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Sustainability Assessment of a Banana Value Chain: The Case of Arba Minch, Ethiopia

Girma Gezimu Gebre and Eweg Rik

This paper assesses the sustainability performance of the banana value chain by comparing and discussing 25 attributes owing to different sustainability dimensions. The paper identifies critical aspects and provides a qualitative assessment of the sustainability performances of banana chains at the local level. The study finds economic, social, and environmental indicators have moderate sustainability performance in the Arba Minch, Ethiopia. The chain has an advantage in terms of profitability, employment, and emission of air pollutants; and constraints in terms of coordination, value share, profit margins, market diversity, product and market information, transportation, waste management, and safety and hygiene.

***Key words**:* Banana, Ethiopia, Local, Sustainability Assessment, Value Chain

Banana (*Musa* spp.) is a crop of major economic importance in the world. It represents the world's largest fruit crop with an annual production of 106,714,204 metric tons in 2013 (United Nations Food and Agriculture Organization Statistical (FAOSTAT) database, 2016). India is the largest producer, but Ecuador is the leading exporter in the world, followed by the Philippines. Banana production is also an important source of income for many smallholder Sub-Saharan Africa farmers (FAOSTAT, 2012). In East Africa, banana supply chains to urban markets are characterized by many links that add little value and result in only a small proportion of the retail price reaching back to farmers, providing little incentive for investments to improve production (Beed et al., 2012). Ethiopia, which lies entirely in the tropics, has great potential for banana production. Cavendish banana is the major fruit crop that is most widely grown and consumed in the country. Especially in the south and southwestern parts of the country, it is of great socioeconomic importance, contributing much to the overall well-being of rural communities including food security, income generation, and job creation (Zenebe et al., 2015a).

In Ethiopia, banana production contributes 47.83% for producers' own consumption, 49.19% for income generation, 0.47% for animal feed, and 2.52% for other purposes (Central Statistical Agency (CSA) of Ethiopia, 2015b). It covers about 59.64%

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(53,956.16 hectares) of the total fruit area, 68% (478,251.04 tons) of the total fruits produced, and 38.3% (2,574,035) of the total fruit producing farmers in Ethiopia (CSA, 2015b). The Southern Nations, Nationalities, and Peoples (SNNP) regional state is the main banana producing region in Ethiopia. Arba Minch, Bench Maji, and Sidama are the major banana producing districts in the SNNP state in Ethiopia, of which Arba Minch alone covers over 80% of the domestic market share in Ethiopia (Livestock and Irrigation Value Chains for Ethiopia Smallholders (LIVES), 2014b).

Banana is an important commercial commodity and major sources of livelihood for farmers and traders in the Arba Minch district. Though the living standard of the banana producers in Arba Minch has substantially improved in recent years, still they face many challenges. According to the LIVES (2014a) report, banana yield per unit area of land is declining in Arba Minch. In addition, the current marketing system benefits traders rather than producers. Banana cooperatives are not strong enough to compete with private traders and, hence, do not benefit their members as much as expected. Farmers sell their bananas to local private traders who decide unilaterally on market prices. The farm gate price of smallholder banana farmers is lower than its potential. The study described in this paper was conducted to improve the sustainability of the banana value chain in the Arba Minch district. The paper is structured as follows: first, a review of literature and theoretical framework is provided. Next, methods are introduced and then results are presented and discussed. The concluding paragraph summarizes the findings of the study.

Literature Review

According to Neven (2014), the sustainable value chain is defined as value-adding activities that produce particular raw agricultural materials and transform them into particular products that are sold to final consumers and disposed of after use, in a manner that is profitable throughout, has broad based benefits for society, and does not permanently deplete natural resources. The sustainability of the value chain plays out simultaneously along three dimensions: economic, social, and environmental or the "triple bottom line" (profit, people, and planet) (Neven, 2014). On the economic dimension, an existing or proposed upgraded value chain is considered sustainable if the required activities at the level of each actor or support provider are commercially profitable. On the social dimension, sustainability refers to socially acceptable outcomes in terms of the distribution of the benefits and costs associated with the increased value creation. On the environmental dimension, sustainability is determined largely by the ability of value chain actors to show little or no negative impact on the natural environment from their value-adding activities; where possible, they should show a positive impact. Therefore, for the purpose of this study, the definition put forward by

Neven (2014) was taken as a working definition of sustainable value chain and considered as the key unit of sustainability performance assessment of banana value chain in Arba Minch, Ethiopia.

