THE TRANSACTION COST OF SUGARCANE FARMERS: AN EXPLORATIVE STUDY

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ABSTRAK

Industri gula sampai kini masih menjadi prioritas dalam pembangunan sektor pertanian di Indonesia, khususnya di Jawa Timur. Tetapi, kinerja industri gula di Jawa Timur dalam dua dekade ini cenderung menurun, yang antara lain dapat dilihat dari penurunan jumlah produksi. Penelitian ini menggunakan analisis ekonomi biaya transaksi untuk mengidentifikasi masalah industri gula di Jawa Timur. Riset ini membandingkan biaya transaksi antara petani tebu kontrak dan non-kontrak di Kabupaten Malang dan Kediri (Jawa Timur). Secara lebih detail, studi ini memperlihatkan bahwa ongkos untuk mengorganisasi tebang-muat-angkut (TMA) (termasuk biaya karung) berkontribusi paling tinggi dari total biaya transaksi petani tebu, baik berdasarkan lokasi, tipe petani, maupun luas lahan. Jika dianalisis lebih detail, ditemukan fakta-fakta sebagai berikut: (i) biaya transaksi TMA lebih besar petani tebu kontrak daripada non-kontrak; (ii) biaya komisi yang diberikan kepada perantara lebih besar petani tebu non-kontrak daripada kontrak; dan (iii) proporsi bunga kredit terhadap total biaya transaksi pada petani tebu kontrak cukup tinggi karena sering terjadi keterlambatan penyaluran kredit, di samping fakta bahwa rata-rata jumlah kredit petani tebu kontrak lebih besar ketimbang non-kontrak.

Keywords: *institutional economics, transaction costs, contract and non-contract sugarcane farmers, East Java*

INTRODUCTION

1. Background

East Java has at least begun to attract some attention as an important economic region in its own right and as a counterweight to the longstanding economic dominance of Jakarta-West Java. East Java's pioneer industries were established as early as the mid 19th century to serve an emerging plantation economy (Dick, 1995:41). Trading networks in East Java and beyond quickly developed to carry the produce of the more intensive and diversified practice of agriculture onto the markets (Elson, 1984:9). West and Central Java also produced sugar, coffee and tobacco, but East Java's output soon surpassed those

parts of Java that had been more intensively exploited by the East India Company. The sugar industry was able through improved cane varieties and application of chemical fertilizers to boost its productivity, especially during the 1920s (Dick, 1995:43). Also, a high yield of sugar per hectare was achieved by intensive and efficient cultivation based on an excellent irrigation system, by the utilization of the best land in every region and, last but not least, by the use of superior quality cutting developed by the research institute maintained by the sugar mills (Mubyarto, 1969:40).

Because of heavy damage to factories during the Revolution, post-independence exports never exceeded the 1954 figure of just 212,000 tones for the whole of Java, and they

then rapidly fell away, ceasing altogether after 1966. (Dick, 1995:45). In order to cope this problem, in April 1975 the Government issued Presidential Instruction (Inpres) 9/1975, setting up the Intensified Smallholder Cane (*Tebu Rakyat Intensifikasi*, hereafter TRI) programme (Mubyarto, 1977:29; Brown, 1982:39; Isma'il, 2001:4). Briefly put, the programme had two prime objectives: changing the basic structure of the industry from one in which the mills grew cane on land rented in from smallholders to one in which the smallholders themselves took on the entrepreneurial role producing cane on their own land; and raising the nation's total production of refined sugar, reducing the import bill and eventually achieving self sufficiency (Brown, 1982:39; Mardjana, 1995:96).

2 Problem Setting

The experience of the TRI programme shows that individual smallholder have frequently not received the full benefits of the programme to which they are entitled (Brown, 1982:59; Mardjana, 1995:96-97). *First*, farm size: The efficient cultivation of cane generally requires blocks of land at least 10 hectares in area. With average farm sizes in Java of less than 0.5 ha, smallholders have had to find ways to amalgamate their land. *Second*, under the programme, the landholder became the cultivator and the mill in a sense a contractor to the farmer. It is in connection with the provision of these services that most of the new conflicts between landholders and mills have arisen, such as profit-sharing activity (Roesmanto, 2000:48). *Third*, problem relating with institutional setting (management) of mills (sugar factories) that usually placed farmers in the marginal position, for example in the calculation of sugar content of the cane (*rendement*).

