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Sector Linkages and Industrial Policy Effects on Regional Wheat Value Chain Actors' Outputs and Consumption in Ethiopia

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Abstract
The article estimates sector linkages, output, income and employment multipliers. It also measures the effects of industrial policy on income and consumption and wheat factory's outputs in aggregate terms. This study indicates that non-agro processing industry has relatively a weaker linkage with the rest of regional economy. The study found that the impacts, measured by social accounting matrix multiplier analysis, agricultural and service sectors have relatively the highest output, income and employment multipliers. Computable general equilibrium model result indicates that shock injections into regional wheat value chain brought about much higher changes in outputs of wheat producers and wheat processing factories, urban and rural household consumption of wheat and wheat product. The agro-processing industrial policy should be set up on the basis of balanced development of only limited sectors along the value chain to impact the wheat economy significantly and ensure higher productivity in the chains.
Keywords: Linkages, industrial policy, multiplier effects, impact, wheat value chain

1 Introduction

The balanced growth theory advocates numerous investment projects simultaneously. It creates horizontal interdependence of demand which in turn maintains harmony and equilibrium. Whereas the unbalanced growth theory advocates the development of only one leading economic sector at a time in order to create disproportion and disequilibria (Hirschman 1961). Law of comparative advantage and modern arguments support later strategy as it enables to exploit the advantage of the concentration of resources and enjoy the advantage of economies of scale, respectively.

Hirschman (1961) argues that the unbalanced growth strategy is a stimulus to technical invention and innovation as well as a means to economize the resources and avoid bottlenecks and shortages of supply in different sectors. Both theories are conceptualized on a basis of big push theory, which advocates investments to break demand side of the vicious circle of poverty. These theories argue that industrialization is the only way for attaining economic growth. However, they differ in the strategies towards industrialization. Mathur (1966) supports the combination of some components of both theories as the best development strategy. On the other hand, scholars made hot debates on the strategy of balanced versus unbalanced growth theories in Western countries and give more weight to unbalanced growth in order to economize on the use of resources and decision-making, achieve the greatest economies of scale and economic efficiency and maximize economic growth (Ghatak and Roberts 1997). Hirschman (1961) and Singer (1958) argue that the unbalanced investment is a basis for creating strong linkages with complementary sectors. Such linkages encourage new and large investment in upstream and downstream sectors as well as related and supporting industries by creating new profit opportunities. Sectors with forward linkages produce and supply goods to other sectors for the production of other commodities. Sectors with backward linkages purchase goods and services from other sectors to produce commodities to react the extra demand of downstream industries. This study intends to answer the following research questions. Urgaia (2007) in a study conducted in Ethiopia to examine the contribution of manufacturing industries to GDP using Johansen co-integration analysis, has found that manufacturing sector contributed 6 per cent to the Ethiopian GDP. Another study on towards a more employment intensive and pro poor economic growth in Ethiopia; has found that the linkages between manufacturing sector and the domestic economy in terms of production, consumption and income were weak (Tadele *et al*., 2006) as the sector was highly contingent upon imported raw materials. SAM model results indicate that agro-processing industries such as food and beverages, textiles, leather and leather products had relatively strong linkages with the agricultural sector. Moreover, large and medium agro-processing industries created the larger employment opportunities as well as better backward linkages (Tadele *et al*., 2006). In sum, there are no empirical studies are conducted which uncover the impacts of industrial policy on value chain actors' outputs and consumption. The overarching objective of this study is to assess linkages and multiplier effects and estimate the impacts of the country's industrial policy on regional WVC actors' output, wheat and wheat product consumption.