Sustainability indicators are particularly hard to define and measure. The basic problem is that sustainability is something that only occurs in the future, while the indicators are something that can be measured in the present (U.S. Agency for International Development (USAID), 2012). The three dimensions of sustainability social, environmental, and economic are treated individually here for clarity; however, in practice, they overlap (USAID, 2012). Once the core processes of the value chain are mapped, indicators must be associated with each link of the chain for the three sustainability dimensions. The indicator selection depends on the level of the organization and the type of activities (Moreno and Salgado, 2012).

Moreover, many academic studies have assessed the sustainability of agri-food chains, but no agreement has been reached about the overall sustainability performance of local food systems (Galli et al., 2015; Hand and Martinez, 2010; Durham et al., 2009). Indeed, those assessments are challenging in their attempts to integrate agri-food production and consumption within comprehensive decision-making tools. However, the scientific community has not yet agreed on a shared methodology which allows for robust and simultaneous comparisons over the sustainability dimensions of agri-food chains.

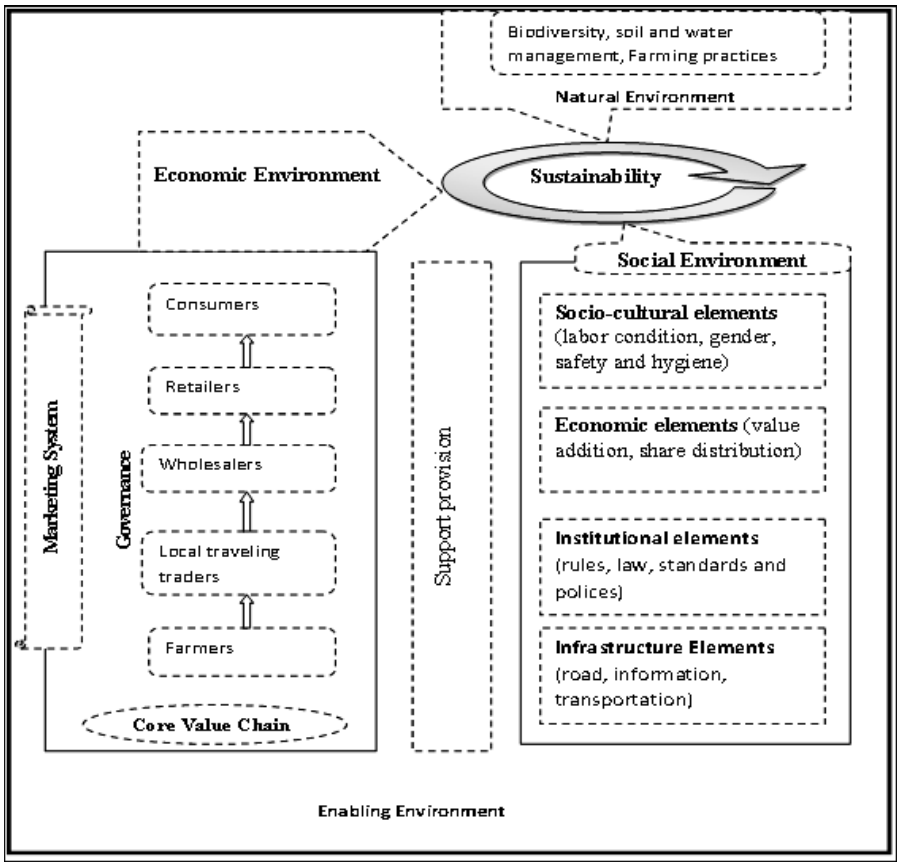
Table 1. Selected Triple Bottom-Line Indicators for Sustainability of the Banana Value Chain in Arba Minch, Ethiopia.

