Abstract: This study examines sustainability and gender dynamics of coffee value-chain development intervention in Ethiopia. The data were collected from male and female farmers and other stakeholders using key informant interviews, focus group discussions, and a questionnaire survey. The study found that some of the introduced technologies/practices were adopted and sustained whereas others were dropped or adapted depending on technical, institutional, and socio-economic factors. The value-chain intervention was generic and not gender-sensitive. Although the intervention generated positive changes and benefits for all household members (by improving coffee quality, market access, and their income), it had mixed outcomes for women. Although women were not primarily targeted by the intervention, their increased involvement in coffee harvesting and processing fostered women’s skills, confidence, and decision-making power. However, some of the new technologies/practices required additional labour, while others were labour saving and eased their work. As a result of increasing the wholesale trading of coffee, the role for marketing largely shifted to men. This study underscores the need for a proper gender analysis and embedding gender-sensitive approaches in designing development interventions to ensure women’s fair representation, and thus equitable and sustainable benefits. Such efforts should entail a paradigm shift from production to promoting women’s role and integration into the entire value chain, as well as improving their access to productive resources and services. Moreover, value-chain development interventions should consider technical, institutional, social, and economic factors that could influence their effectiveness and sustainability.

Keywords: coffee; value chain; coffee processing; sustainability; gender; Ethiopia

1. Introduction

Sustainability and gender equality in development interventions have gained increasing attention among funders, policy makers, and development practitioners in recent decades. The popular definition of sustainable development is the one made by the Brundtland Report: “Development that meets the needs of the present without compromising the ability of future generations to meet their own needs” [1] (p. 43). However, although several efforts have been made to establish sustainable development indicators, there is still no consensus on how to measure progress towards sustainability [2]. Gnégné further argues that most of the sustainable development indices fail to apprehend all of its different aspects: current and inclusive well-being, well-being sustainability, and environmental sustainability. Development project impacts are usually measured immediately at the end of the project lifecycle and funds are rarely available to determine whether or not those impacts are sustained, how they are adapted, and the factors that influence sustainability.

In recent decades, a value-chain development (VCD) approach has been increasingly considered as one of the prominent paradigms in development thinking and practice.
that spur development of sustainable food systems, economic growth, and poverty reduction [3,4]. Awareness is also growing that gender equality and the development of sustainable value chains are interdependent goals [3,5]. The United Nations Development Programme’s (UNDP’s) Human Development Report [6] underscores that inequitable development can never be sustainable development. Nevertheless, disparities have continued to be observed in the comparative advantage men enjoy over women at most stages of the agricultural value chain. Women’s limited access to productive resources, opportunities, and services undermines their decision-making power and capacity to engage in the more profitable nodes of value chains [5,7,8]. According to [9], key constraints for women entering, operating, and expanding within agricultural value chains relate to insufficiencies in (i) capital (including land ownership); (ii) access to credit and financial services; (iii) skills and knowledge in agro-technology; (iv) extension services; and (v) access to labour, storage facilities, and other infrastructure. The inequalities that occur within a given node of a value chain, based on gender, age, and other factors, are also becoming evident [5]. Failure to understand and address such inequalities inevitably undermines the potential of VCD efforts to contribute to both economic and social progress. Unfortunately, many development interventions are generic or gender-blind and tend to overlook intra-household dynamics. The intra-household level (which is crucial to understanding the key dynamics at the root of gender-based constraints) represents a major analytical gap in agricultural VCD interventions. In [3,7,10], the authors warn that interventions that are not grounded in sound gender analysis may risk doing more harm than benefiting. Cognizant of this reality, to date, many publications shed light on the importance of integrating robust gender analysis into the design and implementation of value-chain interventions to ensure inclusiveness, gender responsiveness, and equity. Gender gaps in value-chain development are wide, and if they are analysed and addressed properly, structural and systemic changes can be achieved, which could in turn greatly enhance the sustainability of the value chain [3].

The preconceptions that women only grow subsistence crops and have little or no role in growing cash crops have been disputed [11]. Studies [8] show that the level of female farmers participation in growing cash crops, such as coffee, is not significantly different from their role in other agricultural sub-sectors. An analysis of intra-household labour allocation in different coffee-growing countries suggests that female household members devote disproportionally more time to the cultivation and harvest of coffee than men [8,12]. A survey conducted in 15 countries showed that women’s participation in the coffee production labour force is about 70%, although their participation in in-country trade and export is only 10% [13]. Globally, between 20% and 30% of coffee farms are female-operated (in other words, around 5 million of the estimated 25 million coffee producers worldwide are women [8]), this being 19% in Ethiopia [8]. Likewise, women are less represented in cooperatives and other farmer organizations due to the prevailing social norms, time constraints, and limited mobility [8,14]. A study conducted in the Jimma area of Ethiopia observed that females constituted only 2% of the cooperative members [15].

As in many other developing countries, the agricultural extension programmes in Ethiopia mainly focus on male farmers [16,17]. Extension workers usually provide advice to heads of household, where the husband is invariably considered the head [18]. A study conducted in Western Ethiopia shows that only 37% of female farmers received agricultural extension services compared to 72% for their male counterparts [19]. Women’s long working hours and workload also cause time constraints, leaving them with little free time to access training and extension advice [11,20]. Achandi et al. [21] remark that institutional and cultural factors that constrain women’s access to improved production and processing technologies can be overcome through culturally sensitive and gender-responsive approaches to the delivery of extension services.

