995). In this study, the Social Accounting Matrix (SAM) framework is used to analyze the 1991 SAM for Zimbabwe.

Following Hassan and Olbrich (1999), Hassan (1997), and Sadoulet and de Janvry, (1995), the basic materials balance equation could be specified as:

$$X^{l} = AX^{l} + D \qquad (1)$$

Where X^{l} is an nx1 column vector of total sectoral output, A is an n x n matrix of direct technical coefficients for the endogenous factors and D is an nx1 column vector of final demand. The dimension of the 'A' matrix coincides with the number of productive sectors. Solving for X^{l} from equation 1 leads to:

$$X^{l} = (I - A)^{-1} D \qquad (2)$$

Where 'I' is the identity matrix and $(I-A)^{-1}$ is the Leontief inverse. The input-output model is concerned with solving for the sectoral output levels (X) that satisfy final demand for those outputs (D) given the inter-industry structure of production (A). The model is used to determine the production plan that is

consistent with a desired final demand vector, given the inter-sectoral transactions matrix (A). The above equation can be used to derive various types of multipliers, the most common of which are the production and income multipliers. Equation 2 can be reduced to:

$$X^{l} = M^{l} D \quad where \quad M^{l} = (1 - A)^{-1} \tag{3}$$

Therefore, M^l is the input-output multiplier matrix, referred to in literature as the Leontief inverse. The vectors X^l and D represent sectoral output and final demand respectively. Equation 3 can be used to calculate the endogenous incomes associated with any changes of the total exogenous accounts, given the multiplier matrix. It can also be used to analyze the effects on output arising from exogenous shocks, such as changes in investment or government expenditure or the rest of the world, that change final demand. Each cell in the multiplier matrix M^l, interprets the total income change in the row account induced by an exogenous income injection in the column account. With the production sectors, the multipliers indicate how a unit increase in the sector's production stimulates economy-wide production impact.

Equation 3 can be extended to the SAM Multiplier matrix by the inclusion of the primary factors and the consumption accounts to the production sectors. The inclusion of these accounts aim at incorporating the feedback from rents to consumption to new production that originates from an exogenous inflow. Let A_m be the enlarged square matrix of direct propensities computed from the SAM and M^s the enlarged inverse (SAM multiplier) matrix. Hence M^s can be computed as:

$$X^{s} = M^{s} D, \quad where \quad M^{s} = (I - A_{m})^{-1} \tag{4}$$

Equation 4 solves for the equilibrium level of all endogenous accounts, which result from a shock or exogenous injections, given by changes in the elements of the exogenous accounts. The multiplier matrix M^s measures the direct and indirect impacts of the incorporated endogenous links and reduces to M^l when the dimension m of the A_m matrix corresponds to A (Boughanmi *et al*, 2002). The difference between M^s and M^l is due to the induced effect, which is taken into account by M^s, but not by M^l.

Economic multipliers estimate the economy-wide impact of changing one variable on related variables in a specified economy, such as a state or a province, suggesting a strict cause-effect relationship (Tanjuakio *et al*, 1996). In literature, four types of multipliers exist: i) the direct or production multiplier, which captures the immediate impact of the initial change in the output of the

industry being analysed; ii) The indirect/income multiplier, which captures the increased purchases of inputs required by industry to produce the change in the output; and iii) The induced multiplier, which measures changes in household spending, resulting from the changes in employment generated by the direct and indirect multipliers and iv) the total impact multiplier, an aggregate of the direct, indirect and induced effects.

4. PRESENTATION OF RESULTS

This section presents the computed results of the study. The section is divided into three parts. In the first part, the input-output and the SAM based multipliers are presented, while in part two, the contributions of the various sectors to household income generation and remuneration to the factors of productions are discussed, with special focus on the various categories of labour and capital. Finally, in part three, the simulation results of the inter-sectoral impact of exogenous changes on the economy and households' income generation are presented. The input-output, SAM production based and total impact multipliers are all based on the same 1991 SAM for Zimbabwe. The input-output table used to compute the input-output multipliers was extracted from the 1991 SAM. To extend the input-output multipliers to the SAM total impact multipliers, the endogenous sectors were expanded to include the primary factors of production, firms and the different household categories. The government sector and the rest of the world were assumed to be exogenous. The SAM production multiplier is a subset of the SAM total impact multipliers.