Economic	Social	Environmrntal
Profitability	Employment	Emission of air pollutants
Value added received	Labor condition	Water usage
Value adding activities	Gender/equity	Waste management
Governance/power	Market information	Soil degradation
Fair trade	Product information	Biodiversity
Productivity	Farmer cooperation for bargaining power	
Product loss	Safety and hygiene	
Market diversity	Product quality	
	Stakeholder relations	
	Road	
	Transportation	
	Farming methods	

Sources: Gebre and Rik (2016), FAO (2014), and Moreno and Salgado (2012).

For this study, the selection of triple bottom-line sustainability indicators thus was specifically adapted to the context of the Ethiopian banana sector in Arba Minch. The study proposed a multidimensional sustainability assessment based on a set of 25 criteria. The assessment for each dimension was made at the local level in the study area. The selected sustainability indicators that relate to the economic, social, and environmental elements of the banana value chain in Arba Minch are shown in Table 1.

Since the sustainability of the banana value chain comprises economic, environmental, and social dimensions, the theoretical framework for the study was designed as illustrated in Figure 1.



Source: Gebre and Rik, 2016.

Figure 1. Conceptual Framework of the Study.

Methods

This paper provides a qualitative assessment of the expected performance of local versus national sustainability development goals for banana value chains, based on evidence gathered in a case study from Arba Minch, Southern Ethiopia. The methodology used entails three main steps: 1) analysis of academic literature to identify a pre-defined set of sustainability indicators applicable to the banana value chain; 2) mapping of the Arba Minch banana value chain in terms of localness; and 3) expert qualitative assessment of value chain case-studies with regard to the ability of the selected sustainability indicators to assess the sustainability performance of the banana chain in the context of Arba Minch.

Regarding the first step, sustainability indicators were derived from the FAO (2012), Moreno and Salgado, (2012), and one author's on-the-ground observations in the study area of the performance of agri-food chains applicable to banana value chains. A set of 25 attributes across the economic, social, and environmental sustainability dimesions, representing the most relevant societal expectations on banana value chain sustainability performance, was identified through a process of selection and aggregation of the indicators identified at the local level in the study area. In the second step, a banana value chain map was developed indicating product and price flow across the chain at the local level.

In the third step, the authors turned to selected experts asking them to formulate an assessment of the ability of each selected sustainability indicator to be applied across local chains, and give a preliminary assessment on the best performing local chain in relation to each indicator. The authors interviewed 12 experts chosen to cover as many scientific domains as possible, including experts in production, harvest, post-harvest, trading, and policy-making across local chains. For expert judgment, the assessment method adopted was the Sustainability Assessment of Food and Agriculture (SAFA) Systems Guidelines from the FAO (2014), which were developed for assessing the impact of food and agriculture operations on the environment, economy, and society. The assessment was done by a qualitative method with five score categories. For each of the selected indicators, the authors defined an assessment range from a minimum of 1 for the "unacceptable situations" and a maximum of 5 for the "best situations." The reference points for the assessment performance were Ethiopian national sustainability goals within Arba Minch context. For some indicators, the reference values resulted from this case study. Finally, the results obtained for each indicator were converted into scores on a percentage scale.

Results

The banana sector in Ethiopia

The banana production at the smallholder level shows the appositive change in the amount of production during each production period. It increased from 1,751 tons in 2003-04 to 4,783 tons (CSA, 2015a). Smallholder banana productivity trends varied from year to year during the last 10 years. Productivity had increased from the initial period, stayed constant for three years, started to increase in 2010-11, and then began fluctuating again until the current production period. This fluctuation in productivity of the banana crop came from improper agricultural practices (CSA, 2015a). In the SNNP region, the cultivated area of land under banana fruit production showed a tremendous incremental trend for the last 10 years, except for 2008-09. Productivity in these two regions increased from 18,565 hectares in 2003-04 to double that after 10 years, to 37,076.85 hectares in 2014-15.

