

## Evaluation of Effectiveness of Integrated Rural Development Programme in Malawi

Andrews CHAUTALA,(Reitaku University)

Suminori TOKUNAGA (Reitaku University)

Mitsuru OKIYAMA (Reitaku University)

### Abstract

Malawi is a land locked, densely populated low income country with a per capita Gross Domestic Product (GDP) of \$388.5 in 2017 (World Bank, 2017). The economy is agro-based with many small scale farmers dependent on rain fed agriculture. The Government introduced Integrated Rural Development (IRD) Strategy as one of priority area in national agenda since 2006 to address rural poverty levels through implementation of IRD programmes and projects. Nevertheless, there have been no efforts to assess the effectiveness of IRD programmes on the economy of Malawi leaving information gap.

In order to assess the impact of IRD programmes on output, final demand, disposable income, poverty levels and consumption, this paper measures not only ripple effects on the assumption that export of each commodity rises using Extended Multi-Sectoral Model based on 2014 Social Account Matrix for Malawi, but also income inequality with-group and between-group of urban household and rural household using Theil's T Index.

The findings indicate that agricultural sectors such as pulses, groundnuts, small ruminants, fruit and vegetables, and among others, have high economic ripple effects without expanding income inequality with-group and between-group.

## Evaluation of Effectiveness of Integrated Rural Development Programme in Malawi

Andrews CHAUTALA, Suminori TOKUNAGA, and Mitsuru OKIYAMA (Reitaku University)

### **1.0 INTRODUCTION**

Malawi is a land locked, densely populated low income country with a per capita Gross Domestic Product (GDP) of \$388.5 in 2017 (World Bank, 2017). The population is 18.6 million as of 2017. 93 percent of total export earnings are from agriculture and 76.6 percent of employment. The economy is agro-based with many small scale farmers dependent on rain fed agriculture. Integrated Rural Development (IRD) Strategy has been one of priority area in national agenda since 2006 to address rural poverty levels through implementation of IRD programmes.

### **2.0 RURAL DEVELOPMENT POLICY AND RESEARCH HYPOTHESIS**

The IRD dates back from 1960 which focused on agricultural sector strategies (Ashley 2001). The IRD concept has been in existence for so long has lost its focus on the implementation of programmes which is supposed to bring more impacts on the economy. This is in line with the ideology of World Bank to facilitate integrated rural development programmes in 1970s and 1980s to attain successful rural development programmes through some form of well-coordinated development initiative at rural level (Kwame 2016). According to global policies, IRD has on the centre of advocacy which has impacted on national agendas. Following that, Malawi has shown its commitment to implement IRD since 2006. Nevertheless, there have been no efforts to assess the effectiveness of IRD programmes on the economy of Malawi leaving information gap. In order to assess the impact of IRD programmes on output, final demand, disposable income, poverty levels and consumption, this study will measure not only ripple effects on the assumption that export of each commodity rises using Extended Multi-Sectoral Model based on 2014 Social Account Matrix for Malawi, but also income inequality with-group and between-group of urban household and rural household using Theil's T Index. The study has used a 2014 SAM composed of 64 broad activities, 3 factors of production (labour, land and capital); 15 households which are rural farm, rural nonfarm and urban which are subdivided into five wealth quintiles. The labour forces are subdivided into four educational quintiles such uneducated, primary, secondary and tertiary