2 Theoretical justification for industrial policy and analytical framework

2.1 Theoretical justification for industrial policy

Industrial policy is viewed as a measure to correct market and coordination failures which center on supply

expansion rather than demand control like supply-side economic policy. The infant industry protection, externalities, complementarity and coordination failures are the main theoretical justifications for industrial policy. Scholars argue that the government should give temporary support for infant industries in the form of tariff protection until they become mature in economies of scale. Therefore, they become competitive in international markets (Itoh et al. 1991). The second justification is market failures which are a consequence of externalities (i.e. external economies or spillovers) which are consequences of an economic activity or a transaction that affects bystanders other than those engaged in it (Todaro 1994). Increasing returns to scale is the logic for an industrial policy which is also called internal economies or learning by doing. Internal economies are achieved through economy of scale and absorption of technologies. This scale decreases production cost per unit and increases the productivity of industries (Weiss 1990).

The imperfect capital market is the third justification for infant industry protection for following reasons. The first poor capital market cannot supply adequate fund to finance further investment in manufacturing for overall economic development (Kumar 2003). Second, soft credit service lowers the cost of capital and increases economic efficiency so that firms can realize the merits of increasing returns to scale. Complementary is another reason for industrial policy/government intervention. Some argue that government should play a supporting role in nurturing efficient markets (Itoh et al. 1991). The absence of government intervention in industry coordination may cause overinvestment or underinvestment which is problems of strategic uncertainty that leads firms to go bankrupt and lose the resources invested.

Therefore, the government of Ethiopia has used both investment and export incentives to promote the expansion of industry and export in various sectors and create strong backward and forward linkages among different sectors. It also accelerates economic efficiency and growth indifferent sectors since each sector affects the economy in a different way.

Tariffs, exemption from the payment of customs duty and other taxes on capital goods and construction materials, holiday tax and exemption from payment of income tax for 2-5 years are the main components of Ethiopian industrial policy which are also called investment incentives. The outward orientation strategy including free from sales and value added taxes, export credit guarantee, utilization of export earnings and inward remittances are other elements of Ethiopian industrial policy which are also known as export incentives. For the purpose of this study, the only exempted capital stocks from various taxes are considered as a proxy variable for industrial policy to measure its impacts on regional the WVC.

2.2 Data

In this study, data from surveys of Central Statistical Agency of Ethiopia (CSA), Ministry of Finance and Economic Development (MOFED) and Oromia Finance and Economic Development Bureau (OFEDB) in 2010/11 are used to construct Oromia regional SAM. CSA database including data on outputs, factors of production, intermediate inputs and their costs of production in all sectors, rural household income and consumption expenditure, industry outputs, exported and imported goods. CSA collected data from 14,038 sample households in 703 enumeration areas in 2010/11 fiscal year. Data for the household income, consumption and expenditure were collected at random from 2,301 urban and rural households in 192 enumeration areas with the help of interview schedules and objective methods which were carried out from 4 July to 3 August 2010 in the first round and from 4 February to 5 March 2011 in the second round.

Data on government revenues and expenditures were obtained from MOFED database. Service data on hotel, education and health, transport and others were gathered from OFEDB database. The national import per capita was used to estimate the total regional imported goods since the import data at the regional level was not fully available. This study also used personal interview survey to collect the research data. It allowed collecting more and deeper information from 30 technical and production managers and administrative managers in different public owned and private enterprises.

2.3 Scenarios and wheat value chain

The capital stock formation is used as a proxy variable for industrial policy in order to estimate its impacts on regional WVC. The information on capital stocks, come from OFEDB database and other sources, are used to estimate the scale of exempted capital shock due to industrial policy. The scenario was developed on the basis of CSA and OFEDB database in which 2010/11 is chosen as the base year. However, the injected capital stocks into the regional economy are working under capacity. In order to assess the potential of industrial policy, the consequences of adopting two alternative scenarios are compared against the base scenario. In the first scenario, capital stocks are working under capacity in different sectors. The other scenario assumes that capital stocks are working at their full capacity.

The economic interactions are built on the basis of six accounts: production which includes two agriculture and four non-agriculture, commodities, production factors, institutional agents, saving-investment and rest of the world accounts. Production accounts also include wheat value chain in which wheat farmers produce wheat and

sell their produce to downstream actors and also purchase inputs and industry products from traders. Flour and food complex industries purchase wheat from traders and sell their products to downstream actors. They also sell their products to end and intermediate users. The wheat produced by the farmer goes through different sectors and activities with significant value addition. Costs are incurred at the different stages of the value chain, that is, at production, processing level for labor and capital, and marketing and distribution level for transportation, storage and transaction costs. Wheat factories in production accounts have a link with other accounts such as institutions and the rest of the world.