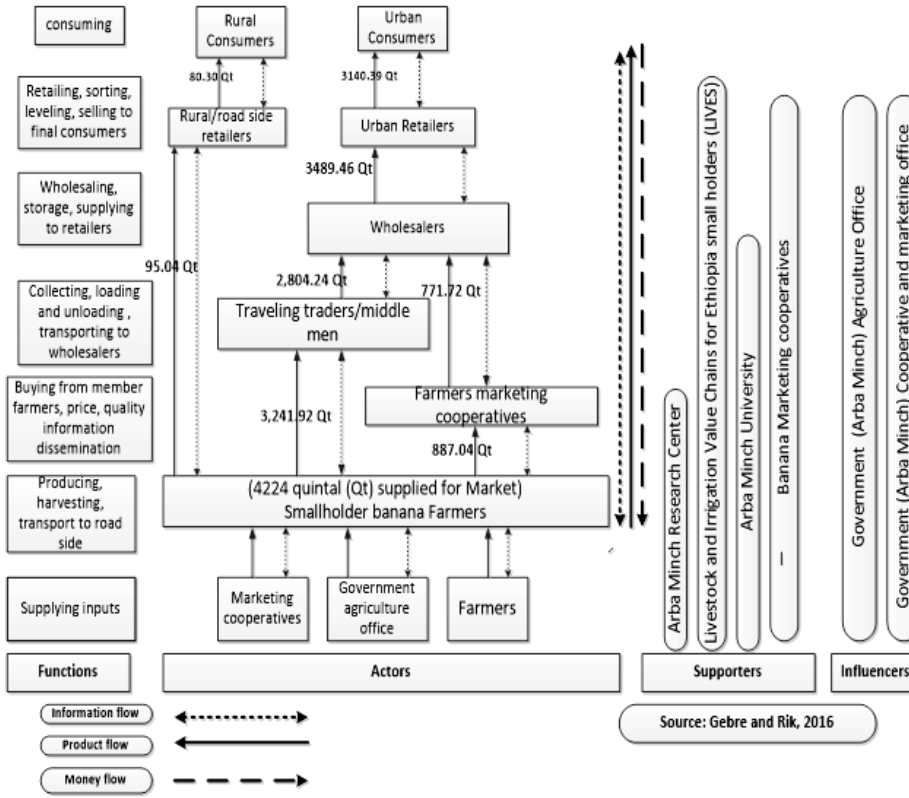
The SNNP region produces a large proportional amount of the total banana production in Ethiopia every year. Banana production in the region has climbed at an increasing rate since 2011-12 (CSA, 2015a). The smallholder farmers' banana productivity has increased significantly since 2010-11, then fluctuated for a while thereafter, but remains constant at a high level of productivity today in comparison to national banana production levels during the same time period.

Mapping the banana value chain

We mapped the banana value chain by identifying and charting the current value chain as discovered during our case study of smallholder farmers, traders, and consumers; experts from governmental and non-governmental organizations; and farmer group discussions. The value chain map in Figure 2 shows the flow of payment, information, and quantity of bananas in the chain. It also depicts activities carried out by and the relationships between different stakeholders at each stage of the banana chain. Those stages of the chain are input supplying, production, collection and transportation, wholesaling, retailing, and consumption.

As illustrated in the chain map (Figure 2), the product flow begins from the farmer and ends with the consumer. Farmers sell their bananas to traveling traders, banana marketing cooperatives, and rural retailers. The farmers sold approximately 3,241.92, 887.04 and 95.04 quintals of bananas to travelling traders, marketing cooperatives, and rural retailers, respectively. According to interviews with traveling traders, banana marketing cooperatives, wholesalers, retailers, and consumers, there were three main

channels for banana marketing in the Arba Minch area. These were: 1) Producer → rural retailers→ rural consumers = 2.25% (95.04 quintals); 2) Producer → travelling traders → wholesalers → urban retailers → urban consumers = 76.75% (3241.92 quintals); 3) Producer → marketing cooperatives → wholesaler → urban retailers → urban consumer = 21% (887.04 quintals).



