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Spices production and marketing in Ethiopia: A review

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Abstract: This paper attempts to describe the status, challenges and opportunities of spices production and marketing in Ethiopia. Ethiopia has enormous potential to produce and export various spice crops. The country mainly produces and exports; chillies, turmeric, ginger, black pepper, cumin, fenugreek, coriander and so forth. Inspite of the fact that the country has tremendous potential for various spices production, the subsector of spices had remained untapped and neglected and subsequently the level of production and share of spice crops of the total export earning of the country is at considerably low level. Hence, it is essential to describe the status, challenges and opportunities of spices sector in Ethiopia, for best uses of the potential and untapped spice crop resources. Among the various spices crops, chilli/hot pepper is the most commonly produced spices in Ethiopia. However, the production of ginger has devastated in 2013 on wards due to bacterial wilt epidemic and hence, turmeric occupies the large share of its production and exports. Similarly, the Ethiopian spice exports has showed a declining trend from 2013 on wards. This is mainly due to the disease that considerably affect ginger production and the rapid increasing domestic demand of spices. Hence, the share of spices export has been remained low compared to the country’s total export earnings. Therefore, intervention and provide awareness for spices growers on using improved

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PUBLIC INTEREST STATEMENT

The sub-sector of spices is among one of the critical components of the agricultural sector in Ethiopia as it contributes to the enhancement of the Ethiopian economy and ensuring food security. In Ethiopia, the spices sub-sector had remained under-utilized and neglected and subsequently the level of production in the country is far below the global standard. Similarly, the share of spices export has been very low compared to the country's total export earnings. Conventional way of cultivation, poor use of mechanized technology, lack of agricultural inputs, unavailability of advanced handling (drying) technology, adulteration, lack of spices marketing regulation and proclamation commonly and mostly influence production and marketing of spices in Ethiopia. Hence, it is greatly recommended to intervene and provide awareness for spices growers on alleviating various production and marketing challenges associated with these crops to improve the smallholder production systems, profits and economic development of the country.
production and processing technology, training across all value chains, formulating strong marketing regulations and proclamation is of paramount importance to increase the production, profits and export values.

**Subjects:** Agriculture & Environmental Sciences; Agriculture; Crop Science; Horticulture; Agriculture and Food; Agronomy; Food Additives & Ingredients

**Keywords:** Export; challenges; ginger; chilli; opportunities; technology

1. Introduction
The agriculture sector is the pillar in the Ethiopian economy as it contributes 34.1% to the gross domestic product (GDP) and offers about 79% of foreign exchange earnings and creating job opportunity for about 79% of the population (Diriba, 2020). Next to coffee, the Ethiopian pulses, oilseeds and spices sectors are among one of the critical components of the agricultural sector contributing to high foreign exchange revenue as reported by the Ethiopian Ministry of Industry (EMI (Ethiopian Ministry of Industry), 2015). As a cash crop, the spice sub-sector has immense potential for income generation of the farming community, creation and development of business opportunities and poverty reduction in Ethiopia (Hordofo and Tolassa, 2020; Tesfa et al., 2017). In Ethiopia, spices have been utilized for different purposes such as to flavor foods and beverages (to improve flavor, aroma and color), to make medicine and perfumes (ITC (International Trade Centre), 2010 and Tesfa et al., 2017). In addition, complex or secondary effects such as salt and sugar reduction and improved texture for certain foods can be achieved by using spices (EMI (Ethiopian Ministry of Industry), 2015).

The total global spice production was amounted to 12.8 million tons in the year 2018. Chilli was the most commonly produced spices, with a total production of 4.1 million tons in the year 2018 (32%) according to Titus and Wojtek (2020). The top five spices producer countries in the world are India, China, Turkey, Bangladesh and Indonesia, in that order (FAOSTAT (Food and Agriculture Organization of the United Nations, Statistics Database), 2019). With long history of spices production (Kiflelew et al., 2017; Tesfa et al., 2017), Ethiopia is one of the East African countries that produce and export various spices (Dessie et al., 2020) with production reaching 244,000 tons per year (GIT (Gatefarms International Trade), 2016). Spices production in Ethiopia was expanded between 1995 and 2011 from 107,000 to 153,000 tons with annual growth rate of 9.5% (EMI (Ethiopian Ministry of Industry), 2015). In Ethiopia, more than 50 spice crops are grown and a total potential for growing low land spices is estimated to be 200,000 hectares (GIT (Gatefarms International Trade), 2016; ITC (International Trade Centre), 2020).