In short, the recent condition of Indonesian sugar industry has a same situation like in Fiji, which what the calls "core inefficiencies." The series of core inefficiencies are: (i) low sugarcane quality; (ii) cane burning; (iii)

mill inefficiencies; (iv) transport inefficiencies; and (v) payments system to farmers (Snell and Prasad, 2001:261-262). Some of the research were conclude that sugar industry inefficiency is caused by lack of raw material, decreasing of productivity and sugar content (Isma'il, 2001:6-9), milling process inefficiency (Martoyo, 2000:10), and sugar loss during cut-load-carry/TMA (Darmawan, et. al, 2000:6). However, from their research were not study sugar industry inefficiency from an institutional economics perspective (Arum, 2000:39), in which the factor is very likely to be the source of sugar industry inefficiency. With this background, this research focuses on efforts to describe and measure transaction costs of sugarcane farmers. Sugarcane farmers issue will be divided into contract (credit) and non-contract (non-credit) sugarcane farmers.

THEORETICAL CONSIDERATIONS

1. Transaction Cost Economics

The definitions of transaction costs pose some difficulties. The distinction between transaction and production costs can be particularly hard to make. Nevertheless, in a heuristic sense, the concept of transaction costs is very useful (Furubotn and Richter, 1991:8). The transaction as the basic unit of analysis has also several definitions. According to Williamson (1981a:552; 1981b:1544; McCann and Easter, 2002:5; Furubotn and Richter, 2000:41), a transaction occurs when a good or service is transferred across a technological separable interface. One stage of activity terminates and another begins[1]. Further, Coase (1988:35) points out "if a workman moves from department Y to department X, he does not go because of a change in relative prices, but because he is

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[1] According to this interpretation, the term is restricted to situations in which resources are actually transferred in the physical sense of "delivery." Such delivery may occur within firms or across markets. Thus, it is possible to speak of internal and external transactions or intrafirm and market transactions. They can be seen as resulting largely from the division of labor. See Eirik Furubotn and Rudolf Richter, *op. cit*, p. 41

ordered to do so." Finally, Commons (1932:4) states that "the ultimate unit of activity..…must contain in itself the three principles of conflict, mutually, and order. This unit is a transaction" (as quoted by Beckmann, 2000:10).

Economic literature provides diverse definitions of transaction costs, with most of the authors relying on definitions that suit their theoretical conceptualizations and/or are relevant to their empirical cases. What therefore Coase had initially generally identified as "costs of organizing transactions," has been re-examined and re-conceptualized to reflect transactions costs incurred in specific situations. For example, Coase later used transaction costs to re-conceptualize the problem of externalities and had to include the aspect of "co-ordinating human interaction" to his earlier definition. Other than this problem of diversity, some definitions are also very general and would therefore be difficult to apply in empirical cases. Examples here include definitions like Williamson pointed out that "the costs of running the economic system", and "costs of adapting to a change in circumstances", etc (Dorfman, 1981; Challen, 2000; as quoted by Mburu, 2002:41). Further, North (1991:203) defined transaction costs are the costs of specifying and enforcing the *contracts that underlie exchange* and therefore comprise all the costs of political and economic organization that permit economies to capture the gains from trade.

Shortly, transaction costs are the costs of negotiating, measuring, and enforcing exchanges.[2] Negotiating an agreement can be a long and costly process. All sides to the exchange must bargain with one another even when they are in bitter opposition. Labor unions and management must negotiate new contracts periodically. Sometimes the process is so difficult that mediators must be brought in to facilitate the discussions. Measurement costs involve measuring all the attributes of a good or service. The root source of measurement costs is poor information. For example, when purchasing a computer, the buyer would like to know a lot more about the computer's attributes than simply the price. Finally, transaction costs include the costs of enforcing exchanges. Differences in enforcement costs across countries may be the single most important reason why some nations are wealthy and others are poor (Yeager, 1999:26-27).

Furubotn and Richter (as quoted by Benham and Benham, 2000:368) pointed out typical examples of transaction costs are the costs of using the market (*market transaction costs*) and the costs of exercising the right to give orders within the firm (*managerial transaction costs*). There is also the array of costs associated with the running and adjusting of the institutional framework of a polity (*political transaction costs*). For each of these three types of transaction costs, it is possible to recognize two variants: (1) "fixed" transaction costs, that is, the specific investments made in setting up institutional arrangements; and (2) "variable" transaction costs, that is, costs that depend on the number or volume of transactions.