Source: Gebre and Rik, 2016.

Figure 2. Banana Value Chain Map in Arba Minch.

According to development experts, agricultural agents were disseminating information on technical practices to farmers, plant managers, and post-harvest handlers. Information was also disseminated on the quantity of banana flows from producer to traders and consumers. There is horizontal and vertical flow of market information for traders, with limited horizontal flows of information among farmers. For private farmers, local traveling traders set a low price for bananas without proper negotiations with them.

As a result, these traders have monopolized banana marketing, and outsiders are not allowed to buy bananas.

In response to limited marketing opportunities, farmers organized in the form of banana marketing cooperatives that have relatively better access to market information. Within these cooperatives utilizing the three market channels discussed above, banana market prices flowed to producers through rural retailers and travelling traders. According to this case study's results, the farm gate banana price for private farmers ranged from Ethiopian Birr (ETB) 3 ($0.13) to 5 ($0.22) per kilogram (kg), or ETB 300 ($13.44) to 500 ($22.39) per quintal (one ETB equalled $0.045 USD during the 2016 study period). Meanwhile, for cooperative members, the price was ETB 5 ($0.22) per kg., ETB 500 ($22.39) per quintal, and varied according to information the cooperative members received from wholesalers. The average banana price paid to farmers at their farm gate was ETB 4.25 ($0.19) per kg, while the farm gate banana price for private farmers was ETB 3.85 ($0.17) per kg, whereas cooperative members received ETB 5.00 ($0.22) per kg.

Profit margin, added value, and value shares

This case study's results showed that the profit margins of the banana value chain actors varied along the chain. Wholesalers shared the highest profit margins, followed by retailers, traveling traders, and, finally, farmers. The share of profit margins for wholesalers, retailers, traveling traders, and farmers were 34.91%, 25.71%, 21.48%, and 17.90%, respectively. The gross margin for farmers was 29.32%, whereas, for traveling traders, wholesalers, and retailers, it was 22.31%, 21.13%, and 11.19%, respectively.

Each of the value chain actors adds value to the product as the bananas pass from one actor to another. Actors improved the form of the product by sorting for quality and with just-in-time delivery. Total value added along the banana chain was ETB 1,600 ($71.66) per quintal. The banana farmers earned 26.56% of the final retail price, while traveling traders, wholesalers, and retailers earned 15.32%, 30%, and 28.12%, respectively. Gross margins along the banana value chain declined from farmers to retailers. We found that farmers earned the highest gross margins and retailers earned the lowest in the chain. However, the distribution among actors of value added shares varied across market channels in the banana chain. With respect to the three market channels, farmers received the highest value share from channel 1 (46.67%) and the lowest share from channel 2 (24.83%) due to the involvement of local traders in this channel. Farmers received their highest value share (31.20%) from the market cooperatives. Wholesalers received their highest value share from channel 3 (34.62%) and their lowest from channel 2 (29.67%).

Table 2. Sustainability Performance Assessment of the Banana Value Chain in Arba Minch.