The total spice production in Ethiopia increased from 234,000 tons in 2013 to 356,000 tons in 2018, while the area under spice cultivation increased from 150,000 ha to 207,000 ha (Titus & Wojtek, 2020). Chilli pepper is the most commonly produced spice (ITC (International Trade Centre), 2010; Herms, 2015; EMI (Ethiopian Ministry of Industry), 2015; Dessie et al., 2019) accounts for over 80% of total spice produced in the country (Titus & Wojtek, 2020). Ginger is the second most produced spice crop until 2013 (EMI (Ethiopian Ministry of Industry), 2015; Herms, 2015). However, ginger production has devastated in 2013 on wards due to bacterial wilt epidemic and hence, turmeric occupies the large share of its production and exports (Titus & Wojtek, 2020). According to Kiflelew etal. (2017) among the total seed spices grown in Ethiopia; black cumin, ajwain or bishop’s weed (netch azimud), fenugreek and coriander were known to have around 36 and 17% share in area and production, respectively. It was estimated that the Ethiopian spice export trade was below 1% of the country’s total export earnings (Yimer, 2010). However, the share of spice exports was 1.1 and 1.4% in volume and value, respectively, during the crop year 2003/04 and 2004/05. It was reported that the average annual growth rate of spices was 25.6 and 25.3% in volume and value, respectively, between 1998 and 2010 (Yimer, 2010). The total value of
spice exports earnings was estimated at US$ 18.568 million in 2009/10 alone. Export earning of an approximately US$ 50 million per year was achieved in 2015, mainly from black cumin, ginger and turmeric, thereby showing an increasing trend compared to the previous years in export spice market (ITC (International Trade Centre), 2010). Ginger was the most commonly exported spice accounting for the lion’s share of 60.75% in volume during the years 2007/08-2012/13, followed by turmeric (11.47%), pepper (9.26%) and cumin (8.85%) (EMI (Ethiopian Ministry of Industry), 2015). From 2013 on wards, the Ethiopian spice exports have shown a declining trend due to the bacterial wilt epidemic that considerably affect ginger production (Titus & Wojtek, 2020). As a result, the export of ginger was almost entirely disappeared in 2015 (Herms, 2015). In 2017, ginger exports from Ethiopia had a value of just only US$10,000 and was thus responsible for a negligible share of Ethiopian spice exports (Titus & Wojtek, 2020)

Ethiopia has favorable or conducive environments for various spices production due to the presence of varied climatic and agro-ecological conditions, abundant cultivable and irrigable land, with encouraging government policy environment (Goshme & Ayele, 2019; Herms, 2015; Hordofa and Tolossa, 2020). However, inspite of the suitable agro-ecology base for spice production and a long history of spice cultivation and marketing in Ethiopia, the status of spice production and export in the country is far below expectation. So far, studies related to the production and marketing of spices in Ethiopia are very limited. Even the existing research works and literature have not been well organized and documented in a way it can give enough information for policy-makers and researchers in the country for best use of the potential and untapped spice crop resources. Hence, it is essential to review the status, challenges and opportunities in spice production and marketing in Ethiopia for end users, including policy-makers, researchers, students, farming communities and enterprises involved in the spice business or trade, especially processers and exporters.

2. Spices production and marketing in Ethiopia

2.1. An overview on status of spices production in Ethiopia

Ethiopia has tremendous potential for growing many spice crops (Herms, 2015; Hordofa and Tolossa, 2020; Titus & Wojtek, 2020). The country mainly produces; chillies, turmeric, ginger, cumin, fenugreek, coriander, black pepper, cardamom and so forth (EMI (Ethiopian Ministry of Industry), 2015; Herms, 2015; ITC (International Trade Centre), 2020; Titus & Wojtek, 2020). More than 50 spice crops are grown in Ethiopia and a total potential for cultivating lowland spices is estimated at 200,000 hectares (GIT (Gatefarms International Trade), 2016; ITC (International Trade Centre), 2020). According to GIT (GIT (Gatefarms International Trade), 2016), the annual average land covered by spices and annual production is around 222,700 ha and 244,000 tons per year, respectively. The production of spices in Ethiopia was expanded during the years from 1995 to 2011 from 107,000 to 153,000 tons with annual growth rate of 9.5%, following global and domestic consumption (FAO (Food and Agriculture Organization of the United Nations), 2013; EMI (Ethiopian Ministry of Industry), 2015). Inspite of the fact that the country has favourable or conducive environments for various spices production, the production of spices in Ethiopia is mostly performed on little plot of land by small holder farmers conventionally (Herms, 2015; Tesfa et al., 2017). As a result, the level of spices production and productivity in the country is far below the expectations.

During the year, 2005 to 2013, black cumin, cardamom, chillies, ginger and turmeric accounted for 97% volume of the national annual average spice production in Ethiopia (ENTAG (Ethiopia-Netherlands Trade for Agricultural Growth), 2018; Herms, 2015). The average spice production shares in Ethiopia during the production years from 2005 to 2013 is shown hereunder (Figure 1). Inspite of the reality that the country is rich in having suitable and diverse agro-ecological zones over its whole regions, 94% of the production comes particularly from Southern Nations, Nationalities and People’s
The SNNP, Oromia, and Amhara regions (ENTAG (Ethiopia-Netherlands Trade for Agricultural Growth), 2018; Herms, 2015) contributed 37, 32, and 25%, respectively, to the average annual spice production during the cropping years 2010 to 2014. The major spice crops produced in these regions mostly comprised of black cumin, cardamom, chillies, coriander, fenugreek, ginger, hot pepper and turmeric (Herms, 2015). The Southern Nations, Nationalities and People’s Regional State (SNNPRs) is the major producer of cardamom, ginger and turmeric (Herms, 2015) with the highest share of total spices produced in the country (Girma et al., 2016). The Oromia and Amhara regions are mostly producers of black cumin and chillies (Herms, 2015). In Ethiopia, the total area and production of spices was estimated at 150,000 hectares and 234,000 tons in 2013, which was increased to 207,000 ha and 356,000 tons in 2018 (Titus & Wojtek, 2020). The share of Ethiopian spice production in 2018 is depicted hereunder (Figure 2). The share of chilli peppers and turmeric increased in 2018 (Figure 2) while that of ginger significantly reduced as compared to average spices production shares shown in 2005 to 2013 in Figure 1.

Figure 1. Average spices production shares from 2005 to 2013 in Ethiopia.