4.1 The multipliers

Following the steps described in the theoretical framework, the input-output, SAM based production and total impact multipliers are computed. The results are presented in Table 1.

The input-output multipliers are presented in column 2 of Table1. This set of multipliers is extracted from the input-output multiplier table in Table A2 in the appendix. These multipliers indicate the impact of a unit increase in the output of the target production sector on the other production sectors. They reflect the inter-sectoral linkages among the production sectors. A multiplier of 3.316 for the large-scale agriculture sector indicates that for every Z$1.00 increase in output in the sector, there is Z$2.316 increase in output of other production sectors. Using this indicator to assess sectoral impacts, the construction sector, with a multiplier of 4.107, has the highest impact on the

production sectors. This is followed by the large-scale agriculture, services, mining, manufacturing, electricity and small-scale agriculture respectively.

Column 3 presents the SAM based production multipliers. These multipliers show that the large scale agriculture sector, with a multiplier of 6.868 has the highest production impact, followed by construction sector (6.714), services sector (6.454), electricity (5.967), mining ((5.866), small scale agriculture ((5.810) and manufacturing (4.994). Generally, the coefficients of the SAM production multipliers are larger than input-output production multipliers.

Table 1: The production and total impact multipliers

	I-O multipliers *(2)*	*SAM production multipliers* *(3)*	*SAM total impact multipliers* *(4)*
1Production Sectors			
11 Large Scale Agric	3.316	6.868	10.508
12 Small Scale Agric	1.876	5.810	09.729
13 Mining	3.131	5.866	09.177
14 Manufacturing	2.906	4.994	07.403
15 Electricity	2.855	5.967	09.761
16 Construction	4.107	6.714	09.641
17 Services	3.307	6.454	09.987
2 Primary Factors			
21 Labour	-	-	
211 LSU workers	-	-	10.558
212 Formal U Workers	-	-	09.507
213 Informal SHU Workers	-	-	09.835
214 Skilled Workers	-	-	08.098
22 Capital	-	-	
221 Large Scale Capital	-	-	08.549
222 Small-holder capital	-	-	10.525
223 Other Capital	-	-	07.476
23 Land	-	-	
231 LS Land	-	-	08.549
232 SH Land	-	-	10.525
3 Institutions			
31 Firms		-	06.452
32 Households	-	-	
321 LS Owner/Manager H/Holds	-	-	07.549
322 LS Farm-worker H/holds	-	-	09.558
323 SH Households	-	-	09.525
324 Urban High Income Households	-	-	07.078
325 Urban Low Income Households	-	-	08.507

Source: Extracted from the SAM multiplier matrix in Table A1 and the input-output multiplier matrix in Table A2.

A third category of multipliers computed is the SAM total impact multipliers. Using this set of multipliers to analyze the production sectors, they indicate that the large-scale agriculture sector, with a multiplier of 10.508, again has the highest impact on the economy. This is followed by the services sector, electricity, small-scale agriculture, construction, mining and manufacturing respectively. The total impact multipliers are the highest of the three, because they capture both the production and consumption linkages generated through value added (remuneration to primary factors of production) and households' income generation. This explains why the construction sector, which has a higher production impact, falls among the least total impact sectors. While construction's contribution to inter-sectoral production is very significant, the sector does little to promote household income generation and primary factor remuneration. On the other hand, while small scale agriculture's, contribution to the production sectors is small, most of the exogenous income injection in this sector goes to households. This specific impact of the production sectors on households' income generation and primary factor remuneration is given more attention in the next section.

In the multiplier matrix presented in Table A1 in the appendix, each element a_{ij} indicates the direct and indirect effects on the row- account of an exogenous unit change in the column account. For example, a_{27} which corresponds to 0.131 indicates that for every Z$1.00 income generated in the small-holder agriculture sector, Z$0.131 will be generated in the services sector.