	Indicators	Chain performance	Judgment scale	Performance score
Economic	Profitability	Revenue earned from banana sales exceeded production and marketing costs for farmers and traders.	5	80- 100%
	Added value shares	30% of value was shared by wholesalers while 26.56% and 15% were shared by farmers and traveling trades, respectively.	3	40-60%
	Chain governance	Wholesaler set prices without negotiation with farmers.	1	0-20%
	Fair trade	Traders were not paid fair prices for farmers.	1	0-20%
	Diversity of market	Less effort was made to access alternative market channels in case the relationship with existing traders were discontinued.	3	40-60%
	Productivity	Banana productivity was less than the potential of the area and not adapted to environmental shocks. According to Arba Mich research center experts, the production potential of bananas is 400 quintal per hectare.	3	40-60%%
	Value adding activities	Only sorting and labelling was done by retailers. There were no processing activities for banana fruits.	2	20-40%
	Product loss	High loss of product due to postharvest handling and logistical problems.	1	0-20%
Social	Employment	Created job opportunities for youth.	4	60-80%
	Labor condition	No child labor.	4	60-80%
	Gender	No gender equality in banana production & marketing. At the farm level, men were engaged in both production and marketing, while at the retailer level, women were engaged in marketing.	2	20-40%
	Transportation	Transported by open truck for long distances.	1	0-20%
	Road	Road from farm gate to distributor was not uniformly distributed for banana transportation.	2	20-40%
	Market information	100% of market information was in the hands of traders.	1	0-20%
	Product information	There was no complete and accessible information on product quality and safety for consumers.	1	0-20%
	Stakeholder relationship	There was a good relationship between farmers, input suppliers, supporters, and influencers. The relationship between farmers and	3	40-60%
	Safety and hygiene	Banana waste was released at loading, unloading, and in the marketing area. It affects the health of people in the market.	2	20-40%
	Product quality	Low banana product quality due to careless handling and logistical problems.	3	40-60%
	Farming method	Most farmers used mono-cropping methods.	2	20-40%
	Farmer cooperation for bargaining power	Cooperative members have relatively stronger bargaining power than private farmers for banana prices.	3	40-60%
Environmental	Emission of air pollutants	Banana production was free of air emissions. No chemicals were used in the production process.	4	60-80%
	Irrigation water usage	Inefficient use and application of irrigation water on banana plants.	2	20-40%
	Waste management	Inappropriate waste management (deposits of banana leaves at roadsides and in marketing centers).	1	0-20%
	Soil degradation	Soil degradation due to poor farming practices.	2	20-40%
	Biodiversity	Reduction of wild animals and plant species due to expansion of banana farms. But there was the introduction of new banana	3	40-60%

Source: Case study results, 2016.

Legend for Table 2.

Chain performance rating	Points scored	Percentage score
Best	5	80-100%
Good	4	60-80%
Moderate	3	40-60%
Limited	2	20-40%
Unacceptable	1	0-20%

Sustainability Performance Assessment

The sustainability of the banana value chain was assessed through selected, local-level indicators in the study area. These indicators were based on discussions with experts on the banana value chain with reference to Ethiopia's national sustainable development goals as applied to the Arba Minch situation. The sustainability results for each indicator on the percentage scale are shown in Table 2.

As shown in Table 2, there were eight economic dimension indicators. The maximum potential score for the economic dimension was 8 indicators x 5 points (best performance) = 40. However, the actual ratings economic indicators were 1 best performance (1 x 5), 3 moderate performance (3 x 3), 1 limited performance (1 x 2) and 3 unacceptable performance (3 x 1) = 19. The final score of the economic dimension was 47.5%, which corresponds to a moderate performance. The maximum potential score for the social dimension was 12 indicators x 5 points (best performance) = 60. The actual ratings of social indicators were 2 good performance (2 x 4), 3 moderate performance (3 x 3), 2 limited performance (2 x 2) and 3 unacceptable performance (3 x 1) = 28. The final score of the social dimension was 46.67%, which corresponds to a moderate performance. The maximum potential score for the environmental dimension was 5 indicators x 5 points (best performance) = 25. The actual ratings of environmental indicators were 1 good performance (1 x 4), 1 moderate performance (1 x 3), 2 limited performance (2 x 2) and 1 unacceptable performance (1 x 1) = 12. The final score of the environmental dimension was 12/25 = 0.48 or 48%, which corresponds to a moderate performance.