2. The Coffee Quality Improvement and Market Linkage Project

Coffee is one of the vital commodities in the Ethiopian economy, generating 24% of the country’s total export earnings [14] and supporting the livelihoods of a quarter of the
population. Ethiopia is Africa’s largest producer and consumer of coffee [14]. Smallholders are responsible for about 95% of the coffee produced in the country, with a low-input, low-output system, making Ethiopian coffee production naturally ‘organic’ [22]. The productivity and quality potential of Ethiopian coffee has not been fully realised due to various factors, including reliance on traditional production and processing technologies and practices.

A project that aimed at introducing improved primary coffee processing in four districts of Ethiopia (Gomma, Alle Didu, Yeki, and Sheko) had been implemented by CABI, the Common Fund for Commodities (CFC), Illy Café, and Ethiopia’s Ministry of Agriculture, from 2004 to 2008. The goal was to increase the income and better the livelihoods of small-holder farmers by improving the quality of their coffee and enhancing market integration. To this effect, a total of 500 farmers (organised into 100 groups of 5) were selected from the four districts and engaged in processing of semi-washed coffee using manually operated pulpers provided by the project. These groups also received materials to construct modern drying beds and sisal bags. An additional 400 farmers received materials for the drying beds and sisal bags and participated in improved sun-drying of the ripe, un-pulped cherries. With the semi-washed method, which was a new technique in Ethiopia, ripe cherries were harvested and pulped using manually operated pulpers and then dried on improved beds without undergoing fermentation, soaking, and full washing processes. The improved sun-drying (natural) component involved teaching farmers to selectively pick ripe cherries and dry each day’s harvest separately on modern drying beds. Interventions were accompanied by awareness raising, capacity building (the training topics included use of the introduced pulping machine and drying materials, improved coffee harvesting, processing, storage, quality management, and marketing), and technical support for farmers, extension staff, and traders. In each season, the quality of coffee produced using the improved processing methods was evaluated and feedback was given to producers. Producers were linked to high-value markets (exporters) that rewarded quality with premium prices. At the time of the intervention, the marketing system was not allowing smallholder producers to directly sell their coffee to exporters. However, through negotiation with the marketing regulatory bodies, exporters with the highest bid prices were allowed to directly reach out to producers (project participant farmers) and collect their products and export. However, such an arrangement was a temporary linkage that worked only during the life of the project.

Direct participation of women in the project was limited. District agriculture offices chose project-participant farmers based on their coffee-farming activities, willingness, and interest to participate in the project. This led to selection of heads of households who are predominantly male farmers. Out of the 900 original project-participant farmers, only 20 (2.22%) were female, although in Ethiopia female-headed households account for about 25% [7]. Of those 20 female farmers, 10 were involved in pulping (spreading across the different groups based on their vicinity) and the remainder in sun-drying.

A previous assessment, carried out shortly after the end of the project, showed that the project had substantial impacts in improving coffee quality, linking farmers to higher value markets, and increasing producers’ income [23]. However, a gendered assessment that documents differential effects of the intervention on men and women farmers and its sustainability over time has not been carried out. Thus, this study examines the sustainability and gender dynamics of a coffee value-chain intervention and its benefits, with particular emphasis on the effects among women farmers in terms of participation, role, as well as access and control over benefits.

3. Methodology

The data were collected in the last quarter of 2015, seven years after the end of the project. Reference [24] suggests that a post-programme evaluation of 3–10 years after it has ended provides evidence on sustainability of the impacts. A scoping visit was carried out to all project districts with the aim of connecting with the relevant local officials, experts, and
farmers, and for creating awareness about the study, to obtain quick first-hand information on the status of the usage of the technologies and to determine sample districts. Considering variations in the natural and socio-economic conditions, all the four project districts were included in the study.

3.1. Qualitative Data Collection

A qualitative study was used both to inform the design of the structured survey as well as for in-depth exploration of the key issues. Key informants and focus-group participants were selected purposively, including project-participant male and female household heads, spouses of project farmers, coffee/extension experts, coffee traders, suppliers of coffee pulpers, Ethiopian Commodity Exchange (ECX) representatives, and local officials. Semi-structured checklists were developed and used to guide key informant interviews (KIIs) and focus-group discussions (FGDs) with various actors (Table 1). The content and focus of the semi-structured checklists varied depending on the nature of the key informants and focus groups. All interviews and FGDs were led by men, including the author of the paper. A Gender Analysis Matrix (GAM) framework was used to assess the effects of the intervention on women and men farmers at the household and community levels (GAM, developed by Rani Parker, aims to help determine the different impacts development interventions have on women and men, by providing a community-based technique for identifying and analysing gender differences [25]). Observations and interviews adopted a technographic perspective. Technography is used for the detailed study of the use of skills, tools, knowledge, and techniques in everyday life, and is a useful methodological approach for the integrative study of social-technical configurations. Technography can be regarded as a descriptive social science of technology that examines human and machine/tool interaction [26]. This approach was especially used to explore how social factors shaped the new coffee technologies and their use, adaptations, impacts, challenges, etc..