### **3.0 METHODOLOGY**

#### **3.1 Extended Multi-sectoral Models**

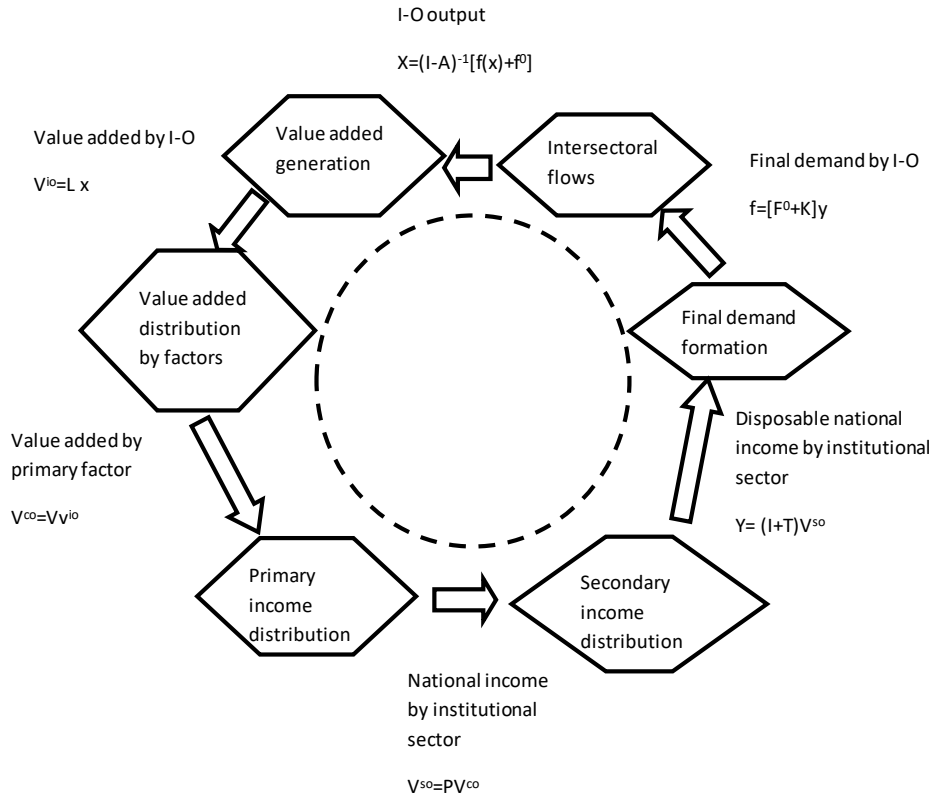
This study has adopted a multi-industry, multi-factor and multi sector model which Miyazawa approach used with the generalization of Keynesian consumption. Ahmed, Socci, & Severini (2018) notes that there is contradiction on the income distribution which goes to various production factors between the institutional distribution during literature review. It is imperative to note that this study is based on SAM presenting an extended circular flow as in Figure 1 below, which provides income generation, primary income distribution, and secondary income distribution (Ahmed, Socci, & Severini, 2018). This study is an extended multi-sector model that imports are handled endogenously (hereafter called the Type  $[I - (I - \hat{M})A]^{-1}$  Extended Multi-sectoral Model) developed for this study. This is because in developing countries that depends on imports, especially commodities made by the manufacturing industry, simulation results far

beyond the real economy will be derived in models that deal with the import sector exogenously. This helps to understand economic impact of the sector on the other sectors. This implies that  $x$  and  $f$  stand for output vector of the industry and final demand formation respectively.

$$x = [I - (I - \widehat{M})A - F(I + T)PVL]^{-1} + f^0 \quad (\text{Eqn1})$$

$$f = F[I + T]PVLx + f^0 \quad (\text{Eqn 2})$$

**Figure 1: Extended input-output model**



Source: I-O, Input-output generated by Ahmed, Socci, & Severini (2018)

### 3.2 Dispersion and Sensitivity analysis

The index of power of dispersion indicates the change in the  $i^{\text{th}}$  good when a unit final demand shock is performed in other commodities. On the other hand, the index of sensitivity dispersion appreciates the relevance of a change in unit final demand in the  $i^{\text{th}}$  industry in terms of a change in the output of all other commodities. The power of dispersion index,  $\pi_j$ , can be defined mathematically as follows:

$$\pi_j = \frac{\frac{1}{m} \cdot r_j}{\frac{1}{m^2} \sum_{i=1}^m r_j} \quad (\text{Eqn 3})$$

where  $r_j$  is the  $j^{\text{th}}$  sector's forward linkage,  $\sum_{i=1}^m r_j$  is the sum of all forward linkages, and  $m$  is the total number of industries.

$$\tau_i = \frac{\frac{1}{m} \cdot r_i}{\frac{1}{m^2} \sum_{i=1}^m r_i} \quad (\text{Eqn 4})$$

Table1. Dispersion-Index using Type  $[I - (I - \hat{M})A]^{-1}$  Extended Multi-sectoral Model