2.4 Analytical framework

Leontief has suggested an input-output analysis for the first time in the 1930s. It is a good tool to measure interactions among different sectors, but it does not provide information about the consumptions and incomes of economic actors. It also assumes efficient local resources utilization, constant returns to scale and linear production functions. Hence, the amount of each input necessary to produce one unit of a certain output is constant. If the output level of a sector changes, the input requirements change proportionally. It is not feasible to estimate the effects of industrial policy on value chain since it does not capture the effects of industrial policy on consumption and income. A social accounting matrix (SAM) overcomes the weakness of this model, which shows a total circular flow of costs and incomes among the different institutional units. It also shows all economic transactions that occur within an economy. The matrix explains the linkages among production, income, consumption and capital accumulation (UN 1993).

A SAM is both a database for CGE model and a logical conceptual framework which offers a visual display of transactions among economic agents (Thorbecke, 1998). SAM has been used to model a range of economic and institutional structures at various levels. It was initially modeled to address issues at the macro level; in recent times the framework has been modeled at the micro (villages and towns) and sub-national (or regional) economics. For instance, it is applied either at the national level (macro SAM) or at the local level (micro SAM). Adelman et al. (1988) applied the first SAM at the village level to analyze the economic structure of a migrant-sending within the rural economy in Central Mexico. Tadele (2008) also applied it at the village level to measure growth linkages and the policy effects on village economy in Ethiopia.

Linkage analysis as recommended by Rasmussen (1957) was used to estimate the magnitude of partial and total backward and forward linkages among sectors. Particularly, multiplier analysis is typically employed to estimate the effects of exogenous shock on value chain consistently. Further, it allows knowing the direction and magnitude of the effects of policy on the value chain (Faße et al. 2009). Moreover, SAM is a more flexible in terms of classification of various components of the economy at mesolevel. SAM multiplier, which is employed to study a similar case by Faße et al (2009), has been chosen to measure output, income and employment multipliers in this study. The SAM framework has a square matrix since each economic agent in the economy has both a row and a column account, in which a row account stands for receipts and column account stands for expenditures. As a comprehensive, consistent, and complete accounting method, the total spending (its column sum) must equal to revenues (its row sum).

The SAM is a basis for multiplier analysis and calibration of CGE model (Pyatt and Round 1979). Modeler makes choice between exogenous and endogenous variables from constructed SAM as a conceptual framework which is called model closure. Endogenous accounts are subjected to changes as any changes in the model experiments, while exogenous accounts have fixed values which are set independent of the force of outside the model (Burfisher 2011). In addition, the CGE model is calibrated on a basis of 2010 Oromia SAM. Regional computable general equilibrium model used in this essay is based on the International Food Policy Research Institute (IFPRI) standard model of Lofgen et al. (2002).

2.5 Model benchmark calibration

The model calibration procedure calculates the parameters used in the model so that the solutions to equation replicate the observed economic data as described in the SAM database. The inputs to calibration practice are the SAM database, which reports an initial equilibrium in the regional economy. The CGE models convert all initial quantities and prices into one unit currency by normalizing (Burfisher 2011). Measurement units for all factors are determined by setting up all factor prices equal to one. Likewise, the domestic commodities, imports and exports so that the prices of domestic goods and imports, the world price of exports and the exchange rate are all set equal to one in the base year.

The CGE model illustrates only relative price, which is homogeneous of degree zero in all prices. This price serves a model's a numeraire, a bench mark value which is chosen by fixing an aggregate price equal to one. The weights of such aggregate price can be the initial values of production in each sector. The numeraire is treated as the CPI (consumer price index), which is a fixed variable. It is calculated as the weighted sum of initial consumer prices, where weights are each good's base budget share in the consumption basket. DPI (producer price index) can be used as an alternative for numeraire. Either the CPI or DPI is equal to a numeraire since the

model is homogenous of degree zero in all prices.

