Reconsidering the economic and nutritional importance of faba bean in Ethiopian context

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Abstract: Faba bean (Vicia faba L.) is not only an important cash crop but also is considered as a promising crop, which adapts to climate change hence feed future generations. Its high protein content and efficient atmospheric nitrogen-fixing ability makes faba bean a vital crop. This study, thus, focused on assessing the importance of faba bean in Ethiopia, specifically at reviewing the status, trend, economic and nutritional values, consumption patterns, environmental importance, and its potential role in the face of climate change. The study was conducted through a critical review of secondary data and published research and analytical reports and presented the findings and implications in Ethiopian context. The analysis revealed that about 4,840,090 tons of faba bean was produced globally on 2,463,966 hectares of land. China (1,803,019 tons), Ethiopia (930,633 tons), Australia (373,605 tons), United Kingdom (302,468 tons) and Germany (188,800 tons) are the top five faba bean producers in 2017. Moreover, the mean yield of faba bean is 1,964.3 kg ha\(^{-1}\) globally. In Ethiopia, there was an average of 41,473.4 tons faba bean export from 2012 to 2016 and an average of 1,995.52 kg ha\(^{-1}\) productivity potential from 2013 to 2017. The economic and nutritional values of faba bean can be promoted through the joint initiative between farmers union to train them, and the government should establish integrated crop markets that provide incentives to the farmers to sell their produce by using the “linking farmers to markets” approach.

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PUBLIC INTEREST STATEMENT

Faba bean is the most important food legume in many countries over the World. It makes up a major part of the daily diet for the population that includes protein, starch and fiber. Moreover, it plays an important role in sustaining the productivity of the farming systems through the fixation of atmospheric nitrogen. In most developing countries, there are various constraints of faba bean production such as poor cultural practices, lack of market opportunity to export and earn foreign income, abiotic and biotic factors, lack of improved varieties, and the ongoing climate change. Nevertheless, the most constraining factor as far as Ethiopia is concerned, appears to be lack of scientific information pertaining to the faba bean, mainly about its economic importance, nutritional values, methods of processing and consuming, the prevalent trend of production, and the world market status.
1. Introduction

Reports by WHO show that the number of people confronting hunger in the world is growing at alarming rate, and it reached 821 million in 2017 (World Health Organization [WHO], 2018). This means one in every nine people face hunger. Moreover, limited progress is being made in addressing multiple forms of malnutrition and its consequences, namely the stunting child growth, adult obesity, and the hundreds of millions of people risking various health problems due to the latter factors. More serious, however, is the worsening food insecurity, famine or hunger in the African countries like Ethiopia, despite of this the trend indicates undernourishment and food insecurity has continued to persist the country (Bogale, 2002; Endalew, Muche, & Tadesse, 2015).

From eastern African countries, the local conflict and drought problem are the main causal of hunger in which millions of people face, and 7.8 and 6.2 million People are food insecure in Ethiopia and Somalia, respectively (Intergovernmental Authority on Development [IGAD] & Food Security Information Network [FSIN], 2019). Malnutrition rates are staggering, with 3.6 million children and pregnant and lactating women projected to develop moderate acute malnutrition and 376,000 children facing severe acute malnutrition (Food and Agriculture Organization [FAO], 2019).

Accompanied by increasing human population size, the price of food crops including that of legumes has also been rising in developing world (Merga, Haji, & Yildiz, 2019). Leguminous crops such as faba bean (Vicia faba L., Fabaceae) and field pea (Pisum sativum L., Fabaceae) have substantial nutritional and environmental advantages in Ethiopia. Faba bean, for example, is a valuable source of cheap protein for the poor that cannot afford to buy animal protein. The upper parts of faba bean are rich in protein that can nourish human with almost all essential elements required for life (Etemadi, Hashemi, Barker, Zandvakili, & Liu, 2019). Its nitrogen-fixing capacity is in the order of 50–330 kg N hm⁻² (Etemadi, Hashemi, Zandvakili, & Mangan, 2018). Through its capacity of solubilizing insoluble phosphorus, it also facilitates the availability of phosphorus for other associate crops, improves soil physical environment and soil microbial activity (Rashid et al., 2016).

