Agro-Food Processing Industry Development Challenges and Policy Issues in Ethiopia

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Abstract: *The agro-food processing industrial development is one of the current very significant concerns of food security. It has also become an Agro-economic industrialization policy for developing countries like Ethiopia. The objective is to analyze the agro-food processing industry development challenging factors and their policy implications. The authors used both primary and secondary data. Total respondents of 242 were selected. Simple random sampling was applied purposively. It covered three cities from two zones of Oromia National Regional Administrative State of Ethiopia. It also included respondents of agro-processing industry owners, expertise, management members, economists, and statisticians. The simple linear and multivariable regression models were applied to analyze exploratory factors of the development of Agro-food processing industries in Ethiopia. These variables include (a) Power Supply, (b) Good Governance, (c) market accessibility, (d) raw materials, (e) constraints of financial and (f) infrastructure, and (g) technology. Thus, the results of the coefficients for Power was (0.176), Good Governance (0.172), Market Constraints (0.164), Raw materials (0.155), Financial Constraints (0.148), Infrastructure (0.147) had positive coefficients, and they were significantly different from zero at 0<0.05. The coefficients for the independent variable 'technology '(-0.010) was statistically insignificant.*

Keywords: Agro-Food Processing, Industry, Development, Policy, Ethiopia

1. Introduction

Ethiopia is one of the developing countries in East Africa, having a population of over 109 million people is the 2nd largest populated country next to Nigeria in Africa. It has registered fast development in the last few decades, and it is one of the countries which are poor with a per capita income of 790 US dollars, according to [2], [19]. The country has a diversified range of agro-ecological zones, arable land, and access to labor allow a diversified agricultural system in the country. Ethiopia is one of the significant producers of coffee and barely. Ethiopia is also the second-largest producer of sorghum in Africa, the third producer of maize and wheat, and the fourth producer of coarse grains in Africa [14]. But, low yields and environmental impacts; and unsustainable agricultural practices are key food security challenges [19], [20].

Agro Food Processing is one of the vital sectors in the study area of the Oromia National Regional State of Ethiopia. Agro-processing is the sub-category of manufacturing that includes raw materials and intermediate products derived from the agricultural sector. The Agro-food processing industry plays a considerable part; in the manufacturing industry of Ethiopia. It constituted 46 percent of the value addition. In sum, the agro-industrial sector's development is critical, given its economic contribution to Ethiopian livelihoods [17].

There is diversified agro-food processing in Ethiopia. These include fruit and vegetables, meat and milk processing, honey and wax processing, coffee and tea, edible oilseeds, sugar, spice processing, wheat flour, biscuit, pasta and macaroni, and wine breweries. The country has diversified agricultural and forestry resources. These resources are sources for raw material input for agro-food processing development. These sources of raw materials firstly raise domestic animals. In terms of the population, it is the tenth

livestock rearing country in the world. The total population of domestic animals is about 60.4 million cattle, 30.7 million sheep, 30.2 million goats, and 1.2 million camels [2], [21].

These resources are necessary for a dairy farm, processed milk products, meat, and poultry agro-food integrated processing. According to [22], urban dairy farms produced about 35 million liters of milk per annual which accounts for 14 % of the total milk production of the nation. In total urban milk production, about 73% of the unprocessed is provided for market. And 9.4% are used for feeding calves, which is approximately 10% used for home usage.

And about 7.6 % is processed into butter, yogurt, and cottage cheese. Ethiopia earns 113.81 million USD from the export of meat and milk. It also gets mutton 61.31 million dollars from sheep and goats. She earns 1.3 USD from live cattle. And, it gets 2.93 USD from honey and wax, and fish products 2.60 million USD in 2019 [14].

2. Review Literature

Agro-food processing is the subset manufacturing sector that processes raw materials; and intermediate agricultural products of fishery and forestry. Hence, the agro-industry includes manufacturers of food, beverages, and tobacco, textile and clothing, wood products, and printings rubber and rubber products [3]. That is the earliest definition of agro-food processing. Food and beverage agribusiness in sub-sectors, tobacco products, paper and wood products, textiles, footwear products, and leather goods are defined in the UN international industrial standard classification [7], too. Hence, as these definitions of agro-processing imply, agro-processing is multi-sectorial in terms of scope. And, food and beverage processing is a sub-sector of agro-processing.

Furthermore, the [8] redefines and divides them into groupings of different codes of classification.