Source: (Herms, 2015)

Figure 2. The share of Ethiopian spice production in 2018.

Source: (Titus & Wojtek, 2020)
The major seed spices producing regions include the Amhara and Oromiya regions, whereas SNNPRs and Gambella region are dominant producers of lowland spices (EMI (Ethiopian Ministry of Industry), 2015). Out of the total seed spices grown in Ethiopia, black cumin, ojwain or bishop's weed, fenugreek and coriander were known to have around 36 and 17% share in area coverage and production, respectively (Kiflew et al., 2017). The mean annual production of spices in Ethiopia from cropping year 2005 to 2018 is also indicated hereunder (Table 1).

Among the various spices cultivated in Ethiopia, chilli pepper was the most commonly produced and consumed spice crop in Ethiopia (ITC (International Trade Centre), 2010; Herms, 2015; EMI (Ethiopian Ministry of Industry), 2015; Dessie et al., 2019). Chili pepper accounts for over 80% of total spice produced in the country (Titus & Wojtek, 2020). The crop is cultivated throughout the SNNP, Amhara and Oromia regions, with centers of production in Ghion, Bako and Harar areas. Ethiopia has good climatic and soil conditions for growing chillies. The most commonly grown chilli variety is the mareko fana (a pungent long chilli of dark-red appearance) and smaller mitmita chillies, an even hotter, red, small pepper (Herms, 2015). In the long run, Ethiopian chillies will have promising potential for a smallholder-driven investment model as smallholder farmers need to build experience with intensive post-harvest treatment and local traders need to gain expertise in product grading, whereas commercial production holds the largest prospects in the short run (Herms, 2015). In Ethiopia, production of chilli was estimated to be 234,000 tons in 2014 (Herms, 2015). Likewise, Ethiopia's dry chilli production was estimated at 290,000 tons in 2018 production year (Titus & Wojtek, 2020). In Ethiopia, the over all chilli production shows an increasing trend (Figures 1 and 2).

Ginger was the second most produced and consumed spice crop, followed by fenugreek in Ethiopia until 2013 (EMI (Ethiopian Ministry of Industry), 2015; Herms, 2015). However, the ginger production has devastated due to bacterial wilt epidemic, which spread throughout the country in 2014. As a result, the Ethiopian government has been implementing soil remediation programs in the SNNP region and Jimma Agricultural Research Center (JARC) has been making research effort in developing resistant seed material against this disease (Herms, 2015). Ginger is grown in many countries in the world. In Ethiopia, the major ginger producing regions include SNNPRs, Oromia, Amhara, Gambella and Benishangul Gumuz (Zakir et al., 2018). However, Eighty-one (81%) percent of ginger was mainly produced in the SNNP region in 2013 (Herms, 2015). According to Buke et al. (2016), Wolaita Zone (SNNPR) shared more than 50% area coverage of ginger production in the year 2011/12. Generally, the production and productivity of ginger in Ethiopia is lower than other ginger producing countries of the world (Girma et al., 2016). In Ethiopia, the ginger

| List of spice crops                          | Production (Tons) |
|---------------------------------------------|-------------------|
| Anise, badian, fennel and coriander         | 2,983.29          |
| Chillies and peppers, dry                   | 182,421.2         |
| Ginger                                     | 9,897.14          |
| Hops                                       | 31,411.07         |
| Mustard seed                               | 2,561.07          |
| Nutmeg, Mace and cardamom                  | 135.5             |
| Other spices                                | 29,690.8          |

Source: FAOSTAT (FAOSTAT (Food and Agriculture Organization of the United Nations, Statistics Database), 2019) and own sketch.
production from the cropping year 2013 to 2018 shows a considerable declining trend (Figures 1 and 2) which is mainly due to bacterial wilt disease.

The bulk of the turmeric produced in Ethiopia is consumed domestically. Only a small portion is exported to China, Djibouti, Egypt, Europe, India, Kenya, Morocco, Saudi Arabia, Sudan, Tanzania, USA and Yemen (Girma et al., 2016). The SNNP region accounted for 76% of Ethiopia’s turmeric production, which was increased from 2,000 tons in 2008 to 12,000 tons in 2013 and 2014, respectively (Girma et al., 2016; Herms, 2015). The production and productivity of turmeric has not been expanded as anticipated in Ethiopia. The production and productivity of turmeric was about 22.75 thousand tons and 3.50 tons per hectare, respectively, in the cropping year 2014/15. As there are wide suitable areas and possibility of adoption of the improved cultural practices for turmeric cultivation, there is a high opportunity to enhance the productivity from the existing 3.5 tons per hectare to more than 10.0 tons per hectare (Girma et al., 2016). According to Addisu (2014), the national productivity of turmeric in Ethiopia was estimated at 2.4 tons per hectare compared to 4.0 tons per hectare for India. From the year 2014 on wards turmeric production and productivity in Ethiopia has been increasing (Figures 1 and 2). This is mainly due to the the impact of bacterial wilt disease had on ginger in 2014 and hence, farmers are shifted to the production of turmeric (Titus & Wojtek, 2020).

In Ethiopia, black cumin is used to flavor bread and sauces as well as an ingredient in the berbere (hot pepper) spice mix. The crop is cultivated in Amhara, Oromia and SNNP regions at an altitude ranging between 1500 and 2500 m.a.s.l., often intercropped with cereals. The crop is not prevalent in western markets, where the white cuminum cuminum is favored (Herms, 2015). At Tepi (Southwestern Ethiopia), the national average productivity of black cumin was estimated at 0.79 tons per hectare (Kifelew et al., 2017).