4.2 Remuneration to the primary factors of production

The primary factors of production are labour, capital and land. For the purpose of detailed analyses, the labour factor was sub-divided into large-scale unskilled, formal unskilled, informal small-holder unskilled and skilled labour. Capital has three categories; large-scale, small-scale, and other capital and land is sub-divided into large scale and small-holder land. Table 2, which is extracted from Table A1 in the appendix, presents the contributions made by the different production sectors to factor remuneration.

Each factor category has a sub total and the total contribution to all the primary factors is presented in the last row of Table 2. The fifth row presents the sub total for the different labour categories. This row shows that small-holder agriculture, with a multiplier of 1.117 has the highest impact on labour remuneration. The figure indicates that for every Z$1.00 generated in small-holder agriculture, about Z$1.12 is paid out to labourers. This is followed by the services sector, large-scale agriculture, construction, electricity and water mining and manufacturing respectively. However, looking at specific labour

categories, small-holder agriculture's influence is more on informal small-holder unskilled workers than the other labour categories.

Table 2: Sectoral contribution to primary factor remuneration

	LS Agric	SH Agric	Mining	Manu-facturing	Electricity & Water	Construction	Services
LSU Workers	0.017	0.004	0.002	0.003	0.002	0.003	0.003
Formal U Workers	0.033	0.029	0.041	0.028	0.050	0.045	0.048
Inf SHU Workers	0.146	0.700	0.067	0.075	0.059	0.091	0.128
Skilled Workers	0.516	0.384	0.464	0.355	0.532	0.524	0.634
Sub total	**0.712**	**1.117**	**0.573**	**0.461**	**0.644**	**0.663**	**0.812**
LS Capital	0.300	0.077	0.040	0.054	0.038	0.045	0.046
SH Capital	0.030	0.243	0.006	0.007	0.006	0.007	0.008
Other Capital	0.485	0.459	0.745	0.483	0.873	0.531	0.643
Sub total	**0.812**	**0.779**	**0.791**	**0.543**	**0.916**	**0.585**	**0.698**
LS Land	0.079	0.020	0.011	0.014	0.010	0.013	0.012
SH Land	0.016	0.128	0.003	0.004	0.003	0.004	0.004
Sub total	**0.095**	**0.148**	**0.014**	**0.018**	**0.013**	**0.016**	**0.017**
All factors total	**1.619**	**2.045**	**1.378**	**1.023**	**1.573**	**1.264**	**1.527**

Source: Extracted from the multiplier matrix in Table A1.

Next is capital remuneration. Row nine presents the sub totals for capital remuneration. The multipliers indicate that the electricity and water sector has the highest impact on payments to capital. In order of magnitude of impact, electricity is followed by large-scale agriculture, mining, small-holder agriculture, services, construction and manufacturing. However, small-holder agriculture has a higher impact on remuneration to small-holder capital than the other sectors. Between small-holder and large-scale agriculture, the implication is that while large-scale agriculture is capital intensive, small-holder agriculture is labour intensive. This is reflected in the payment to these primary inputs.

Row twelve presents the sub totals for sectoral impacts on remuneration to land. Since land is predominantly used in agriculture, the multipliers indicate that small-holder agriculture has the highest impact, followed by large-scale agriculture. Overall, small-holder agriculture, with a multiplier of 2.045, has the highest impact on factor remuneration. This is followed by large-scale agriculture, electricity, services, mining, construction and manufacturing respectively.

4.3 Households' income generation

For the purpose of critical analysis, the household sector has been disaggregated to five sub-sectors based on the factors discussed in section 2. The analysis is also based on the computed multipliers in Table A1 in the appendix.