Faba bean is currently produced in more than 66 countries over the world. Ethiopia is considered to be the secondary center of diversity for faba bean (Torres et al., 2006). Ethiopia is among the major faba bean-producing countries in the world ranking second next to China (FAO, 2019; Torres et al., 2006). In Ethiopia, faba bean is grown primarily for its edible seeds that are used for human consumption. The mature seeds are eaten fresh or cooked in different forms and are rich in proteins and minerals such as calcium, phosphorus as well as vitamins (FAO, 2019). Thus, faba bean is among the most liked legume crops because of its versatile use. In addition to providing food for humans and maintaining soil fertility, it is also used as a fodder, reduces soil borne diseases when used in crop rotation agricultural systems (Landry, Coyne, McGee, & Hu, 2016) and attracts pollinators through its beautiful flowers (Marzinzig et al., 2018). Despite its immense use, no comprehensive information is available regarding its production systems, productivity, and market value.

This mini-review was based on the review of cross-sectional and longitudinal (time series) secondary data compiled in various documents including food and agriculture organization (FAO), FAOSTAT and other published scientific research articles. The data generally focused on worldwide faba bean production rate, consumption, market value, production constraints and future prospects. The time series data that covered many years starting from 1961 analyzed and compared input used for faba bean production, faba bean yield, its supply, consumption, etc by considering 66 countries reported to produce faba bean all over the world. Systematic review of
literature on agricultural innovations on faba bean value chains was conducted by employing systematic review of existing studies.

2. Global trend in total area cultivated vs. faba bean total yield and productivity

In 1961, the amount of land dedicated to faba bean production was 5.4 million ha with less than 5 million tons of faba bean yield. In 1962, these figures increased to about 6 million ha and tons, respectively. Afterwards, both the amount of land cultivated for faba bean production and its yield subsequently decreased and reached minimum value of 2 million ha and 3 million tons, respectively at about 1990. From 1991 to 2017, the amount of land dedicated to cultivating faba bean remained more or less constant at above 2 million ha, whereas the yield constantly increased from 3 million tons to about 5 million tons (Figure 1). Overall, the total area cultivated for faba bean production and the amount of production were 2,463,966 hectares and 4,840,090 tons, respectively in 2017. Compared to the year 1961, the area cultivated for faba bean production decreased from 5.4 to 2.46 million ha in 2017. However, the total production quantity of faba bean remained at the similar amount of 4.84 million tons between 1991 and 2017. Faba bean is also known as broad bean that found on 5th rank under pulse crops world average production of the last decade annually. The global pulse crops data of 2008–2017, revealed that the annual production of this crop is about 4.5 million tons in average (Merga et al., 2019).

Globally, the areas cultivated for faba bean have decreased highly from 5.40 million ha to 2.46 million ha, representing a growth rate of 0.81% year\(^{-1}\) over the last 56 years. As against this, the productivity for faba bean has increased 896.3 kg ha\(^{-1}\) to about 1964.3 kg ha\(^{-1}\) at a rate of 0.81% year\(^{-1}\) or more than 19.07 kg ha\(^{-1}\) during the same time period (Figure 2). Contrary to subsequent reduction in the total amount of land dedicated for cultivation of faba bean, productivity (kg ha\(^{-1}\)) showed increasing trend subsequently from year 1961 to 2017.

Five years data compiled from 2013 to 2017 showed that Asia is the world leading continent in average of productivity (2,836.13 kg ha\(^{-1}\)) and total production quantity (8,276,692 tons) on total average land area 4,088,758 ha and followed by Africa with the average total land cultivated (4,097,769 ha) for faba bean production, average production of 6,873,438 tons and average productivity of 1,527.18 kg ha\(^{-1}\) (Table 2).