2.2. An overview on major challenges in spices production in Ethiopia

According to the Ethiopia-Netherlands Trade for Agricultural Growth (ENTAG (Ethiopia-Netherlands Trade for Agricultural Growth), 2018), the cultivation of spices by smallholder farmers was typically performed on little plots of land (< 0.5 ha) around and inside natural forests. Smallholder farmers barely utilize agricultural inputs, such as pesticides, fertilizers/manures and improved seeds. Farmers mostly utilize traditional drying techniques, which might be a source of contamination by foreign matter, such as dirt and dust as well as the infestation by insect pests and rodents. Most of the smallholders are the least fortunate farmers with low level of education and training. In addition, the spices production system in Ethiopia is mostly rain dependent. Planning and implementation ability of smallholder farmers is poor since they do not allocate reasonable land for the cultivation and development of the spice sector. As reported by Tesfa et al. (2017) with the exception of certain spice crops, like Capsicum and Allium spp., fenugreek, and black and white cumin, farmers do not set up their farm lands well. In general, farmers give little consideration for spice crops, while concentrating mainly on food crops.

Conventional way of farming characterized by the absence of improved seeds/varieties, absence of planting materials, lack of properly recommended seed rate and fertilizer types and rates are among the challenges smallholder farmers are facing. Moreover, high frequency of weeding, lack of effective weed management practices, different plant diseases and insect pests as well as wild animal competition also contributed to the low productivity of spice crops. The problems are further exacerbated by high input requirement, poor harvest and post-harvest management, and a lack of modern drying facilities that led to long time of drying. Most importantly, the addition of lack of access to credit and extension, poor quality of outputs, lack of irrigation facilities affects the production, productivity, and quality of spices in Ethiopia (Gebreazgaabher & Negash, 2015; Goshme & Ayele, 2019; Lupi et al., 2016; Tariku et al., 2016).

Lack or shortage of planting material has been also reported as one of the critical problems of ginger production in Ethiopia (MoARD (Ministry of Agriculture and Rural Development), 2008). Also,
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Geta and Kifle (2011) indicated that high weeding infestation and high input requirements, including purchasing costs of seed and fertilizers, the high cost of production and absence of improved drying techniques reduce ginger production and productivity in southern Ethiopia. Similarly, a study conducted in two districts, namely Nekemte and Shambu, of Wollega Zone, in western Ethiopia, recorded that 86, 74.5, 41, 35.95, 62.10, 52.25, and 32.75% of sampled farmers affirmed that insufficient fertilizer/manure supply, planting materials, lack of access to credit, wild animal competition, price setting, scale and demand, respectively, were the main factors that negatively influenced korarima (cardamom) production (Gebrezgaabher & Negash, 2015).

According to Kiflew et al. (2017), inadequate production technologies developed so far have yet not expanded and not advocated to farmers. As indicated by Yimer (2010), weak role of private business investors in spice production, irregular supply and variable nature of spices produced from forest and agricultural landscape, lack of the use of appropriate modern technologies in farm management, drying, storage and absence of proper spices development strategic interventions were some of factors affecting production of spice crops in Ethiopia. According to Melanie and Michael (2011), smallholder farmers hardly get improved spice crop seeds adapted to their agro-ecological conditions. Farmers are using unimproved spice seeds, which have low production and also that encourage the spread of plant diseases. Counterfeit/unimproved spice seeds sold by corrupt broker’s traders is a major problem in various regions of Africa. Small-scale farmers regularly purchase seeds from informal uncertified sources. The commercial formal seed system may advertise a range of hybrid varieties not necessarily best suited to local conditions but are at the expense of traditional varieties.

Yousif (2008) pointed out that several problems, including lack of improved seed, recommended fertilizer rate, poor postharvest handling and marketing systems, constrain black cumin production and productivity. According to Kiflew et al. (2017), plant diseases, like fusarium wilt, black cumin blight and powdery mildew, are the most significant constraining factors to black cumin production. Aphids and mites are also reported as the major insect pests attacking black cumin. However, Tesfa et al. (2017) reported that both black and white cumin are rarely affected by rust, root rot, aphid, and boil and cut worms in South Wollo, Ethiopia. Pressure on the natural habitat, unimproved variety, non-adapted agronomic practices and losses caused due to biotic and abiotic stresses were also previously reported to affect the genetic diversity of cardamom (Korarima) in Ethiopia (Girma et al., 2016). Similarly, Gobie (2019) currently reported that lack of improved seeds to satisfy producers demand, lack of advice and technical support, non-timely distribution of fertilizer(s), lack of training for experts and shortage of manuals, publications and guidelines for spice production mainly affect the red pepper production in Ethiopia. According to Dessie et al. (2019) the main red pepper production constraints include inadequate agricultural inputs, occurrence of disease, lack of improved and high yielding varieties and shortage of land. The production problem faced by pepper producers at Northwest Ethiopia is depicted hereunder (Figure 3).

Production of the Ethiopian cardamom and long pepper are going on relatively well though long pepper is only being produced by a few farmers. However, Indian cardamom and black pepper face many challenges, mainly due to drought, light intensity and destruction by wild animals, large distances to the forests and the lack of knowledge on plant care, processing and storage (Agize & Zouwen, 2016). According to Mulatu & Gadisa (2020) the major constraints in production of korarima (Ethiopian cardamom) in the Kafa zone includes disease, animal and pest damage, climate change effect, low productivity of existing varieties, lack of improved korarima cultivation practices and inappropriate post-harvest handling techniques.