That's code of 301 up to 304. Accordingly, the classification stated hereunder: code 301 related to manufacturing, processing, and preservation of meat, fish, vegetables, oils, and fats; code 302 grouped to manufacturing, processing of dairy products; code 303 refers to manufacturing and processing of grain mill products, starch products, and prepared animal feeds; and code 304 defined to manufacturing and processing of other kinds of processed agro-food produces. Primarily agro-food processing has passed different levels of processes. These processes are primary, intermediate, and secondary processes. Flour milling, 0il pressing, and fish canning are primary processes. The intermediate process goes through further steps of manufacturing operational systems. These include the agricultural products of bread, biscuit, and other non-food manufacturing [3]. Hence, agro-food processing is a sector that processes raw materials of agricultural cereal crops, fruits and vegetables, and livestock. The level of the processing ranges from the cleaning and grading of apples to the milling of rice, cooking, and fraternization of chemicals that produce textured vegetable food.

Generally, the former and the current definitions of the concepts of agro-food processing are on its processes of operation, economic benefits, linkage with farmers to customers, and in terms of sectorial structural systems.

There are reasons that the agro-food processing development is pointedly necessary for the nation's economic growth. Firstly, the agro-food processing firms are primary food systems that convert agricultural raw materials to finished processed products for the nation's consumption. Secondly, Agro-food processing is the dominant manufacturing industry in most developing countries. At the same time thirdly, it is one of the major export items of the developing countries, and, fourthly, it is a food system that gives nutrients for the increasing population of the nation [13]

Thus, the Agro-food processing development sector plays a significant role in the economic growth of developing countries like Ethiopia. Agro-food processing or agro- industrialization potentially creates necessary prospects and benefits for the developing countries. Agro-food processing assures economic development, export performance, food safety, and quality contribute to the growth of domestic products. It has also a potential for employment [4]. Besides, it has great significance in poverty reduction and unemployment through an increment of financial and economic sustainability of smallholder farmers [18], [20].

Agroindustry encompasses eight production industries and a comparatively large involvement of the agro-industrial market of the food and beverage industry. Agro-industrial exports in overall exports at a national level are necessary to several countries of the region of foreign trade of agro-industrial goods of African countries. The exports of agro-industrial goods contribute more than 30 percent of overall national exports [16]. Findings of Studies of different scholars showed that the factor that affects the growth of

Agro-food processing development is summarized hereunder. The conclusions analyze good governance, bureaucracy, access to finance, technological accessibility, market accessibility problems, scarcity of raw materials, and power or energy problems.

Raw materials constraint is one of the factors that affect the development of agro-food processing. The findings of a study conducted by [10] entitled the challenges facing food processing MSEs in Tanzania qualitative case study of the Sunflower Oil Industry in Babati, Manyara indicate that adverse climatic conditions and droughts affect the availability of raw materials. Because of such constraints of raw materials, most African countries import agricultural raw materials. Research by [12] shows that local raw materials are lower standards are unfit for processing. The relationship between actors in the supply chain processors they are unable to acquire raw materials on time.

The findings of a study conducted on the Sebeta Agro-industry by [7] affirmed that it is one of the commercial processors of a dairy farm.   It depends on the outside sources. Thus, the urban and peri-urban smallholder producers are the supplier of raw milk for the processors at different levels.

The other major factor identified that affects the development of agro-food processing is financial constraints. A study conducted by [11] in Tanzania identified financial constraints as a factor affecting the growth of agro-processing. As the findings implied, most Tanzanian agro-processing firms cannot grow because of limited finance and unfavorable borrowing conditions of higher interests. The firms have problems of limited access to finance from commercial banks.

Similarly, the study findings [9] factors such as lack of collateral, low value of collateral, poor saving habits, and high interest rates also significantly affect the availability of funds from financial institutions.   In most Africa, Good Governance issues and unfavorable government rules and regulations restrict the growth of agro-food processing operations. These have impacts on the development of agro-processing.   A study was done [9] on agro-processing in Tanzania findings of the study identifies that they suffered from import dependence outside the region. A study conducted by [1] discusses company owners in Tanzania struggle because of little to no government funding. Agro-processing fields have deteriorated due to unfavorable laws of high taxation, notably in cotton, cashew processing.

