

SMALL-HOLDER FARMERS' PERCEPTION AND WILLINGNESS TO PARTICIPATE IN OUTGROWING SCHEME OF SUGARCANE PRODUCTION: THE CASE OF FARMERS SURROUNDING WOLKAYET SUGAR DEVELOPMENT PROJECT IN ETHIOPIA

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ABSTRACT

Wolkayet sugar development project is one of the sugar projects currently under construction in Ethiopia. The project is expected to produce sugar for export and local consumption as well as ethanol for energy purpose. In order to fill the gap in demand and supply for sugar and ethanol, the project has planned to increase production by participating small-holder farmers surrounding the project in cane production and supply through contract farming. Therefore, a study was carried out from June 2015 to May 2016, to assess the perception and willingness of small-holder farmers surrounding the project in outgrowing scheme of sugarcane production through contract farming. Primary information was obtained from household heads of 250 small-holder farmers using a pre-tested questionnaire. Three focus group discussions were also conducted. Descriptive statistics, chi-square and student t-test were used to describe and analyze the data using SPSS software version 18. Majority (82.4%) of the sample household heads were men with average age of 46 years and family size of 5 persons. About 92% of the farmers were aware and willing to participate as sugarcane out-growers, although there was a high level of variation in their levels of awareness which ranged from less knowledge level to basic and enough knowledge level. Accordingly, 76.5% of willing farmers were expecting credit, technology and management skill transfers and guaranteed pricing structures from the scheme. They also preferred contracts in which the contracting firm supplies and manages all the inputs on the farm while the farmer provides only land and labor. Therefore, the findings of the study could potentially be used as an input for the project's plans in engaging small-holder farmers in out-grower scheme of sugarcane production.

Key words: Attitude, Contract farming, Peasant association, Household, Sugar



INTRODUCTION

Sugarcane (*Saccharum officinarum* L.) is a member of the Poacea family [1] and is the main cane sugar-producing crop that contributes nearly 75% of the total sugar pool at the global level. The fibrous residue obtained after extraction of juice, is used as a source of fuel in sugar factories [2]. Baker's and brewer's yeast are also prepared from molasses and, it is widely used as a stock feed, either directly or in compound products [3].

The Ethiopian sugar sub-sector is largely underdeveloped with untapped resources and potentials. The role of sugarcane industry in the Ethiopian socio-economy is significant where sugar and its by-products are used for local consumption and export. It has also good prospect especially in relation to enhancing bio-fuel production and thereby substituting and reducing reliance on fossil fuel [4]. The abysmally low production by the existing sugar companies could not satisfy the nation's requirement and the wide gap between demand and supply in sugar is usually bridged through massive importation with huge amount of foreign currency. Consequently, the government of Ethiopia has now identified boosting sugarcane production through expansion of existing and construction of new sugar factories as one of the top strategic goals. Hence, currently, the government is establishing new factories at different places in the country besides expanding the existing sugarcane estates for sustainable supply of sugarcane as well as bio-fuel production.

Wolkayet sugar development project is one of the projects being under construction in Ethiopia expected to contribute its share in supplying sugar and other products to the nation. The factory's maximum potential is expected to be a cane crushing capacity of 24,000 tons a day that enables it to produce 484,000 tons of sugar and 20,827 cubic meter ethanol per annum. Therefore, for efficientwork of the planta continuous and ample supply of cane produce is inevitable. In this regard, the establishment of out-grower scheme through contract farming is necessary.

Contract farming can be defined as a system for the production and supply of agricultural, horticultural or allied produce by primary producers under pre-arranged agreements. Essentially, such arrangements include a commitment to provide a commodity of a type/quality, at a specified time, place, price, and in specified quantity to a known buyer [5]. In the small producer contexts, contract farming is recommended as the only way to make small-scale farming competitive as the services provided by contracting agencies cannot be provided effectively by any other agencies [6]. Moreover, contract farming has been claimed to have a positive impact on local economies by improving the welfare of rural households [5, 7, 8, 9, 10, 11]. The question of small-holder participation in contract farming arrangements (CFAs) is of great importance to policymakers seeking to stimulate rural economic growth and poverty reduction [7].