Table 3: Households' income generation

	LS Agric	SH Agric	Mining	Manu-facturing	Electricity & Water	Construction	Services
LS Owner/Manager	0.64	0.339	0.430	0.318	0.491	0.346	0.405
LS Farm-workers	0.02	0.004	0.002	0.003	0.002	0.003	0.003
SH Households	0.11	0.635	0.041	0.044	0.039	0.052	0.069
Urban High Income	0.61	0.477	0.628	0.457	0.726	0.624	0.756
Urban Low Income	0.137	0.509	0.094	0.085	0.101	0.113	0.142
Total household impact	**1.506**	**1.964**	**1.196**	**0.906**	**1.359**	**1.138**	**1.374**

Source: Extracted from the multiplier matrix in Table A1 in the appendix.

Table 3 provides details of sectoral contribution to households' income generation. As in primary factor remuneration, the small-holder agriculture sector has the highest impact on households' income generation than the other sectors. A total household impact multiplier of 1.964 shows that for every Z$1.00 generated in the small-holder agriculture sector, Z$1.964 is generated in the household sector. This is followed by large-scale agriculture, services, electricity and water, mining, construction and manufacturing. In terms of specific household categories, small-holder agriculture contributes more to small-holder households' income than the other categories. On the other hand, large-scale agriculture contributes to households that are large-scale owners/managers and high urban income earners than small-holder agriculture. However, urban high-income households get more payment from services, electricity, mining and construction than from large scale and small-holder agriculture. Urban low-income households get more income from small-holder agriculture than from the other production sectors. Further illustration to this is clearly provided by the results of policy simulation, which is discussed in the next sub-section.

4.4 Policy simulation

The SAM multipliers are used to generate simulations that provide criteria for identifying key sectors of the economy. They identify not only those sectors that have greater production linkages, but also those that generate more value

added and have significant effects on the distribution of income between rural and urban households.

Table 4: The results of policy simulations

	LS Agric	SH Agric	Mining	Manu-facturing	Electricity & Water	Construction	Services	Combined
LS Agric	159.10	30.30	21.24	28.57	20.21	25.03	24.38	44.12
SH Agric	74.21	120.54	10.78	14.13	10.26	12.83	13.07	36.54
Mining	10.67	10.65	199.70	13.51	16.83	27.84	10.99	41.46
Manufacturing	211.25	214.81	183.84	292.91	162.71	231.96	197.47	213.56
Electricity	12.64	12.59	13.76	7.82	252.14	10.27	10.72	45.71
Construction	2.82	2.51	2.07	2.03	1.77	209.26	4.78	32.18
Services	216.12	189.61	155.17	140.46	132.73	154.26	383.96	196.04
Sub-total	**686.79**	**581.03**	**586.57**	**499.43**	**596.66**	**671.45**	**645.37**	**609.61**
LSU Workers	1.63	1.81	0.23	0.30	0.22	0.27	0.27	0.68
Formal U Workers	3.25	3.00	4.06	2.82	5.05	4.50	4.81	3.93
Inf. SHU Workers	17.62	23.82	6.68	7.68	5.91	9.08	12.50	11.90
Skilled Workers	50.78	50.70	46.39	35.47	53.21	52.38	63.45	50.34
LS Capital	28.07	33.14	3.98	5.25	3.78	4.72	4.74	11.95
SH Capital	4.13	6.72	0.60	0.79	0.57	0.71	0.73	2.04
Other Capital	48.50	46.08	74.54	48.27	87.27	53.12	64.35	60.31
LS Land	7.43	9.50	1.06	1.39	1.01	1.26	1.27	3.27
SH Land	2.18	3.53	0.32	0.41	0.30	0.38	0.38	1.07
Sub-total	**163.59**	**178.30**	**137.84**	**102.39**	**157.32**	**126.41**	**152.50**	**145.48**
Firms	47.94	45.54	73.67	47.71	86.26	52.50	63.59	59.60
Sub-total	**47.94**	**45.54**	**73.67**	**47.71**	**86.26**	**52.50**	**63.59**	**59.60**
LS Owner/Manager	61.87	67.90	42.85	31.65	49.09	34.59	40.68	46.96
LS Farm-workers	1.63	1.81	0.23	0.30	0.22	0.27	0.27	0.68
SH Households	13.46	19.66	4.12	4.56	3.94	5.20	6.59	8.22
Urban High Income	59.72	58.99	62.83	45.66	72.56	62.45	75.65	62.55
Urban Low Income	15.76	19.69	9.45	8.59	10.07	11.28	14.04	12.70
Sub-total	**152.44**	**168.04**	**119.59**	**90.76**	**135.88**	**113.78**	**137.23**	**131.10**
Total	**1050.75**	**972.91**	**917.68**	**740.30**	**976.11**	**964.14**	**998.69**	**945.80**

Source: Generated from policy simulation.