The costs of using the market (*market transaction costs*) may be classified in more detail as follows: (1) the costs of preparing contracts (search and information costs narrowly defined),[3] (2) the costs of concluding contracts (costs of bargaining and decision

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[2] As quoted by Mburu, transaction costs can also be defined to include three broad categories of costs. These are: (1) search and information costs; (2) bargaining and decision or contracting costs, and (3) monitoring, enforcement and compliance costs. See John Mburu, *Collaborative Management of Wildlife in Kenya: An Empirical Analysis of Stakeholders' Participation, Costs and Incentives*, Socioeconomic Studies on Rural Development, Vol. 130, Wissenschaftsverlag Vauk Kiel KG, Germany, 2002, p. 42

[3] These costs may arise because individuals make direct outlays (on advertising, visit to prospective customers, and so on), or costs can arise indirectly through the creation of organized markets (stock exchanges, fairs, weekly markets, and so on). Also included are costs of communication among the prospective parties to the exchange (such as postage, telephone expenses, and outlays on sales representatives).

making),[4] and (3) the costs of monitoring and enforcing the contractual obligations.[5] Managerial transaction costs reduce to the following: (1) the costs of setting up, maintaining or changing an organizational design. Such costs relate to a rather wide array of operations.[6] These are typically fixed transaction costs; and (2) the costs of running an organization, which fall largely into two subcategories: (a) information costs;[7] and (b) the costs associated with the physical transfer of goods and services across a separable interface.[8] Finally, political transaction costs deals with the provision of such organization and the public goods associated with it. They are, in a general sense, the costs of supplying public goods by collective action, and they can be understood as analogous to managerial transaction costs. Specifically, these are: (1) the costs of setting up, maintaining and changing a system's formal and informal political organization;[9] (2) the costs of running polity. These are current expenditures for those things formerly specified as the "duties of the sovereign"[10] (Furubotn and Richter, 2000:44-47).

The transaction costs literature has identified three costs that are particularly important (Dietrich, 1994:21). *First*, there is the cost of thinking about all the different eventualities that occur during the course of the contractual relationship, and planning how to deal with them. *Second*, there is the cost of negotiating with others about these plans. *Third*, there is the cost of writing down the plans in such a way that they can be enforced by a third party –such as a judge- in the event of a dispute (Hart, 1995:680). In more detail, *ex-ante*[11] transaction costs are the costs of drafting, negotiating, and safeguarding an agreement. *Ex-post*[12] transaction costs include: (1) the maladaptation costs incurred when transactions drift out of alignment with requirements, (2) the haggling costs incurred if bilateral efforts are made to correct ex post misalignments, (3) the set-up and running costs associated with the governance structures (often not the courts) to which the disputes are referred, and (4) the bonding costs of effecting secure commitments.[13]

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[4] Costs in this category relate to the outlays that must be made when a contract is being written and the concerned parties must bargain and negotiate over its provisions. Decision costs include the costs of making any information gathered usable, the compensation paid to advisers, the costs of reaching decisions within groups, and so on.

[5] These costs arise because of the need to monitor the agreed upon delivery times, measure product quality and amounts, and so on.

[6] There are costs of personnel management, investments in information technology, defense against takeovers, public relations, and lobbying.

[7] The costs of decision making, monitoring the execution of orders, and measuring the performance of workers, agency costs, costs of information management, and so on

[8] Examples are the costs of idle time in the handling of semifinished products, the costs of intrafirm transport, and so on.

[9] Included here are the costs associated with the establishment of the legal framework, the administrative structure, the military, the educational system, the judiciary, and so on

[10] Involved are current outlays for legislation, defense, the administration of justice, transport, and education.

[11] Ex ante problem occur when one party to a transaction has less information about a potential purchase/sale than the other, but this information disadvantage is eliminated after the transaction is completed. See Michael Dietrich, *Transaction Cost Economics and Beyond: Towards a New Economics of the Firm*, Routledge, New York, 1994, p. 20

[12] Ex post information asymmetries occur when one party of transaction has less information than another even after the transaction has occurred. See Michael Dietrich, *ibid*, p. 20

[13] In a survey of transaction costs literature, Alchian and Woodward (1988) transcend these differences by distinguishing between two types of transactions: exchange transactions involving the transfer of property rights, and contracting transactions involving negotiating and enforcing promises about performance. See Margareth M. Polski, *Measuring Transaction Cost and Institutional Change in U.S. Commercial Banking Industry*, Paper presented for the Annual Conference of the International Society for New Institutional Economics 2000 in Tübingen - Germany, 2001, p. 10-11