Analyses of contract farming often use a political economy perspective, an institutional economics perspective, or a combination of both. In the political economy's view, contract farming is seen from the lens of unequal power relations, conflict, and labor



related issues [12, 13]. The main concern is that contract farming can lead farmers into problems such as loss of autonomy, increased production risk, and indebtedness [14,15]. Conversely, the institutional economics view emphasizes the role of contract farming in addressing market failures [16, 17].

The expansion of contract farming has taken place in all regions of the world and in sub-Saharan Africa; contract farming is on the increase. For instance, in Mozambique almost 12% of the rural population is involved in contract farming mainly in growing cotton [18]. In Kenya, over 50% of tea and sugar are produced under contracts, in addition to the large number of contract growers of horticultural exports. Further, crops with successful contract-farming operations include coffee in Uganda and tobacco in Malawi. Out-grower schemes or contract farming is gaining prominence in sugar industry in Zambia, where small-holder farmers deliver sugarcane to factories which guarantee their market and thus supporting farmers' livelihoods [19]. For instance, 60% of the sugarcane supplied to the mills in Nakambala factory is from own-estates with 40% coming from individual farmers who either operate independently or are part of out-grower schemes operated by the companies and their total earnings for cane delivered amounted to more than 40 million US\$ during 2010/11 production season [19].

The main concern is that contract farming can lead farmers into problems such as loss of autonomy, increased production risk, and indebtedness [14, 15]. Conversely, the institutional economics' view emphasizes the role of contract farming in addressing market failures [16, 17]. In most empirical studies, perception is defined as an attitudinal process explained by the psychological state of an individual that is determined by individual characteristics, socio-economic, institutional and physical factors. The main prerequisite for attaining sustainable agricultural policies is the formulation of appropriate policies, which are supported by the farming communities and to which they are willing and able to respond. The responses, commitments and responsibilities required for the success of such policies still depend on the knowledge and perception of the problem by small-holder farmers.

Therefore, in order to effectively produce sugar in terms of the planned quantity and quality, participation of small-holder farmers in outgrowing scheme through contract farming is of paramount importance. Moreover, identification of the perception and willingness for participation of small-holder farmers in out-growing scheme of sugarcane production as well as the associated constraints and potentials for participation is crucial to consider. However, in the study area, there is no information on the perception and willingness of small-holder farmers' participation in outgrowing scheme of sugarcane production and the constraints as well as potentials for participation is limited. To this end, understanding farmers' perceptions on out growing scheme of sugarcane production and their willingness to participate as well as identifying the constraints and potentials for participation plays a leading role for further work by the project. Therefore, the general objective of this study was to assess the perception of small-holder farmers around Wolkayet sugar development project on out-grower scheme of sugarcane production through contract farming and their willingness to participate as well as the potentials for and constraints to participation.



METHODOLOGY

Description of the Study Area

The study was carried out in Wolkayet district located in western zone of Tigray regional state at about 1, 200 km from the national capital Addis Ababa. The farming system of the study area is of a mixed crop-livestock type, where crop production plays a major role in the households' income. Wolkayet is known for its fertile alluvial soil, which supports the growing of cash crops like sesame, cotton and sorghum. It is also known for the production of gum and resin producing trees [20]. Land tenure in the district is distributed amongst 73.93% owning their land, 25.09% renting, and 0.98% reported as holding their land under other forms of tenure [20].

Wolkayet sugar development project is one of the mega projects of the country located within Wolkayet district. The project is being undertaken in phases and when fully completed it will have a capacity to crush 24 thousand tons of cane per day [21]. The project will cover more than 45 thousand hectares of land with sugarcane plantations primarily relying on Zarema River. When Wolkayet sugar development goes operational, the country expects to produce 484 thousand tons of sugar per annum, almost equivalent to the current total domestic demand [21].