### Table 1. Type, number, and gender of the people involved in KIIs and FGDs.

| Type of KII and FGDs                                      | Number | Gender | Men | Women |
|----------------------------------------------------------|--------|--------|-----|-------|
| FGD of coffee experts                                    | 4      |        | 3   | 1     |
| General FGD of project-participants and non-participant farmers including spouses (2 groups) | 5      |        |     |       |
| GAM FGDs for male project-participant farmers and their spouses | 4      |        | 2   | 2     |
| KIIs of coffee experts (both those who took part in the implementation of the intervention and those who did not) | 8      |        | 7   | 1     |
| KIIs of farmers (five project-participant and three non-participant farmers) | 8      |        | 4   | 4     |
| KII with ECX centres                                     | 2      |        | 2   |       |
| KII with coffee traders (suppliers)                      | 3      |        | 3   |       |
| KII with pulping machine supplier                        | 1      |        | 1   |       |
| KII with unions (managers)                               | 1      |        | 1   |       |
| KII of district officials                                | 7      |        | 6   | 1     |

In addition, we adapted and used an analytical strategy developed by Denmark’s Development Cooperation (DANIDA) [10], which focuses on examining (1) the gender objective of the intervention (if any); (2) the kind of value chain upgrading strategy employed; (3) the gender outcomes of the intervention; and (4) the level of gender mainstreaming in the diagnostic phase and in M&E.

3.2. Quantitative Data Collection

A structured questionnaire survey was administered by trained coffee experts to 200 randomly selected project-participant farmers (100 each from the pulping and sun-drying groups) and a control group of 200 non-project farmers. The former group was chosen from the lists of project-participants while the latter was selected from non-project villages in the same districts, using a systematic random sampling technique. Out of the 20 female farmers
involved in the project (all were heads of households), six were included in the survey through random sampling. Likewise, eight non-participant female-headed households were selected in the control group through random sampling. The low number of female-headed households identified during the random sampling suggests that the proportion of female-headed households producing coffee in the target districts is lower than the nation-wide proportion of 19% reported by [8].

The questionnaire focused on issues such as asset ownership, coffee farming and coffee production, coffee harvesting and processing practices, use of coffee-processing technologies, coffee quality, coffee-marketing practices, modifications made to the technologies and products, status of the pulping/marketing groups, diffusion of the technologies, participation and benefits for women, negative effects on women, and challenges. In addition, secondary sources of information were reviewed, including published information, records, and reports related to the project, reports from regional and district agriculture offices and other institutions, and data from ECX.

3.3. Data Analysis

Both qualitative and quantitative analytical methods were used to analyse the data. Simple statistics, such as frequency tables, percentages, and t-tests, were generated from the survey data using SPSS. Analysis of the qualitative data involved extracting, summarising, thoroughly examining, and synthesising the information, from the particulars to the general perspectives, in order to draw out key issues and themes and establish relationships and patterns. Combining the findings of the structured survey and the qualitative assessments took place during the data interpretation and write-up stages.

4. Results and Discussions

4.1. Sustainability of the Technologies Promoted by the Intervention

The findings show that use of some of the technologies promoted by the project were sustained and further expanded, while others were dropped or adapted for various reasons. The pulping machines initially enjoyed wider acceptance and expansion even among farmers outside the original districts and some commercial farmers. According to the data obtained from the Regional Bureaus of Agriculture of Oromia and Southern Nations, Nationalities, and Peoples (SNNP), the number of such small pulpers reached 180 from the 100 originally introduced by the project (Table 2). The achievements recorded by the project-participant farmers in terms of improved coffee quality, access to high-value markets, and better income appeared to act as a main driver.

Table 2. Status and diffusion of small manual pulpers within and outside the project districts.

| Region | Zone and District | Number of Small Pulpers Supplied by the Project (2004) | Number of Small Pulpers During the Current Study (2015) ** |
|--------|------------------|--------------------------------------------------------|----------------------------------------------------------|
| Oromia | Jimma zone       | 25                                                     | 51                                                       |
|        | Illubabor zone   | 25                                                     | 34                                                       |
|        | West/Kelem Wellega * | 0                                                     | 20                                                       |
| SNNP   | Bench Maji       | 25                                                     | 25                                                       |
|        | Sheka            | 25                                                     | 27                                                       |
|        | Gedio *          | 0                                                      | 15                                                       |
|        | Sidama *         | 0                                                      | 8                                                        |
| Total  |                  | 100                                                    | 180                                                      |

Note: * Non-project participant zones. ** Including those 100 pulpers supplied by the project, some of which were no longer in use.

However, the majority of the original pulpers supplied by the project ceased operation by the time of the current study. For instance, out of the originally supplied 50 pulpers in the Alle and Yeki districts, only 8 are still in use. Sustainability of the pulpers was beleaguered by such challenges as discontinuity of the temporary market linkage created...
by the project, the lack of a market for semi-washed coffee (following launching of the ECX marketing system), and the labour requirements for pulping and drying parchment. Opening of the ECX in 2008 initially had a negative impact on the production of semi-washed coffee, as it did not recognise such coffee for trading (in other words, initially only sun-dried natural coffee and fully washed coffee were traded through ECX). Eventually, ECX created a category for semi-washed coffee and allowed its trading in the centre as a result of the pressure exerted by producers and traders. This was recognised as one of the impacts of the project on Ethiopia’s coffee-marketing system. However, by the time the new system allowed trading of semi-washed coffee, most project farmers had already shifted to sun-drying of cherries, which has a well-established marketing system that can be accessed by individual farmers. In contrast, most of the pulpers acquired by farmers themselves in recent years remained in good working conditions. It is likely that, apart from the fact the machines were newer, market access and the incentive of investing their own money in the equipment may have led to the pulpers being maintained.