The two behavioral assumptions on which transaction cost analysis relies –and without which the study of economic organization is pointless- are bounded rationality[14] and opportunistic behaviour[15] (Williamson, 1981b:1545), which manifests itself as adverse selection, moral hazard, cheating, shirking, and other forms of strategic behavior, to explain contractual choice and the ownership structure of firms.[16] In Williamson's framework, a trade-off has to be made between the costs of coordination and hierarchy within an organization, and the costs of transacting and forming contracts in the market. This trade-off will depend on the magnitude of transaction costs. The ease or difficulty of contracting, and the types of contract made are determined by the level and nature of transaction costs which are influenced by the extent of imperfect information involved in making a transaction. Central to transaction costs economics is the costliness of information. TCE seeks to understand the interplay between institutional factors and market and non-market exchange under positive transaction costs (Kherallah and Kirsten, 2001:12-13).

RESEARCH METHODOLOGY

1 Research Design

1.1 *Research Location*

The survey was carried out in two different regions in East Java - Indonesia, i.e. Malang and Kediri Districts. The research locations were purposely determined. They represent regions which more or less have some similarity to the aspects of the agricultural farming system. From the sugarcane production point of view, Malang and Kediri Districts are the biggest producers of sugarcane in East Java, both of them contributing around 28.76% of the total sugarcane production in East Java. Yet, Malang and Kediri Districts, chosen as locations for this research, are also relatively attractive regions (from an economic point of view) compared with other districts in East Java. This is due to their location adjacent to the provincial capital of East Java, which is Surabaya. Malang and Kediri Districts are about 90 and 150 km, respectively, from Surabaya. The rapid economic development in Surabaya has had many implications for economic growth in Malang and Kediri Districts.

1.2 *Selection of Samples*

This research used stratified random sampling to obtain a comprehensive description for all of the research objectives. Stratified samples require the population to be segmented into homogeneous sub-populations,

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[14] Bounded rationality refers to rate and storage limits on the capacities of individuals to receive, store, retrieve, and process information without error. See Oliver E. Williamson, Markets and Hierarchies: Some Elementary Considerations, *The American Economic Journal*, Vol. 63, Issue 2, 1973, p. 317. The bounded rationality concept is based on two principles: (i) individuals, or groups of individuals, have inevitable limits on their abilities to process or use information that is available. This limited computational capacity exists because of difficulties in understanding and manipulating the sense data involved in any but trivial situations. In short *informational complexity* exists; (ii) is equally implausible to suggest that all possible states of the world and all relevant cause-effect relationships can be identified, following which, probabilities can be calculated, presumably on the basis of previous occurrence. This implies that economic actors are inevitable faced with incomplete information, i.e. informational uncertainty exists. See Michael Dietrich, *op. cit*, p. 19

[15] Opportunism is an effort to realize individual gains through a lack of candor or honesty in transactions. Returns attributable to productive advantages (e.g., a unique location or differential skill) are *not* to be regarded as opportunistic. Strategic representations are required for opportunism to obtain. See Oliver E. Williamson, *ibid*. p. 317

[16] Among the factors on which there appears to be developing a general consensus are: (i) opportunism is a central concept in the study of transaction costs; (ii) opportunism is especially important for economic activity that involves transaction-specific investments in human and physical capital; (iii) the efficient processing of information is an important and related concept; and (iv) the assessment of transaction costs is a comparative institutional undertaking. See Oliver E. Williamson, Transaction Cost Economics: The Governance of Contractual Relations, *Journal of Law and Economics*, Vol. 22, No.2, 1979, p. 234

with random samples drawn independently from each segment (Maxim, 1999:133). The stratified random sampling approach has the advantage of ensuring that specific groups (strata) are included proportionally in the sample. Study on the sugarcane farmers' level was separated into two kinds of sugarcane farmers, i.e. contract and non-contract sugarcane farmers. The number of sugarcane farmer samples taken was 120 respondents in two districts (30 samples for each kind of sugarcane farmer), i.e. Malang and Kediri Districts.

3.2 Research Methods

2.1 *Data Sources*

The research used source of primary data. Primary data was collected by using a questionnaire through face-to-face interviews of a number of respondents.[17] Interviewing some respondents is the main method of obtaining primary data from the sugarcane farmers. In addition, individual in-depth interviews are also taken to obtain more detailed information. The person interviewed was free to voice his/her own expressions/ ideas in an unstructured interview. The interviewer relied on open questions to introduce topics of interest without the interviewer imposing his ideas. Also, the researcher used key informants to collect information.[18] The

survey of sugarcane farmers will be used as a source to gather information on any problems, such as contract systems and input sources.