3. Economic values of faba bean

Proper care in handling is critical especially if the beans are going to be sold for export. Damage to the beans can be very costly. Conveyor augers can help reduce seed damage. Lowering the distance from which the beans are dropped may also help protect the appearance of the seed. Careful handling can limit the amount of cracking and splitting. Since faba beans grow in cool, wet environments they can be seeded very early in the spring, giving farmers the ability to spread the

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**Figure 1.** Globally areas cultivated for faba bean production (million hectares; filled triangle) and amount of production (million tons; filled smooth) from 1961 to 2017. Source: (FAO 2019).
work load during seeding. Seedlings are capable of withstanding temperatures as low as −3 degrees Celsius. Faba bean is a moisture loving crop, so they are not recommended for areas where there is little precipitation or no access to irrigation. They also have great stand-ability which makes ease of harvest an additional benefit. A well thought out marketing strategy is important before you consider growing this crop.

This study has segmented the market on the basis of key regions. Currently, China represents the largest producer of faba beans accounting for more than one-third of the global production. China is followed by Ethiopia, Australia, United Kingdom, France, Germany, Sudan, Egypt, Sweden, Italy, Peru, and Tunisia (Table 1).

4. Faba bean consumptions

Physical appearance is one of the most important criteria for the beans to meet the standard for human food. For instance, physical appearance can be negatively impacted by insect damage, improper handling or improper storage, thus making them less desirable for human consumption.

The research evidence revealed that faba bean can be used as human food and animal feed; mainly for pigs, horses, poultry and pigeons in many countries all over the world (Singh & Bhatt, 2012). Ethiopia is one of the most promising countries in faba bean production that consumed in various forms and plays a significant role in soil fertility improvement over the world (Yitayih & Azmeraw, 2017). In Ethiopia, most of the energy in the diet comes from carbohydrate. Carbohydrate contributes 67.2, 73.5, and 68.1% of the total energy intake in children, women, and men, respectively (Ethiopia National Food Consumption Survey [ENFCS], 2013).

Low tannin varieties are less risky to grow because they can be sold on both export human food and domestic animal feed markets. Tannin-containing varieties are riskier because they contain anti-nutritive compounds that can only be digested easily by ruminants (dairy or beef cattle) but not monogastrics such as swine or poultry. Therefore, they are only desired as ruminant feed if they do not meet edible-grade. Hence, most producers prefer to grow low tannin varieties. There are a limited number of faba bean buyers in the western prairies. Merchants will generally export the beans whole or sell them to fractionating factories to create food ingredients for human consumption.

5. Nutritional values of faba bean

The nutritional value of diets containing varying amounts of different faba bean cultivars characterized by high or low levels of tannins, and high or low levels of vicine + convicine (VC), has been examined in monogastric animals and ruminants. Low-tannin content generally results in higher
protein and energy digestibility for monogastric animals and low VC content has a positive effect on laying hen and broiler production performances (Crépon et al., 2010). Faba bean stubble/crop residue offers significant value as a source of feed for grazing animals. A major portion of the value of stubble lies in the grain remaining after harvest and not in the dead plant (leaf and stem) material. Although the dead plant has some nutritive value, livestock select the grain first and only eat significant amounts of the plant when grain becomes scarce.

Faba bean has an important place in the human diet and is consumed in various forms for its high protein content. In some parts of the world, the green, immature beans are eaten after boiling. The bean is also eaten roasted in India, where it is used as a coffee extender (Yitayih & Azmeraw, 2017).

Faba beans, like other pulses, can be processed into protein, starch, and fiber. They are high in protein (28–32%) compared to field peas (24%) and are low in oil. Faba beans are predominately exported to areas in the Mediterranean and the Middle East with Egypt being the largest producer.