In terms of its gender dimension, out of the 100 pulpers provided under the project, only 10 were given to groups that included women, reflecting the selection of household heads, who are mainly men. Previous studies [7,17,18] noted that the extension service of Ethiopia traditionally focuses on males, whom they perceive as ‘model’ or ‘progressive’ farmers. All of the non-project farmers who acquired pulping machines on their own were male. This is not surprising given that most coffee-producing households are headed by men who control resources (e.g., [8,15]) and that female-headed households are often less wealthy and have limited access to institutional support services, including markets. In [9], the authors note that men tend to enter the production and processing stages when equipment and advanced technologies are introduced.

Improved harvesting and sun-drying of cherries had expanded and have been sustained both among project-participant and non-participant male and female farmers. In total, 93.5% of the interviewed non-project participant farmers who reported copying and using the new technologies/practices indicated adopting improved harvesting and drying practices, while only 6.5% reported copying and adopting the whole package, including the pulping machine. Almost all (99.5%) of the interviewed project-participant and non-participant farmers reported harvesting their coffee by selectively picking ripe cherries. Thus, this study did not find significant differences among male and female farmers as all demonstrated a high adoption rate for these improved practices. The vast majority (95%) of farmers with coffee pulpers (including all six female farmers) had partially or fully switched to improved sun-drying of cherries. Overall, 97% of the 200 interviewed project-participant farmers had continued using the drying beds obtained through the project, while 113 male farmers acquired additional drying beds on their own (on average, they acquired 108 m² of mesh wire.). None of the female farmers reported acquiring additional drying beds but maintained those provided by the project. None of the respondent farmers (project-participants and non-participants) reported drying cherries on bare ground, which was widespread before the implementation of the project. The baseline survey at the launch of the project found that 48% of the farmers were drying coffee by spreading it on the ground and 2.5% used cemented floors, while only 49.5% were using raised drying beds [27].

4.2. Adaptations Made to Coffee Pulpers and Pulped Coffee

The cherry pulper was originally a manually operated machine with a small capacity (50 kg/h), producing semi-washed coffee that does not undergo fermentation and the full washing process. However, market demand, labour requirement, and technical issues motivated farmers to experiment, innovate, and adapt their pulpers and the product. In the quest to boost its pulping capacity, ten male project-participant farmers motorised the pulper by adding a dynamo, while others fitted additional pulping discs, which boosted the pulping capacity to 500–1000 kg/h. Similarly, seven male and three female respondents reported slightly washing the pulped coffee to reduce the mucilage, while 25 male project-participants fermented and washed the pulped coffee. Key informants reported advantages
of washed coffee over coffee dried with its mucilage. The former has a shorter drying period, is easier to handle, has a better appearance and market outlets. Some farmers used their pulping machine to produce coffee seed, which fetches a higher price. Such experiences demonstrate farmers’ innovativeness and sound experimental capacity in response to economic, technical, and institutional factors. Haggar and Rodenburg [28] suggest that local adaptation of sustainable agriculture practices to local social, economic and environmental conditions is critical to enable smallholders, women, and youths to benefit from such an intervention.

Although adoption of a slight washing process was observed both among men and women, efforts made to boost the pulping capacity of the machine were entirely made by male farmers. This could be related to additional financial resources and technical skills required to obtain, embed, and use such motors. Similarly, the use of the pulping machine for coffee seed preparation was reported by male farmers only, which again could be related to the additional skills needed to prepare coffee seed and limited access to such specialised markets. Women’s ability to engage in or to develop value-chain relationships (either horizontal or vertical) supportive of upgrading is limited due to women’s limited capital, agro-technological knowledge and skills, mobility, and prevalent social norms [9,10].

4.3. Social and Economic Benefits for Male and Female Farmers
4.3.1. Change in Farmers’ Knowledge, Attitude, and Practices

The project intervened in districts with poor coffee harvesting and processing practices, emanating from the gaps in knowledge and skills among producers. In the current study, farmers were asked to indicate their perceived level of knowledge related to proper coffee harvesting and processing practices on a scale labelled high, moderate, and low. As shown in Table 3, project-participant male and female farmers felt they had better knowledge on all aspects of coffee harvesting, processing, and handling, compared to the non-participants. In the qualitative study, we tried to assess if the information/knowledge provided to the heads of households trickled down to spouses and other household members. During KIIs and FGDs, we found that some of the spouses of the project-participant farmers were thorough in their explanation of the proper way of harvesting, drying, pulping, and storing coffee, which was an indication that the training and information provided to husbands was somehow transferred to women farmers. Interviewed spouses indicated that they gained knowledge and skills through learning-by-doing and working closely with their husbands. However, further investigation would be needed to determine if this applies to every household.