Sector	Power of dispersion (Eqn3)	Rank	Power of sensitivity (Eqn4)	Rank
<b>AGRICULTURE</b>				
Small ruminants	1.57	7	0.58	30
Cattle	1.29	17	0.54	34
Other foods	1.39	12	0.64	27
Raw milk	0.99	31	0.35	46
Tobacco	1.77	4	0.31	49
Leaf tea	1.23	20	0.31	51
Cotton and fibres	1.38	14	0.24	57
Sugar cane	0.88	36	0.43	40
Maize	0.67	48	3.84	2
Coffee	0.70	46	0.22	60
Other roots	0.99	30	0.74	25
Wheat and barley	0.46	54	0.20	62
Other crops	1.02	28	0.20	63
Pulses	1.13	23	0.86	22
Groundnuts	1.15	22	0.52	36
Other oilseeds	0.61	50	0.22	59
Poultry	0.36	58	0.36	44
Cassava	0.73	43	0.68	26
Fruits and nuts	0.38	56	0.88	21
Vegetables	0.35	59	0.53	35
Sorghum and millet	0.34	60	0.37	43
Rice	0.40	55	0.40	42
Other livestock	0.26	62	0.57	31
Fishing	0.25	63	0.49	37
Forestry	0.21	64	2.82	6
<b>MANUFACTURING</b>				
Fish and seafood processing	1.36	15	0.36	45
Fats and oils	1.58	6	0.59	28
Tobacco processing	1.50	10	0.19	64
Dairy	1.62	5	0.31	50
Meat processing	1.17	21	0.56	32
Animal feed	1.53	8	0.84	23
Fruit and vegetable processing	2.01	3	1.23	15
Machinery and other equipment	1.25	19	0.22	58
Sugar refining	1.05	26	0.76	24
Electrical equipment	1.04	27	0.29	52
Grain milling	1.34	16	1.96	9
Other manufacturing	1.51	9	0.27	55
Vehicles and transport equipment	0.96	33	1.03	17
Fertilizers and herbicides	0.96	34	0.27	53
Leather and footwear	1.08	25	0.27	56
Clothing	0.75	42	0.33	48
Non-metal minerals	0.76	41	0.27	54
Wood products	3.49	1	0.33	47
Paper products and publishing	0.89	35	0.56	33
Other chemicals	0.71	44	1.02	18
Textiles	0.81	38	0.41	41
Beverages	0.77	39	1.36	14
Metals and metal products	0.66	49	0.44	38

(Continued)

Sector	Power of dispersion (Eqn3)	Rank	Power of sensitivity (Eqn4)	Rank
<b>MINING</b>				
Coal and Petroleum products	1.00	29	0.92	20
Mining	0.68	47	0.43	39
<b>SERVICE</b>				
Electricity, gas and steam	1.39	13	1.00	19
Accommodation and food services	2.17	2	1.15	16
Education	1.27	18	3.51	3
Business services	1.11	24	0.21	61
Public administration	1.48	11	1.56	12
Water supply and sewage	0.77	40	0.59	29
Finance and insurance	0.85	37	2.61	7
Information and communication	0.98	32	2.33	8
Construction	0.70	45	3.49	4
Health and social work	0.59	51	1.43	13
Wholesale and retail trade	0.56	52	6.70	1
Transportation and storage	0.46	53	1.61	11
Other services	0.36	57	1.85	10
Real estate activities	0.31	61	3.44	5

Based on table 1, the small ruminants, cattle, tobacco, leaf tea and others have relative high power of dispersion in agricultural sector. On the other sectors, the accommodation, fruit and vegetable processing, and dairy have highest influences on the production repercussions in other sectors. The sensitivity index is ranked the highest among the commodities of the service sector, seconded by manufacturing and mining sector and lastly the agricultural sector. Wholesale and retail has scored the highest indices of sensitivity.

### 3.3 Theil's T index and Decomposition of Theil's T

Theil's T-Statistic Index is an indicator of General Entropy of degree (1) providing inequality measure of within group and the between group of the population categories [Mundial 2005].

$$GE(1) = \frac{1}{N} \sum_{i=1}^N \frac{y_i}{\bar{y}} \ln \left( \frac{y_i}{\bar{y}} \right) \quad (\text{Eqn5})$$

Where,  $y_i$  the income per household of group;  $\bar{y}$  = the mean income per household;  $N$  = number of group.

This decomposes the inequality measure into two components: the first term represents the within-group inequality and the second term represents the between-group inequality.