2.3. An overview on status of spices marketing in Ethiopia

Despite the fact that Ethiopia is being a homeland of numerous spice crops and favorable agro-ecologies and long history of spices production, so far the country is not recognized as a major exporter of spices and, hence, the share of spices of the country’s total export earnings is at low level (EMI (Ethiopian Ministry of Industry), 2015; Herms, 2015; ENTAG (Ethiopia-Netherlands Trade
for Agricultural Growth), 2018; Titus & Wojtek, 2020). Internationally, there are more than 109 varieties of spices that are traded commercially (ENTAG (Ethiopia-Netherlands Trade for Agricultural Growth), 2018). Ethiopia exports ginger, pepper (crushed or ground), turmeric, coriander, cumin, fenugreek, cardamom, Cinnamon, clove and so forth (EMI (Ethiopian Ministry of Industry), 2015). Export trend (tons) for different spices crops in Ethiopia from the cropping year 2005 to 2012 is depicted hereunder (Table 2).

The share of spice export out of the total export earnings of the country generally remained below 1% of total export earnings except for the cropping years 2003/04 and 2004/05, in which the share of spice exports was increased to 1.1 and 1.4%, respectively (Yimer, 2010). During the cropping years from 1997/98 to 2009/10, the cumulative average growth rates of export of spices were 25.6 and 25.3% in volume and value, respectively (Yimer, 2010). The country earned US$ 11.128 and 18.568 million in the consecutive two cropping years of 2008/09 to 2009/10, respectively (ITC (International Trade Centre), 2010). Cumin, ginger and turmeric were the leading export spices in 2009/10 crop year with an export earning share of 8.4, 64.9, and 15.4%, respectively, followed by cardamom, fenugreek and pepper and other spice exports (Yimer, 2010).

Spice exports in the year 2013 and 2014 amounted to 15,000 tons per annum, with a value of US $ 26 million. During this year, ginger was the most exported spice, responsible for nearly 50% of the total export value (ENTAG (Ethiopia-Netherlands Trade for Agricultural Growth), 2018; Herms, 2015). The export of ginger had a share of 60.75% volume out of the total spice export during the cropping years from 2007/08 to 2012/13, followed by turmeric (11.47%), pepper (9.26%) and cumin (8.85%) (EMI (Ethiopian Ministry of Industry), 2015). Likewise, ginger was Ethiopia’s most exported spice until 2013, with an export value of US$ 12,000,000 in 2013 and was responsible for 45% of total export value (Herms, 2015; Titus & Wojtek, 2020). Chillies came in second order, followed by turmeric and black cumin in export of spices in 2013 (EMI (Ethiopian Ministry of Industry), 2015; ENTAG (Ethiopia-Netherlands Trade for Agricultural Growth), 2018; Herms, 2015) with a value of US$ 6.1 million and were also the first in 2015 due to decimation of ginger exports. The chillies are mainly exported to some African and the middle east countries (EMI (Ethiopian Ministry of Industry), 2015). Ethiopia’s total spices export in 2009/10 and export volume and value of Ethiopia spice from 2007/08 to 2012/13 are presented hereunder (Table 3; Figure 4).
Export earnings of approximately US$ 50 million per year were achieved by 2015 mainly from ginger, turmeric and black cumin, thereby showing an increasing trend compared to the previous years (ITC (International Trade Centre), 2010). However, the export of ginger was almost entirely disappeared in 2015 due to the bacterial wilt epidemic (Herms, 2015). Consequently, ginger exports from Ethiopia had a value of just US$10,000 in 2017 and was thus responsible for a negligible share of Ethiopian spice exports. Currently, turmeric occupies the major share of ginger exports with export volume increased by 64% in the year 2013 to 2017. As the export price of turmeric is lower, the production of turmeric does not fully compensate the negligible share of ginger exports (Titus & Wojtek, 2020).

Table 2. Export trend (tons) for different spices in Ethiopia in the cropping years from 2005 to 2012

| Type of Spice | 2005    | 2006    | 2007    | 2008    | 2009    | 2010    | 2011    | 2012    |
|---------------|---------|---------|---------|---------|---------|---------|---------|---------|
| Ginger        | 6990.18 | 5115.78 | 9859.17 | 10,436.33 | 10,751.33 | 10,267.95 | 7144.75 | 10,032.45 |
| Pepper crushed or ground | 320.47 | 358.48 | 415.07 | 114.4 | 194.7 | 458.81 | 2818.4 | 3849.4 |
| Turmeric      | 802.8   | 349.73  | 718.12  | 644.27  | 1253.1  | 1196.3  | 1792.4  | 1494.5  |
| Spices mixture| 1.68    | 19.16   | 3.73    | 1.45    | 39.22   | 1.14    | 0.41    | 0.94    |
| Other spices  | 632.06  | 234.67  | 496.56  | 1318.6  | 1329.1  | 583.01  | 240.1   | 402.17  |
| Coriander     | 390.96  | 336.66  | 493.82  | 204.81  | 452.56  | 262.85  | 422.08  | 491.79  |
| Cumin         | 147.55  | 498.12  | 1560.7  | 1219.4  | 1164.4  | 746.27  | 1845.7  | 2532.7  |
| Fenugreek     | -       | 239     | 49      | 192     | 1171    | 588     | -       | -       |
| Cardamom      | 26.54   | 16.7    | 33.8    | 58.41   | 36.98   | 167.98  | 172.37  | 103.38  |
| Cinnamon      | 1.94    | 0.44    | 0.34    | 216.73  | 276.55  | 48.69   | 1.36    | 0.154   |
| Clove         | 0.645   | 0.65    | 1.23    | 0.44    | 0.05    | 0.081   | 0.19    | 0.2     |

Source: Ethiopian Ministry of Industry (EMI, 2015).