### Table 1. 30 Faba bean-producing countries in 2016 in terms of tons produced and value ($)

| Rank | Country     | Production (tons) | Value (Million $ Int.) |
|------|-------------|-------------------|------------------------|
| 1    | China       | 1,627,776         | 328.43                 |
| 2    | Ethiopia    | 878,010           | 298.10                 |
| 3    | Australia   | 423,527           | 115.82                 |
| 4    | United Kingdom | 291,791       | 105.41                 |
| 5    | France      | 198,246           | 45.05                  |
| 6    | Germany     | 153,700           | 46.47                  |
| 7    | Sudan       | 1,121,412         | 222.04                 |
| 8    | Egypt       | 119,056           | 65.06                  |
| 9    | Sweden      | 103,900           | 40.1                   |
| 10   | Italy       | 100,013           | 75.47                  |
| 11   | Peru        | 71,919            | 43.75                  |
| 12   | Tunisia     | 67,000            | 30.84                  |
| 13   | Spain       | 53,625            | 16                     |
| 14   | Algeria     | 38,048            | 10.93                  |
| 15   | Mexico      | 36,970            | 24.21                  |
| 16   | Syria       | 36,596            | 1.1                    |
| 17   | Guatemala   | 27,705            | 18.1                   |
| 18   | Austria     | 27,695            | 18.16                  |
| 19   | Morocco     | 26,564            | 18                     |
| 20   | Iran        | 17,690            | 5.15                   |
| 21   | Argentina   | 16,408            | 1.23                   |
| 22   | Paraguay    | 15,220            | 9.15                   |
| 23   | Uzbekistan  | 14,973            | 9.8                    |
| 24   | Turkey      | 14,489            | 8.86                   |
| 25   | Bolivia     | 13,114            | 6.95                   |
| 26   | Dominican Republic | 12,849 | 8.4   |
| 27   | Austria     | 6,927             | 1.73                   |
| 28   | Colombia    | 6,251             | 1.8                    |
| 29   | Greece      | 5,693             | 6.35                   |
| 30   | Nepal       | 5,577             | 3.57                   |

Source: FAO (2019)
Both tannin and low tannin varieties are in demand in worldwide food markets. Canning, sauces, and falafel are common uses for both types of faba bean.

The fractionation of faba bean components has been explored. New varieties have been bred to have reduced levels of anti-nutritional qualities. Demand for non-genetically modified, high protein, gluten-free foods rich in micro-nutrients has made pulse crops, such as faba bean, valuable in the food fractions market. Faba bean has the added benefit of being incorporated into animal feed rations if it does not meet the specifications for human consumption. Their low oil content means

| Region   | Country  | Area (ha) | Productivity (kg ha$^{-1}$) | Production (tons) |
|----------|----------|-----------|-----------------------------|------------------|
| Africa   | Algeria  | 191,318   | 1,114.62                    | 213,486          |
|          | Egypt    | 183,724   | 3,497.76                    | 643,591          |
|          | Eritrea  | 2,537     | 605.2                       | 1,556            |
|          | Ethiopia | 2,300,083 | 1,995.52                    | 4,574,768        |
|          | Morocco  | 801,940   | 627.76                      | 533,593          |
|          | Sudan    | 341,430   | 1,783.94                    | 610,841          |
|          | Tunisia  | 276,737   | 1,065.46                    | 295,563          |
|          |          | **4,097,769** | **1,527.18*** | **6,873,438** |
| West Asia| Iran     | 39,925    | 2,248.1                     | 90,144           |
|          | Iraq     | 8,081     | 2,935.52                    | 21,809           |
|          | Syria    | 89,560    | 1,924.04                    | 171,404          |
|          | Turkey   | 29,004    | 2,631.82                    | 76,066           |
|          | Yemen    | 12,456    | 2,383.26                    | 26,066           |
|          |          | **4,088,758** | **2,836.13*** | **8,276,692** |
| East Asia| China    | 3,896,471 | 2,006.78                    | 7,815,495        |
|          | Uzbekistan| 13,261    | 5,723.42                    | 75,708           |
|          |          | **4,088,758** | **2,836.13*** | **8,276,692** |
| Europe   | Albania  | 808       | 1,273.9                     | 1,029            |
|          | Italy    | 227,117   | 1,870.96                    | 425,436          |
|          | Germany  | 159,800   | 3,892.86                    | 623,000          |
|          | Russia   | 28,710    | 1,463.72                    | 40,074           |
|          | Spain    | 174,410   | 1,408.48                    | 234,359          |
|          | Sweden   | 121,340   | 3,564.36                    | 434,800          |
|          | United Kingdom | 371,851 | 3,793.02                    | 141,065          |
|          | France   | 370,217   | 3,156.18                    | 1,162,490        |
|          | Austria  | 45,754    | 2,415.98                    | 110,408          |
|          |          | **1,500,007** | **2,537.72*** | **3,172,661** |
| North America| Mexico | 122,896   | 1,401.78                    | 17,0981          |
| South America| Argentina | 9,088    | 8,946.66                    | 81,309           |
|          | Bolivia  | 67,450    | 950.88                      | 64,108           |
|          | Brazil   | 103,508   | 313.28                      | 33,432           |
|          | Paraguay | 120,108   | 620.06                      | 74,225           |
|          | Peru     | 278,500   | 1,383.08                    | 385,080          |
|          |          | **578,654** | **2,442.79*** | **638,154** |
| Australia|          | 1,097,378 | 1,718.4                     | 1,785,832        |
| World (total)|          | **11,788,185** | **1,918.62*** | **22,612,242** |