Discussion

Referring back to our conceptual framework (Figure 1), the sustainability of the banana value chain considers the "triple bottom-line" which includes environmental, social, and economic dimensions. Our case study results suggest that the economic, social, and environmental indicators of the banana value chain have moderate sustainability

performance with respect to the Ethiopian national sustainability goals as applied to the Arba Minch area. As shown by the economic indicators in Table 2, the total chain is profitable since total revenue was greater than total operational costs. However, this profitability does not imply economic efficiency, as yield per hectare of banana production in Arba Minch was less than the productivity potentials of the Arba Minch which is 400 kg per hectare as reported by researchers in the Arba Minch Research centre in 2016. In addition, added values received by farmers were less than traders, indicating inefficient earnings to farmers from final retail prices in the banana chain. A greater proportion of profits were shared by traders and wholesalers implying that farmers have little or no power to influence market prices of bananas. However, farmers have limited access to alternative markets for their banana products, while wholesalers have many connections and marketing options across the country.

Concerning value-adding activities, there were no innovative activities that added value to the bananas. Moreover, there were poor logistics in the banana value chain leading to reduced banana quality, shelf-life, and high product loss. In addition, farmers inappropriately applied irrigation water in banana production, reducing the productivity of banana farming due to water logging. Therefore, economic indicators of the banana value chain have moderate sustainability performance in the Arba Minch case study area.

One advantage of the banana chain was limited emission of air pollutants at the production level. However, there were safety and hygiene problems at the marketing level from banana waste, particularly associated with packed materials. There was also a reduction of biodiversity such as wildlife and plant species due to the presence of banana plantations. Thus, overall, environmental indicators of the banana value chain have moderate sustainability performance in the Arba Minch case study area.

With regard to social dimensions of the banana value chain, there was no long-term business relationship between producers and traders, as well as between traders and traders. Traders had both vertical and horizontal linkages, while producers had only vertical linkages across the chain. The information and communication flows between farmers and traders were based on trust. Producers had relationships with chain supporters and influencers, but they have been unable to break into the trader network. At the farm level, both production and farm gate marketing was dominated by men, while women dominated the retail market. Thus, men tend to control and dominate larger banana volumes at the farm level, while women engaged in much smaller volumes at the retail level. We also found that the banana value chain has created more employment opportunities for youth. Overall, therefore, social indicators of the banana value chain have moderate sustainability performance in the Arba Minch case study area.

Conclusions

Based on our case study, we found that banana products flow from the farmer and end with the consumer through three market channels which link farmers directly to rural retailers, travelling traders, and farmer cooperatives. The largest banana volume was sold through the travelling traders channel while the smallest volume was sold via the rural retailer channel. The banana payment flow begins with consumers and ends with input suppliers. Market information flows in vertical and horizontal directions in the banana chain. Banana traders have market connections across all regions of Ethiopia. Compared to producers and cooperatives, traders have relatively more information about banana prices and available supplies. As a result, traders have more influence on how the banana chain is governed.

In our case study, we found the gross margin for farmers was 29.32%, while, for wholesalers, it was 22.31%. The share of profit margins for wholesalers was 34.91% and 17.90% for farmers. The added value share for farmers was less than for wholesalers in the chain, indicating that the banana value share was inefficient across the chain. The distribution of the share of added value for farmers across market channels ranged from 24.83% to 46.67%, while, for wholesalers, it ranged from 29.67% to 34.62%. The economic, social, and environmental ("triple bottom-line") sustainability indicators for the banana chain showed moderate sustainability performance in the Arba Minch case study area. Therefore, our study results provide evidence of the positive effects on sustainable development of the banana value chain in Arba Minch, Ethiopia.

References

Beed, F., T. Duois, R. Markham, and A. Moorhead. (2012). "A strategy for banana research and development in Africa". A synthesis of results from the conference banana 2008, held in October 2008, Mombasa, Kenya. International Society for Horticultural Science, January 2012, Belgium.