Production and production of crude, due to the complicated regulations in effect, international investors are hesitant to invest in Tanzania's agro-processing market. The author developed a conceptual framework having seven independent and one dependent variable based on the review.
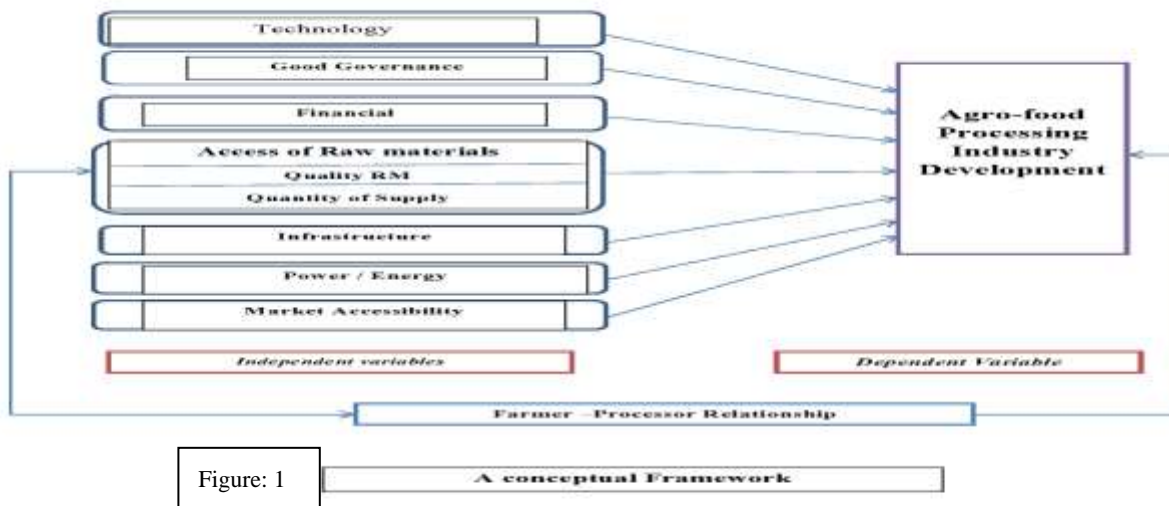
Figure: 1 — A conceptual Framework

3. Methodology

Between December-February 2020/21, the author collected data from the Oromiya National Regional State of the Federal Democratic Republic of Ethiopia. It included three first-level cities, namely, Sebeta, Adama, and Bishoftu. These cities are in the Oromiya special zone of surrounding Addis Ababa city Administration and East Shewa Zones. They are one of the hubs of the manufacturing industries, highly populated, and center of agro-food processing industries in the region. These made it much preferable for the study.

3.1. Target Population: The target population addresses the Agro-food processing industries of the Oromia National Regional State. A Report of the Oromia Bureau of Finance and Economic Development showed the total number of agro-food processing industries in the three cities is 568. The authors used a stratified Random Sampling technique after purposively selecting the study area. Sample Size: The researcher used a simplified formula provided by [21] to decide the required sample size at a 95% confidence level, with a precision level of 5%. Thus, the sample size (n) =245 and total population (N) =568. Managers and owners of industries, government experts, government officials, and economists were respondents to the questionnaire and part of the study.

The author identified seven independent variables. The dependent variable was agro-food processing development, which is in figure (1). In the research paradigm, the variables measured by five (5) point Likert Scale between strongly disagree strongly agree.

A questionnaire was distributed in hard copies to respondents after training groups of data collecting teams. A model comprising 34 variables; was framed to measure eight concepts.

3.2. Characteristics of the Sample

A study sample of 242; cleaned fulfil the circumstance of factor analysis to study; the linear regression model; [6], [7]. The author gathered the study sample from the Oromiya Regional State of Ethiopia to provide the research model. To further test this theory, the author did not examine the odds companies and instead researched the characteristics invested in Oromiya. The author divided the sample into four groups. These are a type of company, level of the enterprise, location, kind of industry. The author used a simple linear regression model to analyse the descriptive data. The author also used Statistical Package for Social Sciences (SPSS) version 22 and Stats 14.2 for analysing factors.

Model Specification

$$f(x) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \varepsilon$$

Where

X_1 = Technology

X_2 = Good governance

X_3 = Financial Constraints

X_4 = Shortage of Raw Materials

X_5 = Infrastructure

X_6 = Power /Energy Supply

X_7 = Market Accessibility

β ' are the coefficients and e is the error term.