Note: *The productivity is presented in average. Source: FAO (2019)
they do not need to be processed for oil extraction before being used for feed, like soybeans. Low tannin varieties can be fed to a variety of livestock such as hogs, dairy, beef cattle, lamb, poultry and even fish and buffalo. Faba bean is the highest nitrogen-fixing annual legume making it an excellent rotational crop. Faba bean can fix upwards of 90% of their own nitrogen requirements, which means less nitrogen fertilizer needs to be applied in the spring. There has been some anecdotal evidence that cereal crops following faba bean can increase a yield increase of 10 to 15%. This could be a result of the nitrogen that is slowly released from the faba bean stubble.

6. Environmental values of faba bean
Efficient management of legumes to maximize benefits depends on a correct field assessment of N₂ fixation (López-Bellido et al., 2011). Faba beans showed high N fixation under optimum conditions (with a mean of varieties of 21.9 g N m⁻²) whereas drought considerably impaired N fixation (with a mean of varieties of 6.3 g N m⁻²; with no differences between autumn and spring-sown faba beans) (Neugschwandtner, Ziegler, Kriegner, Wagentristl, & Kaul, 2015). The effectiveness of faba bean nodule in nitrogen fixation depends on the variety of the crop, the physical and chemical properties of soil and rhizobia that found in the soil (Argaw & Mamlouk, 2017).

Annual rates of N₂ fixation by un-inoculated faba bean varied from 76 to 125 kg N ha⁻¹, with a regular rainfall distribution during the growth cycle, and from 55 to 72 kg N ha⁻¹ under drought stress. Annual rates of N₂ fixation by un-inoculated peas varied from 31 to 107 kg N ha⁻¹ with regular precipitation, and from 4 to 37 kg N ha⁻¹ under drought stress (Carranca, De Varennes, & Rolston, 1999).

7. Taste and cooking quality of legumes
The evidence from the research results revealed that steaming, roasting, frying, and others are the most common cooking methods of legumes (Fabbri & Crosby, 2016). The under-utilization of legumes is due to the difficulty of testa that can consume time and fuel during cooking (El-Tabey Shehata, 1992). Sweet corn and soymilk can improve the taste and nutritional quality of soy-corn milk that makes soya bean preferable from other legumes for consumption and marketing (Omueti, Oguntona, Jaiyeola, & Ashaye, 2000). The in vitro protein digestibility of faba bean and white bean cultivars was greatly improved after cooking with a maximum value of 89.66% obtained for faba bean cultivar BB7 and a minimum value of 48.10% obtained for white bean cultivar RO21 (Abusin, Hassan, & Babiker, 2009). The genetic characteristics of faba bean varieties has sufficient variability in seed yield and its components combined with appropriate amount and variability of carbohydrate, fiber, and protein contents and quality that can determine the taste and cooking qualities for consumption (Gasim, Hamad, Abdelmula, & Mohamed Ahmed, 2015).