Central Statistical Agency of Ethiopia. (2015a). "Agricultural Sample Survey". Time Series Data for National and Regional Level (from 1995-96 to 2014-15) Report on Area and Production of Crops (Private Peasant Holdings, Meher Season).

Central Statistical Agency of Ethiopia. (2015b). "Agricultural Sample Survey, 2014-15". Volume I. Report on area and Production of Major Crops in Ethiopia (Private Peasant Holdings, Meher Season).

Central Statistical Agency of Ethiopia. (2014). "Agricultural Sample Survey". Report on Area and Production of Major Crops. Volume I, VII, and VIII. Statistical Bulletin 578. Addis Ababa, Ethiopia.

Central Statistical Agency of Ethiopia. (2007). "Annual Report". Addis Ababa, Ethiopia. Available at http://www.csa.gov.et/

Durham, C.A., R.P. King, and C.A. Roheim. (2009 March). "Consumer Definitions of Locally Grown for Fresh Fruits and Vegetables". *Journal of Food Distribution Research* 40, 56–62.

Food and Agriculture Organizations for United Nations (2014). "Sustainability Assessment of food and Agriculture (SAFA) systems". Guidelines Version 3. FAO, Rome, Italy. Available at http://www.fao.org/3/a-i3957e.pdf.

Food and Agriculture Organization Statistical Database (2016). Available at http://faostat3.fao.org/download/T/*/E. Accessed June 23, 2016.

Food and Agriculture Organization Statistical Database. (2012). "*Overview of World Banana Production and Trade". The World Banana Economy, 1985-2012.* Food and Agriculture Organization of the United *Nations Corporate Document Repository. Produced by Economic and Social Development Department, Rome, Italy. Available at* http://faostat3.fao.org/home/index.html. Accessed June1, 2016.

Galli, F., F. Bartolini, G. Brunori, L. Colombo, O. Gava, S. Grando, and A. Marescotti. (2015). "Sustainability assessment of food supply chains: an application to local and global bread in Italy". *A Springer Journal*, Agricultural and Food Economics (2015)3:21

Hand, M.S., and S. Martinez. (2010). "Just what does local mean"? Choices 25(1):13–18. Available at http://www.choicesmagazine.org/magazine/article.php?article=108.

Livestock and Irrigation Value Chains for Ethiopian Smallholders. *(*2014a). "The history and future of banana in Arba Minch, Ethiopia. Available at https://lives-ethiopia.org/2014/02/25/banana-history/. Accessed July 25, 2016.

Livestock and Irrigation Value Chains for Ethiopian Smallholders. *(*2014b)**.** Improved marketing systems raise incomes for banana farmers in Gamo Gofa. Available at https://lives-ethiopia.org/2014/10/14/banana-marketing-snnp/. Accessed July 27, 2016.

Moreno, C.A.P. and O. Salgado. (2012). "Sustainability indicators along the coffee value chain: A comparative study between Mexican and Colombian retail". Available at https://www.pomsmeetings.org/confpapers/043/043-0095.pdf. Accessed August 4, 2016.

Neven, D. (2014). "Developing Sustainable Food Value Chains: Guiding Principles". United Nations Food and Agriculture Organization, Rome, Italy. Available at http://www.fao.org/3/a-i3953e.pdf. U.S. Agency for International Development. (2012). A Note on Indicators of Sustainability for Value Chain Project. Washington, D.C. Available at https://www.microlinks.org/sites/microlinks/files/resource/files/Indicators_of_Sustainability.pdf

Zenebe, W., M. Ali, B. Derbew, S. Zekarias, and B. Adam. (2015a). "Assessment of Banana Production and Marketing in Ethiopia". *International Journal of Sciences: Basic and Applied Research* Volume 24(3): 283-307.

Zenebe, W., M. Ali, B. Derbew, S. Zekarias, and B. Adam. (2015b). "Assessment of Banana Postharvest Handling Practices and Losses in Ethiopia". *International Journal of Sciences: Basic and Applied Research* Volume, 5(17).