By decomposition of Theil's T index,

$$T = \sum_j \left( \frac{Y_j}{Y} \right) T_j + \sum \left( \frac{Y_j}{Y} \right) \ln \left( \frac{Y_j/Y}{N_j/N} \right)$$

$$\text{Decomposition of Theil's T} = \sum \frac{Y_j}{Y} \ln \left( \frac{Y_j}{Y} / \frac{N_j}{N} \right) / T \quad \text{Eqn6)}$$

Where,  $Y$  the total income of the household;  $Y_j$  = the household income of subgroup;  $N$  = the total household;  $N_j$  = the household of subgroup

According to simulation analysis that MK100billion is assumed to have been exported in each commodity, the study investigates the changes in the output, final demand and income for all household categories as stipulated in Table 2.

**Table2. Ranking score (Output and final demand) and Ranking Score(Theil's T and Group inequality)**

Sector	Output (Eqn1) Unit: Billion of Kwacha)	Rank 1	Final demand (Eqn2) Unit: Billion of Kwacha)	Rank 2	Theil's T (Eqn5)	Rank 3	Decomposition of Theil's T (Eqn6)	Rank 4	Total Ranking Score (=Rank 1+2+3+4)	Priority Numbering
<b>Agriculture</b>										
Small ruminants	827.942	7	515.358	10	0.4824	7	30.51%	5	29	3
Cotton and fibres	729.577	14	502.316	12	0.4818	6	30.52%	6	38	5
Groundnuts	606.630	22	444.105	18	0.4809	2	30.25%	1	43	7
Leaf tea	651.852	20	429.508	20	0.4812	3	30.43%	3	46	8
Pulses	595.402	23	435.960	19	0.4813	4	30.28%	2	48	9
Other crops	540.480	28	396.150	24	0.4804	1	30.45%	4	57	11
Other foods	736.311	12	485.170	14	0.4876	20	31.03%	19	65	12
Cattle	680.627	17	417.553	22	0.4863	14	30.87%	13	66	13
Other roots	525.310	30	382.138	27	0.4839	10	30.59%	8	75	15
Raw milk	521.064	31	333.504	34	0.4874	17	30.96%	16	98	18
Cassava	386.747	43	292.338	39	0.4848	12	30.67%	12	106	20
Coffee	369.462	46	269.279	45	0.4864	15	30.92%	15	121	21
Other oilseeds	320.637	50	243.077	50	0.4867	16	30.91%	14	130	24
Tobacco	934.161	4	628.592	4	0.4937	62	31.39%	56	126	22
Maize	355.912	48	255.888	48	0.4876	19	30.99%	17	132	25
Rice	209.185	55	171.066	55	0.4883	23	31.04%	20	153	31
Sorghum and millet	180.424	60	149.371	60	0.4881	22	31.06%	21	163	38
Poultry	191.487	58	152.206	59	0.4893	26	31.15%	24	167	43
Vegetables	187.315	59	153.520	58	0.4892	25	31.15%	25	167	44
Fruits and nuts	199.335	56	159.967	56	0.4895	27	31.18%	29	168	46
Sugar cane	463.366	36	314.017	37	0.4909	47	31.39%	55	175	52
Wheat and barley	241.622	54	183.396	54	0.4900	33	31.24%	35	176	54
Other livestock	135.733	62	120.769	62	0.4895	28	31.16%	27	179	56
Forestry	110.402	64	106.241	64	0.4895	29	31.15%	26	183	60
Fishing	131.836	63	118.304	63	0.4897	31	31.17%	28	185	62
<b>Manufacturing and Mining</b>										
Fruit and vegetable processing	1,062.404	3	711.193	3	0.4814	5	30.58%	7	18	1
Animal feed	807.483	8	527.772	9	0.4837	9	30.63%	10	36	4
Dairy	858.257	5	558.920	5	0.4850	13	31.02%	18	41	6
Grain milling	706.608	16	474.169	15	0.4840	11	30.63%	11	53	10
Fats and oils	837.013	6	541.706	7	0.4884	24	31.19%	31	68	14
Fish and seafood processing	721.363	15	459.422	17	0.4881	21	31.12%	23	76	16
Meat processing	620.986	21	392.945	25	0.4875	18	31.08%	22	86	17
Tobacco processing	791.235	10	511.561	11	0.4908	46	31.26%	36	103	19
Other manufacturing	795.966	9	539.992	8	0.4930	61	31.41%	58	136	26
Sugar refining	557.356	26	363.197	29	0.4907	45	31.29%	42	142	27
Leather and footwear	572.679	25	389.848	26	0.4905	42	31.36%	52	145	29
Wood products	1,845.905	1	1,297.499	1	0.4990	64	31.58%	63	129	23
Paper products and publishing	470.942	35	329.153	35	0.4905	41	31.29%	43	154	36
Machinery and other equipment	660.928	19	426.390	21	0.4917	56	31.39%	57	153	32
Beverages	406.701	39	286.476	41	0.4903	36	31.26%	37	153	33
Coal and Petroleum products	528.013	29	346.750	31	0.4913	52	31.34%	48	160	37
Electrical equipment	549.118	27	361.608	30	0.4914	54	31.37%	54	165	41
Vehicles and transport equipment	509.456	33	336.808	33	0.4912	50	31.34%	47	163	39
Non-metal minerals	400.083	41	276.512	42	0.4905	40	31.29%	44	167	45
Textiles	427.938	38	300.584	38	0.4903	37	31.35%	50	163	40
Other chemicals	374.158	44	261.587	47	0.4905	43	31.29%	40	174	50
Clothing	397.002	42	272.572	43	0.4907	44	31.29%	41	170	47
Fertilizers and herbicides	509.140	34	339.323	32	0.4913	53	31.37%	53	172	48
Metals and metal products	347.104	49	245.005	49	0.4904	39	31.28%	38	175	53
Mining	360.460	47	272.545	44	0.4903	35	31.34%	46	172	49