Table 3. Farmers’ knowledge of proper coffee processing and handling.

| Type of Improved Practice                        | Project-Participant Farmers (N = 197) (%) | Non-Participant Farmers (N = 200) (%) |
|-------------------------------------------------|-----------------------------------------|--------------------------------------|
|                                                 | High   | Moderate | Low | High  | Moderate | Low  |
| Proper coffee harvesting—selectively picking ripe cherries | 91   | 9   | -   | 78   | 19   | 3   |
| Proper coffee drying on raised beds             | 86   | 14  | -   | 69   | 24   | 7   |
| Pulping (semi-washing) and drying coffee        | 54   | 26  | 20  | 17   | 34   | 49  |
| Proper storage and handling                     | 66   | 32.5| 1.5 | 31   | 55.5 | 13.5|

4.3.2. Improvement in Coffee Quality and its Sustainability

Project records, including results of the green-bean and liquor quality assessments, showed considerable improvements in the quality of the coffee produced by project-participant farmers. During the life of the project, all the coffee produced by the project participants using the enhanced primary processing methods was rated as superior (Grades 1–3), while the bulk of the coffee produced using conventional practices was classified as low-grade coffee (Grades 4 and lower), with a considerable volume of it graded as non-exportable [23]. Some of the female project-participant farmers demonstrated outstanding
performance in producing coffees of high quality. For instance, two female farmers received prizes from the project for producing coffee of superior quality.

Although the project had ended seven years before this study, the effects of the intervention appeared to persist in those areas. As outlined in Table 4, during FGDs and KIIIs, coffee experts, local officials, and traders indicated that coffee coming from the project districts continued to be of superior quality, noting that the foundation in terms of knowledge, skills, and processing facilities remained intact. During the current survey, 57% of the project-participant farmers had coffee in Grades 1–3 compared with only 28.5% for the non-project farmers. Two project-participant farmers from the Sheko district indicated that they were producing Q grade (superior quality) coffee, which was in high demand. The head of coffee development in the Illubabor zone indicated that they were using lessons and experiences from the project district in teaching farmers and experts of other districts about improved coffee harvesting and processing practices.

Table 4. Evidence of sustained coffee quality improvement in three project districts, based on ECX records.

| Alle District | Sheko District | Gomma District |
|---------------|---------------|---------------|
| • Among the sun-dried coffees delivered to the Bedele ECX (Illubabor zone) from June 2012 to August 2013, only coffee supplied by Alle (project district) attained a Q1 grade; while only coffee from Alle (project district) and Yayu (non-project area) attained Q2 grades among the 22 districts. |
| • Among the sun-dried coffee supplied to the Bedele ECX between July 2013 and June 2014, only coffee supplied by Alle attained Q1 and Q2 grades—superior grades. |
| • During 2013/14, among the washed coffee supplied to ECX from the B/Maji zone, only Sheko (project district) coffee attained a Q1 grade (15.5% of the coffee). |
| • During the same year, all Sheko washed coffee attained 3rd grade and higher, as compared with 45.5%–85% for other districts (D/Bench, Gura Ferda, and S/Bench). |
| • Among 10 districts, Sheko was one of the two whose sun-dried coffee attained 3rd and higher grades. |
| • During 2013/14, out of the 11 districts of the Jimma zone that supplied coffee to ECX, Gomma (project district) is one of the four districts whose coffee got a Q1 grade. |
| • During the 2014/15 season, Gomma was one of the few districts whose coffee attained Q1 and Q2 grades, and was the first in terms of volume of such a grade coffee. |

4.3.3. Market Linkage and Economic Gains

During the project, both male and female project-participant farmers had enjoyed a special market arrangement, which directly connected them to high-value markets (exporters), enabling them to sell their coffee at higher prices. This played a vital role in shortening the value chain and in curbing the undesirable acts of middlemen. During the project period, farmers were able to obtain premium farm-gate prices for their products, going as high as 41% for sun-dried natural coffee and 78% for semi-washed coffee above local conventional coffee [23]. Farmers noted that bulk sale and receiving lump-sum payments helped foster their saving and investment culture. In explaining the economic gains, a spouse of a project-participant farmer from Alle said, “We have realised the real importance and benefit of coffee after participating in the project”.

Farmers interviewed indicated that production of coffee of high quality in the project areas continued to attract the attention of traders who offered attractive prices. Farmers from the Yeki district indicated that while ordinary coffee received 18–20 Birr per kg, coffee properly dried on raised beds fetched 25–30 Birr per kg during the season preceding this survey. Similarly, traders were paying up to 5 Birr more per kg for properly sun-dried coffee in Sheko. Overall, when we looked at the income generated from coffee over the past 10 years before this survey, project-participant farmers obtained a significantly higher income ($P = 0.014; t$-value = 2.457) from coffee sales (averaging 44,535 Birr per year) than did the non-project farmers (33,244 Birr).

However, the market linkage created by the project was a temporary arrangement that worked over the life of the project. After the end of the project, most of the farmers
were not able to continue enjoying such privileges in terms of direct linkage to exporters. In an attempt to overcome such challenges, some male farmers obtained a trade license to sell their coffee at the central auction market, while others formed marketing groups and sold through cooperative unions. Out of the 200 project-participant farmers included in the survey, 37 had become suppliers of coffee to the ECX centre while none of the non-project participant farmers reported such engagements at the higher levels of the value chain. Likewise, some project-participant farmers organised themselves into small groups to market their sun-dried coffee through the ECX centres. However, women seem to be missing out in taking up such opportunities after the end of the project. Researchers [5,15] have noted that limited access to and control over assets, and challenges related to mobility, may reduce women’s capacity to engage in higher and more profitable nodes of the value chain.