Research and Sampling Design

The study design is a non-experimental type with the study population of farmers who reside permanently surrounding Wolkayet sugar project. The target population are those small-holder farm household heads who permanently reside surrounding the Wolkayet sugar project and own land. The study population was identified in consultation with the sugar development project management and office of agriculture and rural development of the district. A two-stage sampling was employed to select district, peasant associations and respondent households in the study area. Thus, Wolkayet district and thirteen peasant associations namely; Qorarit, May zihlto, Adi Jamus, Kisaddelesa, Tsabri, Qalema, Laelay may hmri, May timqet, Delesaquba, May chi, Bet molo, Adi flho, and Mogue, were purposively selected based on accessibility. In the second stage, from the thirteen peasant associations, only small-holder household heads were selected from the list obtained from the administration of respective peasant associations using systematic random sampling technique based on probability proportionate to the size of the peasant associations. Sample size was calculated and determined using a formula developed by Yamane [22] and a total of about 250 households were considered for the primary data collection.

$$n = \frac{N}{1 + N(e^2)} \dots\dots\dots (1)$$

Where; n = sample size,
 N = total number of small-holder household heads in the study area,
 e = margin of errors at 10%



Data Sources and Methods of Data Collection

Primary data were collected through conducting interviews with household heads shouldering the responsibility of the household. A semi-structured questionnaire was used as an instrument for data collection. The questionnaire was reviewed and pre-tested in the study area for any further adjustment to solicit for desired responses before commencement of the actual study. A sample of 30 households was taken for the pre-testing purpose [23]. Besides, for having the right output from the survey work, qualitative information was collected through six focus-group discussions. Secondary data were obtained from the sugar development project, ministry of agriculture and rural development, published reports, books and journals. Finally, primary data were supplemented with secondary data to ensure adequacy and reliability of the information gathered. Educational status and the level of awareness on contract farming of the respondents were measured categorically, while willingness to participate in contract farming was collected as a dummy variable. Besides, to measure respondents' perception, a list of hypothesized advantages and disadvantages of contract farming were presented for the respondents to choose from.

Data Analysis

The data collected were analyzed using descriptive statistics such as mean, frequency distribution and percentages. Student's t test and χ^2 test were also employed using SPSS software (version 18; SPSS Inc., Chicago, IL, USA). Qualitative data are narrated in the results and discussion part.

RESULTS AND DISCUSSION

Demographic characteristics

Analyses of the demographic characteristics of the respondent households showed that majority (82.4%) of the sample household heads were men (Table 1). Similarly, 94% of small-holder household heads engaging in out-growing scheme of potato production in Ethiopia were men [24]. The average age of the sample household head was 46 years (Table 1). This is in line with the finding of research that reported average age of small-holder households who participated and needed to participate in potato contract farming in West Showa Zone of Ethiopia were 39.7 and 39.2 years, respectively [24]. The educational background of the sample household heads is believed to be an important feature that determines the readiness of household heads to accept latest ideas and innovations and most (70 %) of the sample household heads have been found attended at least basic education except 30 % who were illiterate at all (Table 1). The average family size of the sample households were 5 persons (Table 1). Similarly, an average of 4.57 persons per household was reported in Wolkayit district [20].

Household's Perception and Willingness to Participate in Contract Farming

Descriptive analysis of the data showed that majority of the sample respondents (92%) had awareness on contract farming and were willing to participate as out-growers on sugarcane production through contract farming arrangements although high variation was reported on their level of awareness (Table 2). Only 8% of the households did not have any awareness on contract farming and willingness to participate in outgrowing scheme of sugarcane production (Table 2). In line with the findings on potato contract



farming in Ethiopia, 82% of small-holder farmers who did not participate earlier in contract farming indicated their willingness to participate in contract farming and 98% of the farmers perceived that participation could bring some benefits, such as improved income, access to key inputs and technical assistance [24]. Similar findings were reported during focus group discussions where most of the participants indicated that awareness on outgrowing through contract farming was gained formally through conferences prepared by the Sugar Corporation and agricultural and rural development office and informally through agricultural agents.