Since independence, the government of Zimbabwe had focused on equity through income and land redistribution from high-income households/large scale commercial farmers to low-income households/small-holder farmers. Obviously, the income and equity effects of macroeconomic policy reforms need to be evaluated at the household level. Zimbabwe has used three major types of macro-policy; trade and exchange rate policy, public expenditure and

taxation. The total rural income and its distribution among the various household classes are expressed as a function of physical infrastructure and human resources, which in turn are critically influenced by the size and pattern of public expenditure.

The study assumed an increase in government's public expenditure of Z$100 million and simulated the impact of this expenditure on each of the production sectors. The policy simulation investigates the impact of Z$100million increase in government investment on production, factors remuneration and household income generation. The results are presented in Table 4.

Each column in Table 4 represents the impact of a Z$100 million increase in investment in that sector on the rest of the economy. For example, Z$100 million increase in government's investment in the large-scale agriculture sector generates about Z$1051million in the economy. Of this figure, about Z$687 million goes to the production of goods and services, Z$164 million to primary factor remuneration, Z$48 million to firms and Z$152 to households.

However, following the policy of reducing income inequity and rural poverty, there is the need to further evaluate these simulations by examining sectoral impacts on factor remuneration and household income generation. Examination of the sectoral impacts on factor remuneration and household income generation shows that the small-holder agriculture sector generates more income for households than the other sectors, though its overall impact is lower than that of large-scale agriculture, services and electricity and water. Specifically, for every Z$1.00 invested in small-holder agriculture, the sector generates Z$1.68 for households. It also provides the highest income for small-holder households than the other sectors. For the Z$100 million increase in investment in this sector, the simulation result shows that it generates Z$168 million for households, of which Z$89 million goes to rural households.

The small-holder agriculture sector still remains the highest contributor to factor remuneration. It is the highest contributor to large-scale unskilled workers, informal small-holder unskilled workers and formal unskilled workers. Most of these labour categories live in rural areas as explained earlier. It is also the highest contributor of rent to both land and capital categories. In order of magnitude, this sector is followed by large-scale agriculture, electricity and water, services, mining, construction and manufacturing respectively.

5. CONCLUSIONS

The study demonstrated clearly the impact of the production sectors on the economy of Zimbabwe, using the 1991 micro social accounting matrix for

Zimbabwe. When analyzing the true contribution of each of the sectors to the economy, the analytical framework of the SAM multipliers made it possible to factor in consideration of factor remuneration and income generation, since it gives decision makers indicators of the effects on labour, capital, land and household income. This information is necessary in planning development strategies, because it helps policy makers to identify sectors that not only have a significant multiplier effect on production, but also important effects on the distribution of income and value added generated.

The analysis of the 1991 micro SAM for Zimbabwe shows that the agriculture sector in general has a profound impact on the economy. The large-scale agriculture sector, among the other sectors has the highest multiplier, indicating that its overall impact on the economy is the highest. However, the small-holder agriculture sector, though its overall impact on the economy is not as much as large-scale agriculture, services and electricity and water, has the most significant impact on value added and households' income generation. This clearly indicates the importance of small-holder agriculture in rural poverty alleviation and income redistribution for sustainable development of Zimbabwe. However, the other sectors are also important in terms of production expansion and overall impact on the economy.

The results of the study have policy implications for improved decisions regarding investment policies for agriculture, so that they contribute more effectively to development and poverty reduction in Zimbabwe. The results show that while investment in small-holder agriculture promotes income generation for poverty reduction generally, doing it at the detriment of large-scale agriculture will have devastating effects. Therefore, a combination of policies that promotes small-holder agriculture and at the same time maintain the levels of operation of the other sectors will be more appropriate in the development strategies of Zimbabwe. Policies that are aimed at poverty reduction and income equity should target small-holder agriculture, while those aimed at sustainable growth in output should target large-scale agriculture.