3 Results

3.1. Sector Linkages and Industrial Policy Impact on Regional WVC Actors' Output and Consumption

This section describes linkages, multipliers analysis and the impact of industrial policy on the WVC actors' output, wheat and wheat product consumption. The first subsection describes total and partial backward and forward linkages, output, income and employment multipliers. The second subsection deals with the impact of industrial policy on the WVC actor's output and wheat and wheat product consumption.

3.1.1. Linkages and multipliers analysis

Backward linkages take place in a situation where downstream actors purchase the input from upstream actors, while forward linkages occur in which upstream economic actors supply goods and services to downstream economic actors.

Imported raw materials in food and beverage industries shared about 36% of the total raw materials to produce finished goods. In particular, manufacturing of meat, fruit and vegetable, animal oils and fats purchased about 100 per cent of their raw materials from traders in the domestic product markets to produce these goods. It indicates that they had the strongest backward linkage with the regional economy. Manufacturing of prepared animal feeds used about 92 per cent of local raw materials to produce processed animal feed which had strong backward linkage with feed suppliers (Table 1).

The wheat processing factory bought about 80 per cent of its raw materials from domestic WVC actors in the product markets to maximize its actual working capacity. Wheat flour factory supplied its byproducts to dairy and cattle production. Wheat production required the large quantity of imported fertilizers, herbicides and pesticides which shared about 65 per cent of the total intermediate input use of wheat production. The fiber processing factory had the strongest forward linkage with wheat processing factory because it entirely sold its product to wheat processing factory. However, packing material factory has not yet sold its product to the cement industry. This is because the product does not meet the quality requirement of the cement industry. Manufacturing of wood and its products and the cork purchased about 87 per cent of their raw materials from traders in domestic product markets (Table 1).

Table 1. Cost of raw materials for industrial group in Oromia region in "000" ETB

Industrial group	Value of raw material consumed			
	Local		Imported	
	Value	%	Value	%
Manufacture of food products and beverages	4,746,318	64.4	2,622,128	35.6
Processing and preserving of meat and fruit	1,270,915	99.9	870	0.01
Manufacture of vegetable, animal oils and fats	26,406	99.4	162	0.6
Manufacture of grain mill products	1,591,739	80	397,370	20
Manufacture of prepared animal feeds	94,610	90.9	9,442	9.1
Manufacture of bakery products	278,863	88.4	36,616	11.6
Manufacture of sugar and sugar confectionery	1,039,426	70.5	435,657	29.5
Manufacture of macaroni and pasta	174,224	99.4	1,023	0.6
Manufacture of malt liquors and malt	495,793	55.4	399,334	44.6
Manufacture of soft drinks and mineral	288,039	52.6	259,940	47.4
Manufacture of textiles	239,549	12.9	1,620,511	87.1
Manufacture of wearing apparel,	80,771	75	26,920	25
Manufacture of foot wear, luggage and handbags	1,121,966	46.1	1,311,520	53.9
Manufacture of wood and its products and cork	41,954	87.4	6,070	12.6
Manufacture of paper, its products and printing	54,757	16.3	281,641	83.7
Manufacture of chemicals and chemical products.	290,705	15.2	1,625,848	84.8
Manufacture of rubber and plastic products	59,230	8.5	636,245	91.5
Manufacture of other mineral products	830,037	67.2	405,405	32.8
Manufacture of fabricated metal products	427,110	14.1	2,594,030	85.9
Manufacture of basic iron and steel	114,790	26.5	318,037	73.5
Manufacture of machinery and equipment.	800	11.2	6,367	88.8
Manufacture of motor vehicles and trailers	8,816	12.5	61,680	87.5
Manufacture of furniture	94,867	62.8	56,286	37.2

Source: Author's calculation on the basis of CSA database 2010/11

Manufacturing of wearing apparel bought about 75 per cent of their raw materials from domestic traders in domestic product markets to produce finished products, while manufacturing of foot wear, luggage and hand bags purchased about 54 per cent of their raw materials from abroad. Manufacturers of rubber and plastic products had weak linkage with the regional economy since it was extremely contingent upon imported raw

materials (about 91.5%) to produce the final products. The imported raw materials in machinery and equipment industries had a great lion's share which was about 89% of the total raw materials.