2.2 *Method of Analysis*

In general, the researcher used both qualitative and quantitative approaches. The researcher used qualitative analysis methods to describe the institutional arrangements of the sugar industry in Indonesia. Problems with institutional settings will be also be explored. The objective of the qualitative analysis was to get an inside perspective of the economic participants on the process of establishing contractual arrangements in the sugar industry. On the other hand, quantitative analysis methods, for example frequency distribution tables, were used to analyze some empirical data. All the data in the household questionnaires was processed to SPSS after being re-checked by the author. A section of the questionnaires contained semi-structured questions as a guideline for collecting information on reasons, opinions, comments, and responses about the institutional arrangements in the sugar industry. From these two methods, it is anticipated that a more comprehensive picture of the institutional background of the sugar industry in Indonesia will be obtained. The combination of the two analyses will significantly bridge the gap between macro and micro types of analyses, which happen quite frequently.

3.3 Measuring Transaction Costs

3.1 *Measuring Transaction Costs of Sugarcane Farmers*

In the case of sugarcane farmers, the transaction costs' variables can be classified into the components as follows: (i) market

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[17] Face-to-face interviews have at least three advantages: (i) they can be used with people who could not otherwise provide information –respondents who are illiterate, blind, bedridden, or very old, for example; (ii) if a respondent does not understand a question in a personal interview, you can fill in, and, if you sense that the respondent is not answering fully, you can probe for more complete data; and (iii) personal interviews at home can be much longer than telephone or self-administered questionnaires. See H. Russell Bernard, *Social Research Methods: Qualitative and Quantitative Approaches*, Sage Publications, Inc., Thousand Oaks, California, 2000, p. 230

[18] Perhaps the single most important diagnostic feature of good qualitative enquiry is its full exploitation of insights from key informants. By key informants we mean persons whose position or previous experience gives them particularly valuable information on a give topic. If the basis is *position*, the key informant becomes, in effect, a surrogate observer for the

investigator. On the other hand, if the basis is *experience*, the informant provides the investigator with a chance to view information from other sources in historical perspective –in effect a longitudinal 'time slice'. See Jon Moris and James Copestake, *Qualitative Enquiry for Rural Development*, Intermediate Technology Publications on Behalf of the Overseas Development Institute, 1993, London, p. 58

transaction costs (cooperative fee and donation, SPTA/letter of delivery order fee, middleman fee, interest rate, interest margin, paperwork, opportunity cost, and credit delay); (ii) managerial transaction costs (cut-load-carry and sack costs); and (iii) political transaction costs (land tax). In addition, some variables still exist in transaction costs of sugarcane farmers, like costs of security, village donation/tax, making a contract, ceremonial meal cost, and group fee. However, because only a few sugarcane farmers spent money on those variables, the variables are not involved in this analysis. In general, most of the variables are explicit (which means that farmers have the data), so it is not difficult to measure transaction costs. However, some variables, like paperwork, opportunity cost, and credit delay must be approached with special measurements, because farmers usually do not calculate these variables (implicit). In detail, the measurement of sugarcane farmers' transaction costs can be explained as follows:

- Land tax = Legal land tax paid to (local) government every year **(explicit).**

- Cut-load-carry = Costs incurred by sugarcane farmers to organize cut-load-carry activities (TMA), including costs of truck rented, sugar mill operations, and wage/meal/cigarette of truck drivers. For contract sugarcane farmers, this cost can be seen from the sugar mill report that is given to farmers **(explicit).**

- Sack = Costs incurred by sugarcane farmers to purchase the sacks, usually in the sugar mill report given to farmers **(explicit).**

- Cooperative fee and donation = Regular cooperative donation (each month) and contribution payment (one time only); and also illegal fees paid to the cooperative in the form of commission and credit cutting (this data comes from interview with farmers) **(explicit).**

- SPTA fee = Payments to obtain SPTA (letter of delivery order) from sugar mill officer **(explicit).**

- Interest rate = Interest rate paid to cooperative (for TRKs/contract farmers) based on government decision (16%/year) or middleman (for TRMs/non-contract farmers) **(explicit).**

- Interest margin = Payments to cooperative based on interest margin between government decision and cooperative arrangement, including margin of sugar yield-share **(explicit).**