Reasons for Participation in Contract Farming

Agribusiness firms are likely to have some strategic advantage that allows cost savings to be conferred on smallholders through contracting. Similarly, the small-holder households expect benefits related to marketing, production and other compensations related to opportunity cost of their previous crop production. Accordingly, out of the sample households who agreed to participate in contract farming scheme, 23.5% had expectations of getting support related to provision of inputs and production services, guaranteed and fixed pricing structures and access to reliable markets, while the other 76.5% reported to have expectations regarding credit, technology and management skill transfers related support in addition to the gain expectations reported by the 23.5% (Table 3). Gumataw *et al.* [24] similarly indicated that 98% of the 82% farmers who needed to participate in outgrowing potato production believed that participation could bring some benefits, such as improved income, access to key inputs and technical assistance. Stability and technical knowledge were the most important reasons why farmers joined contract-farming initiatives [25, 26]. Similarly, during the focus group discussions, it was indicated that willingness of participation in outgrowing sugarcane production through contract farming was mainly due to the benefits perceived such as provision of inputs and production services, guaranteed pricing structures and access to reliable markets, access to credit service, technology and management skill transfers associated benefits.

This study is also extended to understand the reason behind those who were not willing to participate in the contract farming scheme. This survey was a good opportunity for those who had failed to express their reasons in the conferences prepared by the Sugar Corporation and agricultural and rural development office. Accordingly, out of the 8% who did not have awareness and willingness to participate, 67% justified fear of risk related to a decrease in production and/or earnings while the fear of the rest 33% were related to unsuitable technology and crop incompatibility and/or domination or lack of bargaining power. The production technologies available to and appropriate for smallholders can be similarly limiting [7]. Finally, institutional constraints such as limited access to credit and insurance, insecure land rights and uncertainty regarding new risks may further reduce the feasibility and attractiveness of contract farming arrangements participation for smallholders [7]. However, 38% of non-participated respondents on potato contract farming expressed their concerns about contract farming, which included possible disagreement on contract terms, lack of trust in the relationship, and low contract price [24].

For more investigation of the features behind the willingness and unwillingness to participate by the farmers, this study conducted mean comparison test between the demographic as well as socioeconomic factors of the willing and unwilling farmers. As shown in the table 4, the likelihood of willingness is high among younger smallholders where on average, those who were willing to participate were 42 years old, whereas the unwilling were 56 years old. Another important variable behind willingness was the educational status of the household head, which was collected categorically assigning 0 for illiterates, 1 for those who attend basic education (religion based), 2 for those who attended primary education, 3 for those who went to secondary education and 4 for those who attended post-secondary school education. Accordingly, farmers who were willing to participate in the contract farming had 1.92 statuses, which is close to secondary school education, while those who were not willing had 0.9 or a status less than or equal to elementary education. This difference is statistically significant at 1% level of significance. Moreover, as reported above, keeping other things constant those willing to participate in contract farming had higher cultivated land than those who were not willing to participate.

Type of Contract Farming Design Preferred by the Households

Out of those willing to participate in contract farming, all the households preferred total contracts under which the contracting firm supplies and manages all the inputs on the farm and the farmer becomes just a supplier of land and labor (Table 5). It was indicated that contract terms and conditions, hereafter called contract design attributes, can affect farmers' decisions to participate in contract farming, varyingly affecting their expected level of utility from participation [24]. Consequently, it was indicated that small-holder farmers in potato contract farming in Ethiopia were generally positive about the prospect of contract farming to improve their livelihoods [24]. Moreover, farmers' willingness to participate in potato contract farming increased if a contract design had the following attributes: a written form, inputs, technical assistance, and seed supplied by the buyer firm; and variable output quality and variable price options [24].