Some of the industries were prominently contingent upon imported raw materials because of investment coordination failures and a shortage of intermediate inputs supply in the local markets. The shortage of raw materials, lack of working capital and frequent machinery break/failure were considered to be the main cause of under capacity utilization of industries.

3.1.2. SAM and CGE models result

Agricultural and related activities yielded the highest total and partial backward linkages. The whole effect on all accounts is summed up jointly is called total backward linkage due to a unit injection into agricultural and related activities resulted in 16.49 units of output in the regional economy and the same implication for other sectors (Table 2). The magnitudes of total and partial backward linkages varied across sectors because of differences in technology, value added and intermediate input composition in the production process. The great proportion of value added in the production process shrinks the value of output multiplier and backward linkages (BL). Backward linkages also are associated with savings propensities, indirect and direct taxes.

Table 2. The partial and total backward linkages among six important sectors in the regional economy

Sectors	Partial backward linkages (PBL)				
	Production	Commodity	GDP	Income	Total BL
Agricultural and related activities	7.3	5.42	2.2	2.02	16.49
Wheat activity	2.39	2.15	0.3	0.25	5.09
Agro-processing industries activities	2.41	1.79	0.4	0.38	4.98
Wheat processing industries activities	1.28	1.22	0.1	0.08	2.68
Other manufacturing and industries activities	2.06	0.96	0.3	0.32	3.64
Services activities	4.65	2.28	0.9	0.88	8.71

Source: Author's calculation on the basis of CSA database and other institution databases 2010/11

Total backward linkage for production accounts for agricultural and related activities, wheat activity, agro-processing industries activities, wheat processing industries activities, other manufacturing and industries activities and services activities was 16.49, 5.09, 4.98, 2.68, 3.64 and 8.71, respectively. The agricultural and related activities had the largest total backward linkage (16.49), followed by services activities (8.71) (Table 2).

Table 3. Multiplier effect on the components of regional economy

Component of regional economy	AGR-A	W-A	AGRO-A	WPI-A	OMI-A	S-A
Output	3.25	3.18	3.02	3.66	0.7	3.36
GDP	2.47	2.42	1.72	2.22.	0.39	2.21
Income	2.47	2.42	1.72	2.22	0.388	2.12

Note: AGR-A = Agricultural and related activities, W-A= Wheat activity, AGRO-A = Agro-processing industries activities, WPI-A = Wheat processing industries activities, OMI-A = Other manufacturing and industries activities, S-A = Services activities. Source: Author's calculation on the basis of CSA database and other institution databases 2010/11.

Table 3 shows that agricultural and related activities, wheat activity and wheat processing industries activities had larger output, GDP and income multipliers as compared with agro-processing industries activities, other manufacturing and industries and services activities. Output multipliers for all activities were the highest of other multipliers. Gross output multiplier for agricultural and related activities, wheat activity, agro-processing industries activities, wheat processing industries activities, manufacturing and other industries and services activities was 3.25, 3.18, 3.02, 3.66, 0.7 and 3.36, respectively.

More factors in the production process are highly linked with more production. Thus, factors of production payment increased with goods and services supply. The size of GDP multipliers for agricultural and related activities, wheat activity, agro-processing industries activities, wheat processing industries activities, other manufacturing and industries activities and services activities was 2.47, 2.42, 1.72, 2.22, 0.39 and 2.21, respectively. Of all multipliers, income multiplier was the smallest (Table 3). Value added (or factor) multipliers in some sectors were not being transferred in full amount to household income multipliers. Household income multiplier for agricultural and related activities, wheat activity, agro-processing industries activities, wheat processing industries activities, other manufacturing and industries activities and services activities was 2.47, 2.42, 1.72, 2.22, 0.39 and 2.12, respectively.