- Middleman fee = Costs incurred by non-contract sugarcane farmers to middleman to process their sugarcane at sugar mill **(explicit).**

- Paperwork = Cost of completing all the forms required by the cooperative/sugar mill, including photocopies of documents, pictures, and others. Commonly, sugarcane farmers do not calculate paperwork expenditure. However, by assuming conservatively, the costs for paperwork (as a requirement to make a contract), including photocopies of documents, pictures, elaboration of personal documents, and others, add up to approximately Rp 50,000 for sugarcane farmers who get credit from a cooperative/sugar mill. These transaction costs are only for contract sugarcane farmers **(implicit).**

- Opportunity cost = Cost of the time needed to gather all the information required by the cooperative/sugar mill. The opportunity costs equal approximately Rp 35,000/ sugarcane farmer. This calculation comes from: (i) contract farmers need at least two days to gather all the information required by the cooperative/sugar mill, and if we compare this to their average wage rate as a laborer in a farm field (Rp 15,000/day), then the opportunity cost for gathering information is Rp 30,000/contract farmers; and (ii) transportation cost to go to the

cooperative/sugar mill is Rp 5,000 **(implicit).**

- Credit delay = Cost of not obtaining the credit immediately (especially for contract farmers). Not obtaining the credit immediately can cost 10% of sugarcane farmers' income. About 40% of contract farmers said that they always received credit not on time (as late as two months from the agreement). In this sense, it is rather difficult to say exactly the amount of opportunity costs. However, the research used special measurements to calculate the opportunity costs. Because of the lateness of receiving credit usually sugarcane farmers are also delayed in giving fertilizer to their sugarcane plants. Some farmers said that the two months' lateness of fertilizing caused a decrease of 10% in their sugarcane. Therefore, the opportunity costs of contract farmers are estimated to be 10% of contract farmers' income **(implicit).**

3.2 *Limitations of Measuring Transaction Costs*

The limitations of this research have to do with the difficulty of measuring some data. At the level of sugarcane farmers, transaction costs have not yet been calculated for these components: (1) *repaksasi*, by which the sugar mill is permitted to deduct the farmers' revenues if the farmers' sugarcane is regarded as mixed or dirty (soil, leaf, and so on). But, the sugar mill conducts this valuation in a unilateral way so that it has potential to disadvantage sugarcane farmers; (ii) decreasing weight of sugarcane volume. Sugarcane farmers cannot control this process because all processes are done by the sugar mill; (iii) transportation from truck to lorry (transportation tools are owned by the sugar mill). Many sugarcanes often fall to the ground as a result of the transporting process so that it reduces the weight of farmers' sugarcane; (iv) transaction cost in the form of hidden deductions from the cooperative. For example, deduction of transportation costs and cutting fees from cooperatives is not detailed so that there is potential to put sugarcane farmers at a disadvantage; and (v) transaction cost in the form of decreasing sugar content (*rendement/sucrose*) as a result of the indolence of the sugar mill in milling sugarcane. Sugarcane milled 24 hours after being cut, according to sugar mills, will decrease the sugar content by 1%. Therefore, total transaction costs calculated in this research are actually lower than the real ones.

RESULTS OF THE RESEARCH

1. Sugarcane Farmers' Transaction Costs

Several kinds of requirements directly related to sugarcane farmers' activities were identified from the contracts, and are classified into three groups, i.e. market, managerial, and political transaction costs. It is important to note that the transaction costs included in this analysis are only those directly related to the economic exchange (transfer of property rights) between sugarcane farmers (contract and non-contract farmers) and other economic actors, namely cooperatives, middlemen, and sugar mills. However, to calculate the effective transaction costs it was necessary to have access to the archives of the institutions. For example, a researcher needs to have access to cooperatives' annual financial reports to get the actual transaction costs on some variables, like differences of seed/fertilizer price between cooperatives and shops/retailers. Unfortunately, all cooperatives were reluctant to allow access to their archives. Therefore, some transaction costs variables could not be accounted in this research. As a result, the real transaction costs could be even greater than those calculated.