4.4. Gender Responsiveness and Gendered Outcome of the Intervention

4.4.1. Gender Sensitivity and Responsiveness of the Intervention

As outlined under heading 2 above, women had limited representation in the intervention. Our findings suggest that the value-chain intervention was generic and none of its components was specifically targeted at women. We did not find efforts made to consider gender-segregated data collection and analysis in the baseline survey, selection of project participants, and monitoring and evaluation activities. The project focused on a value-chain-upgrading strategy, namely, product, process, and functional upgrading, where product upgrading refers to moving into more sophisticated products with an increased unit value (e.g., products complying with buyer requirements for higher quality); process upgrading refers to achieving a more efficient transformation of inputs into outputs through the reorganization of productive activities (e.g., applying new processing technology); and functional upgrading refers to acquiring new functions that increase the skill content of activities (e.g., carrying out grading, primary processing, bulking, and storage) [10]. The coffee intervention under analysis focused on improving coffee processing, quality, storage, and market linkage for project-participant households, which were largely headed by men and lacked a clearly spelt out gender objective and deliberate effort to ensure gender equality. The reviewed literature warns that assuming that women will automatically gain from generic value-chain interventions can have serious consequences [10]. The current study shows that the gendered outcomes of the intervention are mixed. Even though the intervention was not targeted specifically at women, the value-chain-upgrading strategies implemented by the project addressed the key coffee quality problems faced by the coffee producing households. As noted in the sections below, all members of the household, including women, benefited from the spill-over in terms of skills upgrading and economic gains generated for the household. Riisgaard et al. [10] noted that generic value-chain interventions can have positive effects for women if they (even unintentionally) address gendered constraints. Some evaluation studies suggest that as women often start from a relatively more disadvantaged position with regard to business knowledge and skills, generic technical assistance can benefit participating women more than men [10]. Kruijssen et al. [29], however, warn that although value-chain interventions may result in economic upgrading, they may have limited effect on improving inequity in the chain.

4.4.2. Influence of the Intervention on Women’s Role in Coffee Production, Processing, and Marketing

The current study shows that all members of the household, including men, women, and children, play different but important roles in coffee production, processing, and marketing (Table 5). Some of the activities, such as land preparation, slashing weeds, stumpng, and pulping of cherry, which require physical strength, were mainly the responsibility of men. Planting, hand weeding, harvesting, transporting, sorting, and drying coffee were largely women’s duties. This is in agreement with Kemal et al. [15], who reported that seedling preparation, transplanting, weeding, and drying coffee are primarily the
responsibility of women and girls. In terms of coffee marketing, our findings show that in the male-headed households, bulk sale of dry coffee is often the responsibility of men, while women are traditionally restricted to selling their produce to local markets to cover household expenditures. In agreement with this finding, Kemal et al. [15] noted that in Ethiopia men take the lion’s share in marketing coffee, which gives them an opportunity to control the income. FAO [7] similarly reported that the marketing and income from cash crops grown at larger scale, such as coffee, are controlled by the household head, who are mainly male.

Table 5. Gender roles in coffee production, processing and marketing, and sharing of benefits (GAM and FGD).

| Level of Involvement | Men | Women | Boys | Girls |
|----------------------|-----|-------|------|-------|
| **Coffee production and processing** |     |       |      |       |
| • Seed selection and storage | ** | ** | * | * |
| • Sowing and nursery management | ** | *** | * | ** |
| • Land preparation (clearing, hole preparation, etc.) | *** | * | ** |
| • Planting | ** | *** | ** | ** |
| • Slashing weeds | ** | * | ** | * |
| • Hand weeding | * | *** | * | ** |
| • Hoeing/cultivation | ** | * | * | * |
| • Stumping | *** | * | ** |
| • Shade regulation/management | *** | * | * |
| • Harvesting | * | *** | * | ** |
| • Transporting to processing site | * | ** | * | ** |
| • Sorting | * | *** | * | *** |
| • Drying bed construction | *** | * | ** |
| • Pulping | *** | * | ** | * |
| • Drying | * | *** | * | *** |
| **Coffee marketing** |     |       |      |       |
| • Selling small quantities | * | *** | * | * |
| • Bulk (wholesale) | *** |     |      |       |
Table 5. Cont.

| Level of Involvement | Men       | Women      | Boys | Girls |
|----------------------|-----------|------------|------|-------|
| **2. Benefits**      |           |            |      |       |
| **Access**           |           |            |      |       |
| • Access to training and extension advice | *** | * | | |
| • Access to processing facilities | *** | *** | * | * |
| • Access to coffee farm | *** | *** | * | * |
| • Access to income | *** | *** | * | * |
| **Control**          |           |            |      |       |
| • Control over processing facilities | *** | ** | | |
| • Control over coffee farm | *** | ** | | |
| • Control over income | *** | ** | | |

Note: * = Low; ** = Moderate; *** = High.