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Appendix A

Table A1: The SAM multipliers

	LS Agric	SH Agric	Mining	Manu-facturing	Electricity & Water	Construction	Services
LS Agric	1.591	0.303	0.212	0.286	0.202	0.250	0.244
SH Agric	0.742	1.205	0.108	0.141	0.103	0.128	0.131
Mining	0.107	0.107	1.997	0.135	0.168	0.278	0.110
Manufacturing	2.112	2.148	1.838	2.929	1.627	2.320	1.975
Electricity	0.126	0.126	0.138	0.078	2.521	0.103	0.107
Construction	0.028	0.025	0.021	0.020	0.018	2.093	0.048
Services	2.161	1.896	1.552	1.405	1.327	1.543	3.840
LSU Workers	0.017	0.004	0.002	0.003	0.002	0.003	0.003
Formal U Workers	0.033	0.029	0.041	0.028	0.050	0.045	0.048
Informal SHU Workers	0.146	0.700	0.067	0.075	0.059	0.091	0.128
Skilled Workers	0.516	0.384	0.464	0.355	0.532	0.524	0.634
LS Capital	0.300	0.077	0.040	0.054	0.038	0.045	0.046
SH Capital	0.030	0.243	0.006	0.007	0.006	0.007	0.008
Other Capital	0.485	0.459	0.745	0.483	0.873	0.531	0.643
LS Land	0.079	0.020	0.011	0.014	0.010	0.013	0.012
SH Land	0.016	0.128	0.003	0.004	0.003	0.004	0.004
Firms	0.479	0.455	0.737	0.477	0.863	0.525	0.636
LS Owner/Manager	0.619	0.679	0.430	0.316	0.491	0.346	0.407
LS Farm-workers	0.016	0.018	0.002	0.003	0.002	0.003	0.003
SH Households	0.135	0.197	0.041	0.046	0.039	0.052	0.066
Urban High Income	0.597	0.590	0.628	0.457	0.726	0.624	0.757
Urban Low Income	0.158	0.197	0.095	0.086	0.101	0.113	0.140
SAM production multiplier	**6.868**	**5.810**	**5.866**	**4.994**	**5.967**	**6.714**	**6.454**
Total SAM impact multiplier	**10.508**	**9.729**	**9.177**	**7.403**	**9.761**	**9.641**	**9.987**

Table A1 cont. The SAM Multipliers

	LSU Workers	FU Workers	ISHU Workers	Skilled Workers	LS Capital	SH Capital	Other Capital	LS Land	SH Land
LS Agric	0.731	0.473	0.445	0.222	0.272	0.386	0.190	0.272	0.386
SH Agric	0.347	0.255	0.361	0.114	0.135	0.583	0.095	0.135	0.583
Mining	0.121	0.110	0.111	0.095	0.099	0.112	0.072	0.099	0.112
Manufacturing	2.504	2.241	2.257	1.903	2.011	2.291	1.465	2.011	2.291
Electricity	0.116	0.149	0.138	0.140	0.100	0.114	0.087	0.100	0.114
Construction	0.025	0.022	0.023	0.021	0.023	0.025	0.016	0.023	0.025
Services	1.826	1.658	1.736	1.535	1.696	1.898	1.212	1.696	1.898
LSU Workers	1.008	0.005	0.007	0.002	0.003	0.010	0.002	0.003	0.010
Formal U Workers	0.031	1.028	0.029	0.025	0.027	0.031	0.020	0.027	0.031
Inf SHU Workers	0.113	0.094	1.111	0.068	0.075	0.148	0.054	0.075	0.148
Skilled Workers	0.424	0.378	0.400	1.326	0.351	0.445	0.254	0.351	0.445
LS Capital	0.130	0.092	0.119	0.042	1.050	0.173	0.035	0.050	0.173
SH Capital	0.019	0.014	0.020	0.006	0.008	1.033	0.005	0.008	0.033
Other Capital	0.490	0.451	0.458	0.399	0.419	0.474	1.306	0.419	0.474
LS Land	0.035	0.025	0.032	0.011	0.013	0.049	0.009	1.013	0.049
SH Land	0.010	0.007	0.011	0.003	0.004	0.017	0.003	0.004	1.017
Firms	0.484	0.445	0.453	0.395	0.414	0.468	1.291	0.414	0.468
LS Owner/Manager	0.424	0.354	0.393	0.345	1.284	0.476	0.663	1.284	0.476
L.S Farm-workers	1.008	0.005	0.007	0.002	0.003	0.010	0.002	0.003	0.010
SH Households	0.077	0.131	0.446	0.045	0.044	1.110	0.034	0.044	1.110
Urban High Income	0.522	0.470	0.491	1.322	0.436	0.536	0.589	0.436	0.536
Urban Low Income	0.113	1.097	0.788	0.076	0.083	0.137	0.072	0.083	0.137
Total impact multiplier	**10.558**	**9.507**	**9.835**	**8.098**	**8.549**	**10.525**	**7.476**	**8.549**	**10.525**