Based on the definitions, in the case of sugarcane farmers, the transaction costs can be classified into the components as follows (summary can be seen in Table 1): land and village taxes, cut-load-carry (TMA) and sack,

cooperative fee and donation, farmers groups donation, SPTA (letter of delivery order) fee, middleman fee, making contract, ceremonial meal, credit interest,[19] interest margin, paper-work,[20] opportunity cost,[21] and credit delay.[22]

With Collins and Fabozzi's formula, land and village taxes are included among (fixed/taxes) transaction costs; and cooperative donation & fee, making contract, SPTA fee, farmers group donation, middleman fee are included (fixed/ commissions and transfer fees) among tran-saction costs. Based on the Williamsons' definition, TMA and sack are included as (managerial) transaction costs (and together with credit interest, interest margin, and credit delay are considered as variable costs). In all variables, every kind of sugarcane farmer has his/her own characteristics. For example, contract farmers do not pay costs for SPTA fee and payment to farmers union. On the contrary, non-contract farmers usually must pay a fee to join other farmers who have SPTA. Also, there are sugarcane farmers who spend money for the ceremonial meal in the early planting or after harvest, but there are many sugarcane farmers who do not.

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[19] Interest rate is included in the transaction costs because its reflects the sugarcane farmers' cost to get credit. With this conception, interest margin of interest rate, paperwork, opportunity costs of credit, and credit lateness are also included as transaction costs. In the case of banking, interest expense is a direct indicator of the external costs of the way banking firms organize their activities are situated on all interest bearing liabilities, and is affected by monetary policy, pricing regulation, pricing competition, and internal funds management practices. See Margaret M. Polski, *Measuring Transaction Costs and Institutional Change in the U.S. Commercial Banking Industry*, Paper presented for the Annual Conference of the International Society for New Institutional Economics, 2000, Tübingen, Germany, p.17

[20] Commonly, sugarcane farmers do not calculate paper-work expenditure. However, by assuming conserva-tively, the costs for paperwork (as a requirement to make a contract), including photocopies of documents, pictures, elaboration of personal documents, and other costs Rp 50,000/for sugarcane farmers who get credit from a cooperative/sugar mill (contract farmers). These transaction costs are only for contract sugarcane farmers.

[21] The opportunity cost of time 'invested' in loan processing is another important component of borrowers' overall transaction costs. The aim is to measure the opportunity cost in such a way as to compare its extent to the monetary cost components. In the literature, the opportunity cost of time is often valued at the daily wage rate (e.g. Adams and Nehman, 1979) or the daily minimum wage established by law. See Wolfram Erhardt, *Financial Markets for Small Enterprises in Urban and Rural Northern Thailand*, Peter Lang, Frankfurt am Main, 2002, p. 168. In the case of sugarcane farmers, the calculation of opportunity cost comes from two things: (i) contract farmers need at least two days to gather all the information required by the cooperative/sugar mill; then if we compare the regional minimum wage (UMR) amount Rp 15,000/day, the opportunity cost to gather information is Rp 30,000/contract farmers; and (ii) transportation costs to go to the cooperative/sugar mill are Rp 5,000. Transportation costs are quoted using the cost for public or private transport (cars or motorbikes). Therefore, total opportunity costs are Rp 35,000/sugarcane farmer.

[22] The costs of not obtaining the credit immediately (especially for contract farmers) is 10% of the sugarcane farmers' income. In this sense, it is rather difficult to say exactly the amount of opportunity costs. However, this research used special measurements to compute the opportunity costs. Because of the delay in

receiving credit usually sugarcane farmers are also late in giving fertilizer to their sugarcane plants. Some farmers said that the two month delay (usually credit comes late two months after the agreement) of fertilizer decreases sugarcane productivity by 10%. Therefore, the opportunity costs of contract farmers are calculated as 10% of contract farmers' income.