Table 3. Ethiopia’s total spices export by commodity in the cropping year 2009/10

| Type of Spice | 2002EC(2009/10) | Share of Volume (%) | Share of Value (%) | Top Ranking |
|---------------|-----------------|---------------------|--------------------|-------------|
|               | Volume          | Fob Value           |                    |             |
| Ginger        | 10,270          | 11,999              | 66.22              | 64.93       | 1          |
| Turmeric      | 2932            | 2840                | 18.91              | 15.37       | 2          |
| Cumin Seed    | 801             | 1555                | 5.16               | 8.41        | 3          |
| Cardamom      | 116             | 567                 | 0.75               | 3.07        | 4          |
| Fenu Greek    | 588             | 508                 | 3.79               | 2.75        | 5          |
| Pepper        | 133             | 486                 | 0.86               | 2.63        | 6          |
| Others        | 667             | 526                 | 4                  | 3           |            |

Source: Yimer (2010).
The Ethiopian spice exports in the year 2011 and 2017 amounted to an average of 17,000 tons per annum, representing a value of US$29 million. From 2013 onwards, Ethiopian spice exports has been showing a declining trend, stabilizing at a volume of 13,000 tons, with a value of US $21 million in 2017 (Table 5; Titus & Wojtek, 2020). This decrease is mainly due to bacterial wilt disease that considerably affect ginger production (Titus & Wojtek, 2020). The trend of Ethiopian spices export in volume and value from 2011 to 2017 is depicted hereunder (Figure 5).

During the cropping year 2009/10, Sudan was the leading importer of spice crops with a 38.4% share of value of total spices export from Ethiopia, followed by India (10.4%) and Yemen (8.6%).

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The Ethiopian spice exports in the year 2011 and 2017 amounted to an average of 17,000 tons per annum, representing a value of US$29 million. From 2013 onwards, Ethiopian spice exports has been showing a declining trend, stabilizing at a volume of 13,000 tons, with a value of US $21 million in 2017 (Table 5; Titus & Wojtek, 2020). This decrease is mainly due to bacterial wilt disease that considerably affect ginger production (Titus & Wojtek, 2020). The trend of Ethiopian spices export in volume and value from 2011 to 2017 is depicted hereunder (Figure 5).

During the cropping year 2009/10, Sudan was the leading importer of spice crops with a 38.4% share of value of total spices export from Ethiopia, followed by India (10.4%) and Yemen (8.6%).
Other importers of spice crops from Ethiopia were UAE (8.3%), Saudi Arabia (6.7%), Morocco (5.8%), while Singapore and Jordan had a share of 3.2 and 3.1%, respectively (ITC (International Trade Centre), 2010). In the cropping years 2011/12 and 2012/13 likewise, Sudan was the major export destination of spices from Ethiopia with 52 and 64%; and 29.8 and 37.5% in volume and value, respectively (EMI (Ethiopian Ministry of Industry), 2015). In 2017 likewise, Sudan was the leading importer of spices with share of 40% of total export value from Ethiopia. Other important export destinations are Egypt, USA and Djibouti. The export of spices to Asia is increasing with share a 15% to 24% in the year 2013 to 2017. The export of spices to Europe has a share of 10% in 2017, compared to 4% in 2013. This increasing trend is expected to continue, since the European market for spices is expected to expand. However, the exports of spices to the Middle East decreased by 53% in the 2013 to 2017 period (Titus & Wojtek, 2020).

On the other hand, in the cropping year 2013/14, cinnamon, cloves, ginger and crushed/ground pepper were the main imported spice crops in Ethiopia. During this year, cinnamon was the major imported spice crop with 22.8% share of value of total imported spice crops. The major origin of imports of these spices into Ethiopia is found out to be mainly China, followed by India (EMI (Ethiopian Ministry of Industry), 2015). Import of spices in Ethiopia from 2005 to 2009 is illustrated hereunder (Figure 6)

The southwestern part of Ethiopia is a region where several spice crops are produced and major trading activity is situated. Especially in and around Tepi, many spice crops are being produced and traded (Agize & Zouwen, 2016). The supply chain of spice crops in Ethiopia is made up of numerous actors whose relationships are loosely coordinated through short or long-term business transactions (EMI (Ethiopian Ministry of Industry), 2015). In Ethiopia, spices purchasing at the farmers level is done by small traders and, hence, they either buy for their own or they are liaised to large processors in Addis Ababa or Adama. The supply chain of spice crops, such as ginger and turmeric, is short; as these spice crops are mainly cultivated for export they pass only few steps to reach the export companies (ITC (International Trade Centre), 2010; EMI (Ethiopian Ministry of Industry), 2015). Smallholder farmers, local traders, center market retailers and center market whole sellers or exporters, spice processor enterprises, input suppliers and consumers are the main actors and participants in the Ethiopian spices market (EMI (Ethiopian Ministry of Industry), 2015).