Potentials and Constraints for Participation in Out-growing Scheme of Sugarcane Production

The potentials and constraints mentioned were obtained through focus group discussions and from literature reviews.

The presence of good government policy for commercial agriculture development in Ethiopia helps in linking small-holder farmers to market and encourages small-holder participation in contract farming. Good level of awareness of small-holder farmers on out-growing scheme in the study area coupled with the presence of encouraging experiences in out-growing scheme in the country, and Africa is another potential for successful implementation of the outgrowing scheme. Moreover, educational background of most of the small-holder farmers who are literate could help successful implementation of sugarcane contract farming, in particular, and adoption of technologies, in general.



Available and cheap labor force as well as huge capacity of quality irrigation water in the study area can be considered as a driving force for successful implementation of the sugarcane outgrowing scheme. Besides, the high sugar and energy demand and comparative peace and stability in the country in general can be a good potential for successful implementation of the outgrowing scheme of sugarcane production.

Little experience in outgrowing scheme through contract farming in the study area in particular and Tigray region in general could be considered as a constraint for implementing this outgrowing scheme of sugarcane production in the study area.

CONCLUSIONS

The government policy on commercial agriculture and linking small-holder farmers to market is fully acknowledged from the study findings. Small-holder farmers in the study area are aware and have good level of attitude towards contract farming in sugarcane production and are willing to participate in the farming system considering some requirements are fulfilled. Thus, the findings of the study could potentially be used as an input for the project in engaging small-holder farmers in the sugarcane outgrower scheme.

ACKNOWLEDGEMENTS

The study was funded by Aksum University Internal Research Fund. The authors would like to thank the University for the financial support rendered. Authors also would like to thank Wolkayet district office of agriculture and rural development, administration of Wolkayet district as well as Wolkayet sugar development project for their support in providing the necessary information required for the study.



Table 1: Demographic characteristic of respondent households

Characteristics	Number/mean	Percent/Standard
Sex of household head		
Male	206	82.4%
Female	44	17.6%
Educational status of the household		
Illiterate	75	30%
Basic education (religion)	64	25.6%
Primary education	88	35.2%
Secondary education	15	6%
Post-secondary education	8	3.2%
Average age of the household	46	± 9.17
Average family size	5	± 2.10

Source: Own survey, 2015/16

Table 2: Respondent household's level of perception and willingness to participation in outgrowing scheme of sugarcane production

Level of awareness	Frequency	Percentage
I know nothing	20	8.0
I have very less knowledge	66	26.3
I have basic awareness	128	51.2
I have enough awareness	36	14.5
Total	250	100
Willingness of participation		
-Yes	230	92.0
-No	20	8.0
Total	250	100

Source: Own survey, 2015/16

Table 3: Respondent household's reasons for participation in contract farming of sugarcane production

Reasons	Frequency	Percent
Provision of inputs and production services, guaranteed pricing structures and access to reliable markets	54	23.5
Expecting credit, technology and management skill transfers related supports in addition to the gain expectations	176	76.5
Total	230	100

Source: Own survey, 2015/16



Table 4: Household's characteristics and their willingness for participation in outgrowing scheme of sugarcane production

Household characteristics	Willing	Unwilling	Student's t test/ χ^2 test
Age of household head (years)	42	56	2.36*
Education status of the household head	1.92	0.9	1.64***
Total cultivated land (ha)	9.2	5.8	1.93**

Source: Own survey, 2015/16 *,** and *** denote significance at 10%, 5% and 1%, respectively

Table 5: Type of contract farming and households' preference

Type of contract farming	Number	Percent
Contracts under which only produce sale and purchase conditions are specified	0	0.0
Contracts wherein some of the inputs are supplied by the contracting firm and the produce is bought at pre-agreed prices	0	0.0
Total contracts under which the contracting firm supplies and manages all the inputs on the farm and the farmer becomes just a supplier of land and labor	250	100.0
Total	250	100.0

Source: Own survey, 2015/16

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