8. Faba bean variety
Ethiopia is considered to be one of the centers of secondary diversity for faba bean pulse crop and produced in many parts of the country (Torres et al., 2006). The productivity, economic and nutritional values, nitrogen-fixing ability, taste, and cooking for consumptions, and tolerance or resistance of faba bean crop depends on the variety or cultivars (Zandvakili, Barker, Hashemi, Etemadi, & Autio, 2019). The purpose of faba bean cultivation, seed size, color, nutritional quality, environmental adaptation, and system of production are vary from one variety to the other that can be used for feeding animals and human consumption (Crépon et al., 2010; Gnanasambandam et al., 2012). In 2014, three cultivars of high-yielding faba bean that increased faba bean yields in Sudan by 40% were released in Sudan, which can tolerate temperatures up to 35 °C including “Hudeiba93,” “Basabeer” and “Ed-Damer” (Etemadi et al., 2019). The variety of faba bean crop released in Egypt “Nubaria 3” is drought tolerant and “Windsor” popular in England (Etemadi, Hashemi, Shureshjani, & Autio, 2017; ICARDA, 2018). In New England, the variety Windsor is currently the dominant cultivar available to the growers (Etemadi et al., 2017).
The mean performance of 11 faba bean varieties for 33 years of breeding revealed that there was a decline of 8.9% in chocolate spot resistance in Ethiopia (Tolessa, Keneni, & Mohammad, 2015). In Ethiopia the major and widespread faba bean disease, faba bean gall, can be controlled not to cause economic yield loss by using “Degaga” and “CS20Dk” varieties that revealed superior yield of 1,157.74 and 1,085.12 kg ha\(^{-1}\), respectively (Yitayih & Azmeraw, 2017). Obse and Motie were found to have maturity to have early maturity date; whereas Hachalu had late maturity, good height, resistance to disease, largest 1000-seed weight, the highest yield (24.3 kg/ha) and best fitted to the agroecology by providing above average yield performance in Ethiopia (Tigabu Degu & Oluwole, 2019). Singh, Bharati, Manibhushan, and Pedpati (2013) reported that faba bean is the best performing pulse crop under current global climate change and has high adaptability to various soil conditions.

9. Nutrient requirements of faba bean

Even though various research results showed some controversy on the nitrogen requirements faba bean crop an average of 25 kg N hm\(^{-2}\) as a starter during crop sowing to emerging period (Roman, Bralewski, Fiebig, & Bocian, 2004). The research evidence revealed that 7.84 pods plant\(^{-1}\) and 4,585 kg ha\(^{-1}\) was obtained after 301 kg ha\(^{-1}\) N, 30.0 kg ha\(^{-1}\) P, 206.9 kg ha\(^{-1}\) K, 138.5 kg ha\(^{-1}\) Ca, and 23.9 kg ha\(^{-1}\) Mg were up-taken by faba bean plant (Daur, Sepetoglu, Marwat, & Geverek, 2010).

The biological nitrogen fixation of faba bean has a significant role to produce high yield and maintain N fertility of the soil. Moreover, the N and P up-taken by plant that can be shared among grain and straw have positive impact on the quality and yield of faba bean seed (Klippenstein, 2019). The application of potassium (K) and sulfur (S) fertilizer on faba bean did not show a significant influence on the crude protein (CP) and amino acid (AA) composition (Barłóg, Grzebisz, & Remigiusz, 2019). Negative control plants grown in 0.01 mM MgSO\(_4\) revealed strong reductions in photosynthesis and biomass, which illustrate the importance of Mg as a plant macronutrients and this tell us the need for developing adequate Mg application strategies to ensure high plant productivity (Neuhaus, Geilfus, & Mühling, 2014).