The findings from the male and female FGDs and questionnaire survey show that the project had both positive and negative effects on gender roles. According to the household survey, the negative effects of the intervention on female farmers included increased workload, which was reported by 71% of the project farmers. Similarly, both male and female farmers (in the KIIs and FGDs) noted that introduction of the new technologies/practices, such as selective picking of ripe cherries, pulping, and washing of coffee, entailed more labour requirement, which added to women’s workload. Previous studies from Ethiopia [12,20,30] similarly reported that adoption of improved agricultural technologies increased women’s workload due to increased involvement in farm activities. Global experience [10] also shows that participation in value-chain development schemes (such as Fairtrade organic production) tends to increase the workload of women due to demands for product and process upgrading, which may also hinder their effective participation in such schemes.

However, women focus groups indicated that the positive contributions of the intervention outweigh the negative effects on women. They noted that women did not carry the extra burden alone, but other family members and hired labourers were involved, as the raised income would enable households to hire labourers. A spouse of a project-participant farmer from Kundi village in the Alle district reported gaining new skills and enjoying the work, and taking part in pulping cherries, drying on modern beds, and associated practices instilled a sense of pride and confidence in her. On the other hand, sun-drying of cherries on raised modern beds, which is normally women’s responsibility, was made more convenient and easier than the traditional process. Traditional drying of cherries is labour intensive and requires the coffee to be taken home every evening and when raining, as well as taking longer than the improved drying practice, often resulting in coffee lacking evenness. Both men and women key informants noted that the improved drying facilities and methods helped to tackle such problems.

4.4.3. Access to and Control over Resources and Benefits

Access to and ownership of key production assets is one of the critical factors that influence decision-making power and control over benefits. In this regard, the pulping machines and drying facilities provided by the project were registered under the heads of households, who were mostly men. However, project-participant male farmers and their spouses in the FGD indicated that the facilities were accessed and used by all household
members, although some major decisions were left to the household heads. Interviewed male and female farmers in the FGDs and KIs reported improvements in the gender-related policy environment in Ethiopia, which has improved women’s asset ownership rights and decision-making power. A female farmer (spouse of project farmer) from Gomma said, “These days, men have stopped monopolising and misusing farm income and have started consulting with their spouses regarding its investment. The income generated from coffee sales, in most cases, is being used for the welfare of the family”. Members of the female FGD indicated that taking an active part in coffee processing and use of the new technologies enhanced women’s confidence and decision-making power over the income. Similarly, over 90% of the male and female project-participant respondents in the questionnaire survey indicated that women had benefited through increased access to income, raised household income, and improved family welfare. A study conducted in Jimma in Ethiopia [12] similarly noted that increased involvement of women in coffee production had positive implications by increasing their participation in decision making on the utilisation and allocation of the income from the produce.

Interviewed male and female farmers in the FGD and KII noted that wholesale of coffee at the end of the season helped them to receive the money once and plan over its effective use. Spouses of two project-participant farmers from the Alle district indicated that the intervention taught them to develop a saving culture. Other farmers, however, indicated that selling coffee in large quantities entails travelling some distance to big market centres, which shifts such responsibility to men, providing them an opportunity to enjoy better control over the income. A study conducted in Ethiopia [15] showed that distance from the market centre had a negative influence on the quantity of coffee marketed by women, further noting that men had relatively more power on controlling farming income. Global experiences, e.g., [8], also show that due to their greater involvement in selling the coffee, male household heads usually control the revenues from coffee production. In a study that examined the gendered impacts of value-chain development, Tavenner and Crane [31] illustrated how the commercialization of smallholder dairy production interacted with locally embedded, gendered power relations and marginalized and disenfranchised women in the VC. However, among the project-participant male and female farmers interviewed in the current survey, only 4% felt that the project denied women control over coffee income, although this may have been influenced by the fact that most were male. Male and female key informants reported that women could still sell small quantities of coffee any time in local markets to cover daily household expenditure. In some districts, such as Alle, women (spouses) have their own coffee plot for use to cover household expenses.

Moreover, key women informants reported that introduction of the new technologies and practices had created an employment opportunity for youth and women who worked as daily labourers. Project-participant male and female farmers indicated that they were able to hire more labourers during harvesting, pulping, and drying of coffee, and the majority of those labourers were young women. A deeper qualitative analysis showed that the effects of the intervention span across the entire household (male and female) and the wider coffee farming community in those areas (see Table 6).

Table 6. Gender analysis matrix of the impacts of an intervention at different levels (views of male and female farmers).

| Labour | Time | Resources | Culture |
|--------|------|-----------|---------|
| (+) Modern drying beds made drying cherry simpler | (+) Pulped coffee dries faster than cherry | (−) Processing facilities were given to HH head | (+) Raised women’s social status and confidence |
| (+) Learnt new skills | (+) Use of drying beds shortens drying period | (+) Improved access to processing facility | (+) Promoted saving culture |
| (−) Selective picking of cherry added to workload | (−) Selective picking of cherry requires longer time | (+) Improved control over income | (−) Opportunity to actively participate in processing activities |
| (−) Pulping increased demand for labour (workload) | | (−) Wholesale of coffee by men; had implications for decision-making and control over income | (−) Women were required to do pulping of coffee—workload |
| (+) were able to hire labourers | | | |
| (+) Employment opportunity | | | |
### Table 6. Cont.