(Continued)

Sector	Output (Eqn1) Unit: Billion of Kwacha)	Rank 1	Final demand (Eqn2) Unit: Billion of Kwacha)	Rank 2	Theil's T (Eqn5)	Rank 3	Decomposition of Theil's T (Eqn6)	Rank 4	Total Ranking Score (=Rank 1+2+3+4)	Priority Numbering
<b>Service</b>										
Accommodation and food services	1,146.372	2	796.614	2	0.4831	8	30.61%	9	21	2
Public administration	783.707	11	554.572	6	0.4947	63	31.88%	64	144	28
Electricity, gas and steam	734.554	13	495.376	13	0.4929	60	31.51%	62	148	30
Education	671.202	18	463.038	16	0.4924	58	31.43%	61	153	34
Construction	370.542	45	268.484	46	0.4896	30	31.21%	32	153	35
Business services	587.333	24	414.179	23	0.4925	59	31.42%	60	166	42
Information and communication	519.876	32	373.734	28	0.4914	55	31.41%	59	174	51
Transportation and storage	244.372	53	189.146	53	0.4904	38	31.24%	34	178	55
Other services	192.421	57	156.216	57	0.4901	34	31.22%	33	181	58
Finance and insurance	448.401	37	320.835	36	0.4918	57	31.35%	51	181	59
Water supply and sewage	405.635	40	289.249	40	0.4912	51	31.34%	49	180	57
Real estate activities	165.297	61	139.174	61	0.4899	32	31.18%	30	184	61
Wholesale and retail trade	298.319	52	226.354	52	0.4911	49	31.28%	39	192	63
Health and social work	314.257	51	234.943	51	0.4911	48	31.31%	45	195	64

#### 4.0 SUMMARISED RESULTS

The findings indicate that agricultural sectors such as small ruminants, groundnuts, pulses, leaf tea and among others, have high economic ripple effects without expanding income inequality within-group and between-group.

The manufacturing sectors such as fruit and vegetable processing, animal feed, dairy and grain milling have demonstrated the significant performance among the several parameters such as output, final demand and poverty reduction of all household categories.

The government is therefore required to promote the commodities of achieving high economic ripple effects such as pulses, groundnuts, small ruminants, fruit and vegetable processing, and grain milling among others should be promoted. IRD programme should be expanded and effectively targeted at commodities which bring high positive impact on the economy. Stakeholders championing IRD promotion should enhance further sustainability efforts of ongoing programmes and initiatives.

#### REFERENCE

- Ahmed Irfan, Claudio Socci, and Francesca Severini. 2018. „Financial Linkages in the Nigerian Economy: An Extended Multisectoral Model on the Social Accounting Matrix.“ *Journal of the Applied Regional Sciences Conference (The Applied Regional Conference (ARSC) and John Wiley & Sons Australia, Ltd)* 30: 89-113.
- Muller, Ronald E, und Peter Blair. 2009. *Input-Output Analysis: Foundations and Extensions*. London: Cambridge University Press.
- Thurlow, James. 2017. „A Nexus Project SAM for Malawi.“ *International Food Policy Research Institute*. Washington DC, Washington, 11. February.