According to Geta and Kifle (2011), the concern of marketing is of great importance for ginger growers in the SNNP (Major spice growing regions) as almost all the total amount of ginger produced in the region is supplied to markets with little portion locally consumed. In the region, the market price of ginger is highly unstable and variable and/or fluctuating (Geta & Kifle, 2011). When the quality increases, the ginger prices goes high and then after a certain period producers
Table 4. Minimum, maximum and most frequent price (Birr kg⁻¹) of some prices at Kombolcha, Mekane-Selam and Segno Gebeya Markets

| Market name          | Frequency | Fenugreek | White cumin | Black cumin | Basil | Coriander |
|----------------------|-----------|-----------|-------------|-------------|-------|-----------|
| Kombolcha (Kalu)     | Minimum   | 14.00     | 5.25        | 7.00        | 1.75  | 2.10      |
|                      | Mode      | 15.75     | 7.00        | 8.75        | 2.63  | 2.80      |
|                      | Maximum   | 17.50     | 9.63        | 10.50       | 3.50  | 2.80      |
| Mekane-Selam (Debresina) | Minimum | 2.63      | 1.40        | 3.50        | 1.40  | 0.70      |
|                      | Mode      | 5.25      | 2.63        | 5.25        | 2.45  | 1.40      |
|                      | Maximum   | 7.00      | 5.25        | 8.75        | 3.50  | 1.75      |
| Segno gebeya (Were Ilu) | Minimum | 3.00      | 1.75        | 5.25        | 1.75  | 1.75      |
|                      | Mode      | 4.60      | 3.50        | 7.00        | 3.50  | 2.63      |
|                      | Maximum   | 6.00      | 5.25        | 8.75        | 5.25  | 3.50      |

Source: Tesfa et al. (2017)

decrease the quality, then the price decreases (Buke et al., 2016). The minimum, maximum and most frequent price of spices at Kombolcha, Mekane-Selam and Segno Gebeya Markets, in South Wollo, is indicated for illustration of the reality (Table 4).

In Ethiopia, large portion of red peppers are supplied to the national markets as farmers mostly grow it as a cash crop (ITC (International Trade Centre), 2010; Dessie et al., 2019). The chilli peppers value chain starts at the farm gate. Farmers use traditional drying techniques (sun) to dry the pods and to reduce moisture content to 25–30%. After drying, farmers then group their harvest and offer the volume to traders (ITC (International Trade Centre), 2010). The main receivers of red pepper output are district wholesalers, district retailers and district assemblers (collectors) (Dessie et al., 2019). According to Gobie (2019), the major red pepper value chain actors involved in Ethiopia are input suppliers, producers, collectors/collectors, brokers, mostly processors, wholesalers, retailers, and final users or consumers.

2.4. An overview on major challenges in spices marketing in Ethiopia

Regarding challenges in marketing of spices in Ethiopia, farmers and traders face challenges due to low prices, difficulty in finding good markets and problems of long distance transport, lack of capital for transport and extending production, lack of marketing information and small amount to sell at a time (Agize & Zouwen, 2016). As indicated by Herms (2015) and ENTAG (ENTAG (Ethiopia-Netherlands Trade for Agricultural Growth), 2018), transaction costs in the local spice trade are high. In spite of the large number of consecutive intermediaries, smallholders sell little amounts, frequently just a couple of kilograms, to nearby local collectors and village traders. Moreover, these traders do not regularly have access to proper storage and packaging materials and may resort to some malpractices, such as adulteration with low-value materials. In cases where preliminary washing is performed by local collectors and village traders, the quality of the water used is generally poor and further reduces the product quality.

According to Yimer (2010) and Negera (2015), keeping spices in storage for a long time with the desire or ambition for fetching higher or best prices, increasing role of unlicensed intermediaries in the trading of spices in the market, price instability due to changes in demand and supply, lack of organized market information service to the different actors in the spices farm to market chain were reported marketing constraints of spices. As per Yimer (2010), poor quality of spices traded due to highly unimproved cultivation and postharvest handling practices, adding less quality water for the purpose of increasing weight and color/appearance, weak organizational capacity of cooperatives/
unions, weak market research and promotion in potential overseas markets for natural and processed spices products were marketing considerable constraints of spices in Ethiopia.

Weak marketing system not stimulating production and marketing based on enforceable quality standards, lack of value addition in major agro-processing activities in spices, lack of structured market information service to the different actors in the spices were reported to affect marketing of spices in Ethiopia (Hibistu, 2020; Vijayalaxmi & Sreepada, 2014; Yimer, 2010). In addition, according to the report of Vijayalaxmi and Sreepada (2014), unbalanced supply and variable nature of spices produced from forest and agricultural landscape, weak business linkage among stakeholders in the value chain actors, including farmers, traders, processors and meso-level support institutions and macro level regulatory and enforcement institutions are also the marketing constraints of the spice sector in Ethiopia.

Moreover, Negera (2015) also reported that poor training programs and quality deterioration due to limited commercial investors in spice production, poor access to credit facilities, absence of capacity building, like training program, lack of transport in remote markets, especially during wet seasons and difficulties from unlicensed dealers in the cardamom markets, are constraints reported by cardamom traders at Bench Maji Zone of SNNPR, Ethiopia.