| Labour | Time | Resources | Culture |
|--------|------|-----------|---------|
| **Men** | (+) Men no longer needed to carry much wood to construct drying beds |
| | (+) Learned new skills |
| | (+) Were able to hire labour |
| | (−) Pulping increased labour demand |
| | (+) Drying coffee on beds saved time |
| | (+) Men were required to spend time on their coffee |
| | (−) Demand for more time meant less leisure time |
| | (+) Increased income |
| | (+) Maintained similar access and control |
| | (+) Raised participant farmers’ social status |
| | (+) Boosted saving and investment |
| | (+) Fostered a positive attitude of family members about coffee activities |
| **Household (HH)** | (+) Responsibility shared among members |
| | (+) HH was able to hire labour |
| | (−) Some practices increased workload |
| | (+) Family members spent more time working together |
| | (−) Time for leisure was reduced |
| | (−) Women had less time for family |
| | (+) Knowledge and skill shared among members |
| | (+) Increased income and family welfare |
| | (+) Improved access to processing facilities |
| | (+) Linked to market |
| | (+) All members of the household got involved in the work |
| | (+) Motivated to produce coffee |
| | (+) Promoted saving and investment culture |
| **Community** | (+) Introduced new technologies |
| | (+) Employment opportunity |
| | (−) Started working for longer periods |
| | (+) Diffusion of new skills and practices |
| | (+) Improved coffee quality, attracted better prices |
| | (+) Less water, low pollution of environment |
| | (+) Change in behaviour and practices |
| | (+) Improved image of coffee of the area |
| | (+) Prestige for the community |

Note: (+) = positive impact; (−) = negative impact.

### 4.5. Pulping/Marketing Groups and Implications for Women’s Empowerment

Each coffee pulping machine was supplied to a group of five farmers, formed based on their proximity and common interest. The findings suggest that the group extension/training approach and organization of farmers into groups for coffee processing and marketing had a number of advantages. It had strengthened friendship, teamwork, joint learning, as well as sharing of resources and experiences among both male and female farmers. Participation of female farmers in such mixed-sex groups helped them to closely work with and learn from male farmers, building their technical skills, confidence, and social capital. Project-participant female farmers indicated that as a result of the knowledge/skills they gained through group activities, they enjoyed respect and recognition among their community. Existing literature, e.g., [20,30], similarly claims that access to social capital and networks enables female farmers to access information, inputs, finance, develop, and deploy their entrepreneurial skills. Studies [4,8,32] show that farmers’ groups, co-operatives, and other forms of associations can play an important role in facilitating smallholders’ effective engagement into value chains, particularly by improving access to production factors and product markets, through sharing risks and to realise economies of scale. Riisgaard et al. [10] recommend that the product and process-upgrading strategies employed in development interventions should also pay adequate attention to supporting producer and marketing groups, and their marketing activities, so as to improve horizontal and vertical linkages. However, the processing and marketing groups formed under the project were mixed-sex groups, predominantly composed of male farmers. FAO [32] notes that although mixed-sex groups could be more effective than single-sex groups in achieving their development objectives, arguably, leadership positions could be taken up by men, which may undermine women’s empowerment. However, most of the groups formed under the project had become inactive and dissolved when some of the farmers stopped pulping coffee, while some of the male farmers continued working together and supplied coffee to the ECX market.

### 5. Conclusions

Some of the technologies/practices introduced by the project were widely accepted and sustained, while others were dropped or adapted depending on various technical, institutional, and socio-economic factors. The value chain intervention was generic and not gender sensitive, which resulted in poor representation of women. However, all members of the household (men, women, boys, and girls) were eventually involved in the
implementation of the new technologies/practices, all benefitting to a varying degree from the economic gains and betterment of their welfare as a result of the intervention. However, such conclusions may not hold true for other interventions that may exclusively generate benefits for the direct beneficiaries of the project alone. Moreover, such spill-over benefits could be short-lived and may not result in long-term empowerment for women. Although some of the technologies eased women’s work, their involvement in coffee harvesting and pulping entailed new roles and additional workload. The role of coffee marketing, particularly bulk sale, was shifted to men, which has implications for control over income. Following the end of the project and the temporary market linkage, some male farmers devised mechanisms to continue accessing higher value markets, which the female farmers were not able to do. Thus, if male and female farmers are to sustainably benefit, value chain development efforts should not solely focus on short-lived arrangements nor be gender-blind as the outcome of such interventions can undermine gender equalities. The study suggests that adopting gender-sensitive and gender-responsive approaches would enhance gender equity and sustainability of the intervention and benefits.

Thus, such VCD efforts need to carry out prior gender-sensitive analysis of the value chain in order to properly understand the relations between women and men, their differential roles, responsibilities, challenges, and needs, and consider these in their design features. Analyses such as ICO [8] suggest the need to have extension beyond the farm level, to cover the entire value chain. This would help to design a more inclusive intervention that systematically integrates women across the different stages of the VC. Moreover, if the underlying causes of gender disparities and inequalities are to be properly addressed, long-term policy measures, gender transformative strategies and approaches, and empowerment, all increasing women’s access to and control over productive resources and services, need to be given due consideration.

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