Results in Appendix Table 1 indicate that the investment of 1 ETB in agricultural and related activities increases their outputs by 2.23 ETB, output of wheat activity by 0.13, outputs of agro-processing industries activities by 0.22, outputs of wheat processing industries activities by 0.05, outputs of other manufacturing and industries activities by 0.19 and services activities by 0.52. This means a million ETB investment in agricultural and related activities caused them to increase their outputs by 2.23 million ETB. Investment of an ETB in wheat processing industries activities made them to increase their outputs by 1.31 ETB. The result indicates that a unit change in the service sector of Oromia region's economy caused wheat processing industries activities to

increase their wheat outputs by 0.23 units due to backward and forward linkages. When rural household income was raised by a unit the supply of wheat commodity was increased by 0.15 ETB (Appendix Table 1).

Table 4. The impact of industrial policy on the WVC actors' outputs and consumptions

Variables	100% capital stock injections into the regional WVC		
	Without IP	FCU	Increase over base (%)
	Base	SIM1	SIM1%
Wheat output	9.51	11.93	25.45
Wheat processing industries' output	3.11	4.44	42.77
Rural households' wheat consumption	3.91	4.52	15.34
Urban households' wheat consumption	1.71	2.41	41.00
Rural households' wheat product consumption	0.87	1.15	32.53
Urban households' wheat product consumption	0.87	1.41	62.07**

Note: ** is statistically significant at 5 per cent, ns=non significant at 5 per cent level.
Source: Author's calculation on the basis of CSA database and other institution databases 2010/11.

An increase in capital stock by 100 per cent would make the output of wheat activity to increase by 25 per cent, the output of wheat processing industries activities to raise by 43 per cent. It caused rural and urban households' wheat consumption to increase by about 15 per cent and 41 per cent, respectively. The socks increased rural households' wheat product consumption by about 33 per cent and urban households' wheat products consumption by about 62 per cent (Table 4).

4 Conclusions

This study supports the notion that capital accumulation in free markets is a basis for economic growth. However, capital formation is very difficult under laissez-faire industrial policy in developing countries like Oromia region because investors could not direct their cash flow into various manufacturing sectors. It is possible to conclude that industrial policy is a driving force of capital accumulation in developing countries. But, capital accumulation by itself may not be a basis for productivity and higher economic growth rate. The result indicates that almost all firms depend on imported raw materials that weaken forward and backward linkages among different sectors. There is also industry coordination failure between upstream and downstream industry as well as the lack of related and supporting industries in both upstream and downstream industries. This study suggests that investment coordination mechanism is very crucial to overcome over investment or under-investment which is a problem of strategic uncertainty that also leads firms to waste the resources invested and higher capital-output ratio. So, the government should determine the optimal level of entry into the industry. The government should act as an external coordinator. This is because effective industrial coordination generates external economies that decrease the costs and increase the use of raw materials for user industries which reduces the cost of manufactured products for consumers because of their higher productivity and other internal economies.