Discussion and Results

Post-Estimation Tests

Multi-collinearity is approximate or exact linear relationships among some or all explanatory variables of a regression model. When any two explanatory variables are changing in nearly the same way, it becomes difficult to establish the influence of each one regressed on the dependent variable separately. **Multi-Collinearity Test**

The rule of thumb is that if the variance inflation factor (VIF) is less than 10, there are no severe problems with multicollinearity. Since the mean value of VIF is 1.05, there is no high linear association among the explanatory variables.

Heteroskedasticity Test

Hetero-scedasticity occurs when the variance of the error term changes with the changes in the values of the repressors'. The Breusch-Pagan test (p. value = 0.119) shows we cannot reject the null hypothesis of homoscedasticity. In other words, the model does not suffer from the problem of heteroskedasticity. **Regression Result**

The regression result of factors affecting the development of the agro-food development industry shows that all the explanatory variables are statistically significant at a 5% significance level, except the indicators technology. The F-test (probability. 0=000) also confirms the joint significance of the independent variables. Moreover, the adjusted R2 reveals 0.6983 it is nearly 70 percent of the variations in the dependent variable (Agro-Processing Development).

Figure: 2 Regression Result

(Source: Author Survey Result 2020/21)

Dependent Variable: Agro-Processing Development				
Independent Variables	**Coefficients**	**Std. Error**	**t-statistics**	**Prob.**
Tech	-.0108829	.0167024	-0.65	0.515
Gov.	.1722286	.0270466	6.37	0.000
Fc	.1489231	.0117719	12.65	0.000
Rm	.155193	.0169109	9.18	0.000
Infra	.1474015	.0122163	12.07	0.000
Power	.176158	.0146086	12.06	0.000
Mc	.1640108	.0287681	5.70	0.000
_cons	.1642456	.2080907	0.79	0.431
Adj.R2	0.6983			

F-statistics	80.67
Prob. (F-stat.)	0.0000

According to the regression results of figure two, the coefficients for Power was (0.176), Good Governance (0.172), Market Constraints (0.164), Raw materials (0.155), Financial Constraints (0.148), Infrastructure (0.147) had positive coefficients that were significantly different from zero at $0<0.05$. The coefficients for the independent variable 'technology '(-0.010) were negative. That was statistically insignificant. It indicates that the variable does not contribute to the growth of agro-food processing development in the study area.

The Results in figure 2 shows one percent rise in power supply or electricity would increase the agro-food processing industry development by (0.176) percent power supply determines the growth of agro-food processing industries.

Similarly, solving good governance problems by one percent would increase the development of the agro-food processing industry by (0.172) %. In the same way solving the constraints of market accessibility, raw materials, financial, and infrastructure by one would upsurge the development of the agro-food processing industry by (0.164%), (0.155%), (0.148%), and (0.147%) respectively. But, the results of 'technology' that is (-0.010) is statistically insignificant. Thus, it does not affect the development of the agro-food processing industry.

4. Conclusion and Recommendations

As nations go from primary agricultural production to commercial agriculture and then secondary products, food processing gains prominence as a priority of food policy. These changes have made the changing requirements and tastes of urban households with rising revenue. Agro-Food Processing industries in Ethiopia have great opportunities to produce processed foodstuff. The agricultural climatic condition, the concentrated labor nature in the sector, and local demands are the elements of seed production. However, most studies showed the current challenges of the agro-food processing industry development in Ethiopia.

The survey made on 242 agro-food processing development industries in a linear regression model in the Oromiya region had identified six factors that directly affect the development of agro-food processing. These factors included (1) power supply, (2) good governance, (3) market accessibility, (4) raw materials, (5) financial, and (6) infrastructure.

Thus, the development of the agro-food processing industries needs the engagement of the concerned bodies of the government, non-governmental organizations, and private developers should be co-ordinately strive for the betterment of the development. They primarily need to solve the problems of power supply or energy. The government should develop other options of energy resources than hydroelectric power. At the same time, the government needs to advance a scientific system of power management. Then, the government should establish accountability policies of good governance in areas of land offering management structures and human resources. The government should also solve the constraints of market accessibility of the domestic and international markets by creating forums, bazaars, and market events both at national and international levels. They should also solve the problems of raw materials scarcity.

The quality and quantity of raw materials should be advanced. Thus, it is necessary to evolve policies that link the agro-food processing industry and the farmers. It is also necessary to unravel financial constraints by providing support from government banks and financial institutions.

Finally, the government needs to develop infrastructure. It helps the facilitation and accessibility of the raw materials from the agricultural producers to the market.

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