Gebreazgaabher and Negash (2015) made analysis of major factors affecting production and marketing of korarima in Ethiopia and reported that 92.7, 88.3, 86.1, 77.50, 75.2, 70.6, 57.8, 40.4 and 35% of the sampled traders reported adulteration problems, quality problems, capital shortage, demand problems, lack of government support, supply shortage, administrative problems, theft problem and absence of government control on unlicensed traders, respectively, were the nine determinant factors of Aframomum corrorima marketing. According to Dessie et al. (2019) red pepper marketing in Ethiopia is constrained by lack of government support, problem of storage facilities, lack of credit service, lack of market information, problem of price setting and natural quality problem. The marketing problem of red pepper producers in Northwest Ethiopia is depicted hereunder (Figure 7).

2.5. Opportunities of spices production and marketing in Ethiopia

The major opportunities of spices, herbs, and aromatic crops in Ethiopia include the appropriate or suitable environment for introduction and cultivation of different spice crop varieties, increasing local markets and demand by international hotels, medicinal factories, spa and massaging services (EMI (Ethiopian Ministry of Industry), 2015). Ethiopia has suitable and conducive environment for spice
crop production due to presence of varied climatic conditions and agro-ecologies, vast cultivable and irrigable land and encouraging government policy environment (Goshme & Ayele, 2019; Herms, 2015; Hordofa et al., 2020). For instance, the suitable agro-ecological conditions permit the highest advantage in Wolaytta Zone, SNNPRS to grow ginger. In addition, the emergence of new market opportunities in the Middle East countries, like United Arab Emirates (UAE, Dubai) and Yemen, will encourage increased production and the result in benefits from this crop (Asale & Ashango, 2017). Due to the low levels of inputs and the use of virgin lands, the spices production in Ethiopia is near organic standards. Nowadays, international markets for organic products are growing, real opportunities can be identified and some foreign companies are already investigating the possibilities for setting up an organic chain in Ethiopia (EMI (Ethiopian Ministry of Industry), 2015).

Truly speaking, spice crops have huge potential for income generation of the farming communities in Ethiopia (Tesfa et al., 2017). According to Herms (2015), spices are one of the traditional promising horticultural crops of Ethiopia. Kifelew et al. (2017) indicated that spice crops are small in size and so cheap to transport and of high value per unit area although most of the spice works are labour intensive. Hence, spice crops provide a special opportunity to hasten both the rural and the urban community development (Kifelew et al., 2017). The country is geographically better located towards the EU than India or Indonesia, which will support spices export ambitions and feasibility (ITC (International Trade Centre), 2010).

In Ethiopia, spice crops are used not only to flavor bread, butter, meat, soups and vegetables, but also to make medicines and perfumes (ITC (International Trade Centre), 2010; Tesfa et al., 2017; ENTAG (Ethiopia-Netherlands Trade for Agricultural Growth), 2018). Ethiopia is currently one of the largest consumers of spices in Africa since over 90% spice crops produced in the country are consumed domestically. Fortunately, the domestic consumption has been growing fast due to increases in income, rapid population growth and greater urbanization (ENTAG (Ethiopia-Netherlands Trade for Agricultural Growth), 2018).

The government of Ethiopia is promoting agro-industrial projects and has declared spice crops as focus area for development as spices have a wide possibility of being cultivated in diverse agro-ecological zones of the country and have also a high potential for expansion and diversification of export earnings of Ethiopia (Vijayalaxmi & Sreepada, 2014). The Ethiopian government has developed a package of incentives under Regulations No. 84/2003 for investors to encourage private investment engaged in new enterprises and expansions, across a range of sectors, including the spice subsector (EMI (Ethiopian Ministry of Industry), 2015; ITC (International Trade Centre), 2020).

3. Conclusions and recommendation

The spice subsector, is among the critical component of the agricultural sectors in Ethiopia. However, the country has not well utilized its huge potential and opportunities for spice crops production, marketing and revenue generation. The spice subsector is largely neglected and under-utilized and, hence, the level of production and share of spice crops of the total export earning of the country is at considerably low level. The country mainly produces and exports; chillies, turmeric, ginger, cumin, fenugreek, coriander, black pepper, cardamom and so forth. Among the various spices crops, chilli/hot pepper is the most commonly produced spices with the highest share of the total spices produced in the country. Likewise, ginger was the second most produced spices crops in Ethiopia until 2013. However, the production of ginger has devasted in 2013 on wards due to bacterial wilt disease and hence, currently, turmeric occupies the large share of its production and exports. The Ethiopian spice exports has showed a declining trend from 2013 on wards. This is mainly due to the disease that considerably affect ginger production and the rapid increasing domestic demand of spices market. Hence, the share of spices export has been remained low compared to the country’s total export earnings. The poor mechanized technology, lack of adequate agricultural inputs, poor cultivation and post-harvest handling practices, product adulteration, lack of marketing regulation(s) and decrees mostly affect the production and marketing of spice crops in Ethiopia.
For the foreseeable future, the demand for spice crops utilization in the country is expected to outstrip domestic supplies, which might be due to rapid population growth and expansion of urbanization and industrialization. Therefore, the governmental organizations and all other stakeholders should focus on increasing and promoting production and productivity levels of spice crops to satisfy the anticipated ever-rising domestic markets and international trade demand. Likewise, intervention and regular awareness creation on using improved production, postharvest handling and processing technologies of spices, such as providing training across all value chains and formulating strong marketing regulations and promulgation of proclamation with reference to introduction, production, postharvest handling, processing, storage and exportation is also vital to increase production level of smallholder farmers and economic development of the country. Moreover, researchers should focus on developing and disseminating improved spice varieties and processing technologies for sustainable production and productivity.

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