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Notes

1. In this article, we use the production approach (i.e. the value of gross output (GVO)) less intermediate cost (IC) to estimate gross value added (GVA). GVO is calculated using basic prices, and the value of inputs is estimated at purchasers' prices.
2. For instance, the direct method is used to compute the approximate value of gross livestock output. GVO = Value of livestock off-take + value of livestock byproducts + value of the change in stoke - the value of imports. IC= value of feed cost + value of health cost+ value of breeding cost + other costs.
3. This study does not use weighted average commodity prices since it is not possible to get the monthly sold volume of commodities. So, the current price is employed to estimate GVO in different sectors.
4. Birr is Ethiopian currency; 14.409 ETB was approximately equal to 1.00 US dollar in 2010.
5. Although it is possible to obtain data for imported items at the national level but it is found it difficult to get reliable data on imported commodities at the regional level. We calculate per capita imported goods to estimate total imported goods in the region.
6. The residual approach is applied to calculate Oromia region export (X). X=C-M +G +I-GDP
7. The capital budget and the recurrent budget are used to estimate government expenditure.
8. CGE modeling is a new direction in economic history which presents theory with a number. The theory is stated at the equilibrium level of output, the regional output produced (Y) equals quantity demanded in the region. Where the regional economy is at equilibrium it holds that: Y=C +I +G +NX.
9. Static CGE model, which considers one-time effects of policy changes, is used in this study. CGE model in General Algebraic Modeling System (GAMS) software is employed to analyze the data. SAM is a static representation of the regional economy.
10. Calibration is carried out for CGE model exercise in GAMS which is a process of assigning a numerical value to variables and parameters of the model.
11. The factor market closures balance between quantity demanded and quantity supplied for each factor.
13. CAGR=agriculture commodities, CWP=wheat commodities, CAGRO=agro-processing commodities, CWM=wheat processing commodities, COMI=other manufacturing and industry commodities, CS=service commodities.
14. The elasticity parameters used in the model are taken from Ethiopian IFPRI database.

Appendix Table 1. Technical linkage coefficients, outputs multiplier

	aagr	aw	Agro	Awp	Amoi	as	cagr	cw	cagr	cwp	cmoi	cs	lab	cap	rhh	uhh
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	2.23	1.16	1.17	1	0.68	1.1	2.27	1.1	0.97	0.99	0.17	1.1	1.26	0.91	1.37	0.64
2	0.13	1.21	0.11	0.7	0.08	0.11	0.13	1.16	0.09	0.74	0.02	0.1	0.14	0.12	0.14	0.11
3	0.22	0.21	1.38	0.2	0.15	0.26	0.22	0.2	1.15	0.18	0.04	0.3	0.22	0.18	0.23	0.15
4	0.05	0.04	0.04	1.1	0.03	0.04	0.05	0.04	0.03	1.09	0.01	.04	0.04	0.04	0.04	0.04
5	0.18	0.18	0.17	0.2	1.2	0.17	0.18	0.17	0.14	0.17	0.3	0.2	0.19	0.15	0.2	0.12
6	0.52	0.52	0.78	0.5	0.63	1.73	0.5	0.49	0.65	0.47	0.16	1.7	0.5	0.42	0.53	0.36
7	1.26	1.2	1.2	1	0.7	1.09	2.23	1.14	0.99	1.02	0.18	1.1	1.3	0.94	1.41	0.66
8	0.14	0.22	0.11	0.8	0.08	0.12	0.14	1.21	0.09	0.78	0.02	0.1	0.14	0.13	0.15	0.11
9	0.27	0.25	0.46	0.2	0.18	0.32	0.26	0.24	1.38	0.22	0.04	0.3	0.26	0.22	0.28	0.19
10	0.05	0.04	0.04	0.1	0.03	0.04	0.05	0.04	0.03	1.09	0.01	0.4	0.04	0.04	0.04	0.04
11	0.71	0.7	0.65	0.7	0.81	0.66	0.69	0.67	0.54	0.67	1.2	0.7	0.73	0.59	0.78	0.47
12	0.52	0.52	0.78	0.5	0.63	0.73	0.5	0.49	0.65	0.47	0.16	1.7	0.5	0.42	0.53	0.36
13	1.97	1.89	1.35	1.5	0.85	1.42	1.92	1.81	1.12	1.48	0.21	1.4	2.23	0.93	1.33	0.69
14	0.56	0.63	0.74	0.7	0.69	0.7	0.55	0.61	0.61	0.75	0.17	0.7	0.43	1.34	0.46	0.27
15	1.88	1.84	1.41	1.5	0.97	1.46	1.83	1.76	1.17	1.53	0.25	1.5	2.05	1.28	2.3	0.69
16	0.66	0.69	0.67	0.7	0.56	0.66	0.64	0.66	0.56	0.7	0.14	0.7	0.61	0.99	0.49	1.28

Source: Source: Oromia regional SAM