Table A1 cont. SAM multipliers

	Firms	LS Owner/ Manager	LS Farm Worker	SH H/holds	Urban High Income	Urban Low Income
LS Agric	0.186	0.272	0.731	0.386	0.218	0.473
SH Agric	0.093	0.135	0.347	0.583	0.112	0.255
Mining	0.072	0.099	0.121	0.112	0.095	0.110
Manufacturing	1.456	2.011	2.504	2.291	1.899	2.241
Electricity	0.086	0.100	0.116	0.114	0.144	0.149
Construction	0.016	0.023	0.025	0.025	0.020	0.022
Services	1.207	1.696	1.826	1.898	1.525	1.658
LSU Workers	0.002	0.003	0.008	0.010	0.002	0.005
Formal U Workers	0.020	0.027	0.031	0.031	0.025	0.028
Informal SHU Workers	0.054	0.075	0.113	0.148	0.067	0.094
Skilled Workers	0.252	0.351	0.424	0.445	0.324	0.378
LS Capital	0.035	0.050	0.130	0.173	0.041	0.092
SH Capital	0.005	0.008	0.019	0.033	0.006	0.014
Other Capital	0.304	0.419	0.490	0.474	0.399	0.451
LS Land	0.009	0.013	0.035	0.049	0.011	0.025
SH Land	0.003	0.004	0.010	0.017	0.003	0.007
Firms	1.301	0.414	0.484	0.468	0.394	0.445
LS Owner/Manager	0.666	1.284	0.424	0.476	0.261	0.354
LS Farm-workers	0.002	0.003	1.008	0.010	0.002	0.005
SH Households	0.033	0.044	0.077	1.110	0.045	0.131
Urban High Income	0.591	0.436	0.522	0.536	1.406	0.470
Urban Low Income	0.059	0.083	0.113	0.137	0.076	1.097
Total impact multiplier	**6.452**	**7.549**	**9.558**	**9.525**	**7.078**	**8.507**

Table A2: Input-output multipliers

	LS Agric	SH Agric	Mining	Manufacturing	Electricity & Water	Construction	Services
LS Agric	1.353	0.032	0.045	0.154	0.014	0.087	0.047
SH Agric	0.588	1.014	0.020	0.067	0.006	0.038	0.020
Mining	0.026	0.018	1.937	0.087	0.096	0.219	0.037
Manufacturing	0.479	0.352	0.558	1.957	0.170	1.103	0.507
Electricity	0.030	0.022	0.055	0.016	2.427	0.022	0.009
Construction	0.010	0.006	0.007	0.010	0.002	2.079	0.032
Services	0.829	0.432	0.509	0.615	0.140	0.559	2.654
Input-output multiplier	**3.316**	**1.876**	**3.131**	**2.906**	**2.855**	**4.107**	**3.307**