Globally China is the leading country with 40% while Ethiopia followed with 24% for faba bean production (Figure 4). This revealed that Asia is the leading continent and Africa found on second (Figure 3). According to FAO data, the global export of faba bean is increased slightly from 1994 to 2016 years (Figure 5). Ethiopia is among the major faba bean-producing countries in the world ranking second next to China with 930,633 tons while the total production value was about 315.97 million dollars during 2017. There was average of 41,473.4 tons faba bean export from 2012 to 2016 and an average of 1,995.52 kg ha\(^{-1}\) productivity potential from 2013 to 2017 (Tables 2 and 3).
Factors such as growing population, rising disposable incomes, adoption of healthier food habits and growing intake of legumes, particularly in emerging countries, are currently driving the growth of the faba beans market. This paper has also covered some of the key exporting and importing countries in the global faba bean market. The "average importing and exporting" status of the world in 2012–2016 is evident in Tables 3 and 4, which gives the national share of different countries of the faba bean in import and export, and how it has changed in 5 years. Australia represents the biggest exporter accounting for more than 43% of the total global export volumes while France and United Kingdom revealed equal share of 22%. Australia is followed by France, United Kingdom, Lithuania (7%) and Ethiopia (6%) (Table 3). Among the top importing

Table 3. Annual exports of top 5 exporters of faba bean in average 2012–2016

| Country          | Exports (tons) |
|------------------|----------------|
| Australia        | 308,257.2      |
| France           | 157,090.8      |
| United Kingdom   | 152,779.4      |
| Lithuania        | 51,456.6       |
| Ethiopia         | 41,473.4       |

Source: FAO (2019)
countries, Egypt represents the biggest importer of faba beans accounting for around 74% of the total global import volumes. Egypt is followed by Sudan (9%), Saudi Arabia (7%), Norway (7%), and Italy (3%) (Table 4).

10. Conclusions
This paper has clearly shown that 7.8 million People in Ethiopia are food insecure. This shown us that the intervention is needed to feed and updated information required to disseminate the production system and status, trend, economic and nutritional values, and environmental importance of food crops. Faba bean is currently produced in more than 66 countries over the world. Ethiopia is among the major faba bean-producing countries in the world ranking second next to China with 930,633 tons while the total production value was about 315.97 million dollars during 2017. There was average of 41,473.4 tons faba bean export from 2012 to 2016 and an average of 1,995.52 kg ha$^{-1}$ productivity potential from 2013 to 2017. Ethiopia is one of the most promising countries in faba bean production that consumed in various forms and plays a significant role in soil fertility improvement over the world. Low tannin varieties are less risky to grow because they can be sold on both export human food and domestic animal feed markets.

Faba beans, like other pulses, can be processed into protein, starch, and fiber. They are high in protein (28–32%) compared to field peas (24%) and are low in oil. There is a remarkable change in production, consumption, and value of faba bean over the world especially in developing countries like Ethiopia. Faba bean have value in both human consumption and animal feed markets. They are a hardy crop and can be a valuable part of a crop rotation. Pricing options are available to faba bean producers, although it is important to discuss contract specifications with potential buyers ahead of time to ensure that there is a buyer for the product. The trends and changing patterns in the food vs. feed vs. vegetable use of faba bean crop, and the gender dimensions associated with the production, marketing, and consumption are policy relevant topics for further research.

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| Table 4. Annual imports of top 5 importers of faba bean in average 2012–2016 |
|-----------------------------|-----------------------------|
| Country       | Imports (tons) |
|-----------------|-----------------|
| Egypt           | 420,696.8       |
| Sudan           | 51,719.4        |
| Saudi Arabia    | 38,261.2        |
| Norway          | 38,043.6        |
| Italy           | 20,866          |

Source: FAO (2019)
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