Table 1. Transaction Costs' Variables of Sugarcane Farmers

Variables	Description	Expenditure
Land tax	Legal land tax paid to government every one year	Explicit
Cut-load-carry (TMA)	Costs incurred by sugarcane farmers to organize cut-load-carry activities (TMA), including costs of truck rent, sugar mill operations, and wage/meal/cigarette of truck drivers	Explicit
Sack	Costs incurred by sugarcane farmers to purchase the sacks	Explicit
Security	Costs incurred by sugarcane farmers to hire security (*mandor tebang*) during harvest period	Explicit
Cooperative fee and donation	Regular cooperative donation (each month) and contribution payment (only one time)	Explicit
Credit interest	Interest rate paid to cooperative (for contract farmers)/middleman (for non-contract farmers) based on government decision	Explicit
Village tax	Legal taxes paid to village, including water tax (PAM), street tax (DLLAJR), mosque donation, etc.	Explicit
Making contract	Cost of completing contract with cooperative (KUD)/sugar mill, including cost of administration, notary, commission, and credit deduction	Explicit
SPTA fee	Payments to obtain SPTA (letter of delivery order), including auction cost	Explicit
Ceremonial meal cost	Costs incurred by sugarcane farmers to hold ceremonial meal, usually in early planting or harvesting	Explicit
Interest margin	Payments to cooperative based on interest margin between government decision and cooperative arrangement, including margin of sugar yield-share	Implicit
Farmers groups donation	Legal and illegal fees paid to farmers group, including donation to head of group	Explicit
KUD fee	Illegal fees paid to cooperative in form of commission and credit cutting	Implicit
Middleman fee	Costs incurred by sugarcane farmers (non-contract farmers) to middleman to process their sugarcane to sugar mill	Explicit
Paperwork	Cost of completing all the forms required by cooperative/sugar mill, including photocopies of documents, pictures, and others	Implicit
Opportunity costs	Cost of the time needed to gather all the information required by the cooperative/sugar mill	Implicit
Credit delay	Cost of not obtaining the credit immediately (especially for contract farmers)	Implicit

Source: Processed primary data

Table 2 describes the contribution of each variable to total transaction costs. Cost of cut-loading-carry (TMA, including sack cost) gives the highest contribution to total transaction cost, based on the location, type of farmers, and land size. Contribution of this TMA reaches almost 70% of total transaction costs. The second highest contributor to transaction cost is the middleman fee, which averages nearly 16% of total transaction costs. Only contract farmers do not pay the middleman fee because they have been bound by contract with a cooperative/sugar mill so that they do not need middlemen. Three variables, namely credit interest, interest margin and SPTA fee, are not or somewhat high contributors to total transaction costs with 3-6%. The variables land tax and cooperative fee and donation only make small contributions to total transaction costs. Altogether these four variables only contribute less than 3% to transaction costs.

If analyzed in detail, the facts are as follows: (i) the highest percentage of TMA cost is paid by contract farmers and the smallest by non-contract farmers. This is because TMA activities on contract farmers are handled by sugar mills whose enforcement often involves manipulation, for example transportation cost and labor wage, which sugarcane farmers cannot control; (ii) the biggest middleman fee is paid by non-contract farmers and reaches more than 17%; contract farmers are not burdened with the middleman fee. Non-contract farmers need middlemen because they do not have contracts with sugar

Table 2. Variables' Contribution to Transaction Costs/ha Based on the Location, Type of Farmers and Land Size (Rp 000, %)

Variables	Malang	Kediri	TRKs	TRMs	> 2 ha	≤ 2 ha
Land tax	60 (1.8)	53 (1.1)	56 (1.4)	57 (1.3)	49 (1.1)	75 (1.7)
TMA and sack costs	2,504 (74.4)	3,438 (71.8)	3,024 (74.7)	2,942 (67.3)	2,943 (68.3)	3,096 (71.1)
Cooperative fee & donation	38 (1.1)	22 (0.5)	38 (1.0)	40 (0.9)	42 (1.0)	33 (0.7)
Credit interest[1]	199 (5.9)	314 (6.6)	636 (15.7)	224 (5.1)	247 (5.7)	262 (6.0)
SPTA fee	134 (4.0)	-	148 (3.7)	148 (3.4)	154 (3.6)	108 (2.6)
Interest margin[2]	11 (0.3)	156 (3.2)	139 (3.5)	224 (5.1)	150 (3.5)	150 (3.4)
Middleman fee	420 (12.5)	803 (16.8)	-	739 (16.9)	722 (16.8)	631 (14.5)
Total	3,364 (100.0)	4,787 (100.0)	4,042 (100.0)	4,372 (100.0)	4,303 100.0	4,354 (100.0)

Note: Variables of security, village donation/tax, making contract, ceremonial meal cost, and group fee is not involved in this table because the number of sugarcane farmers who spent on these variables is small.

[1] Credit interest includes costs of paperwork, opportunity costs, and credit delay in the case of contract farmers.

[2] Interest margins include cost of sugar yield-share margin.

Source: Processed primary data

Table 3: Type of Transaction Costs Based on the Type of Farmers (%)

No	Type of Transaction Costs	TRKs	TRMs
1	Market transaction costs	23.7	30.6
2	Managerial transaction costs	74.7	68.1
3	Political transaction costs	1.6	1.3
4	Total	100.0	100.0

Source: Processed primary data

mills. This middleman fee is divided into two kinds: molasses taken by middleman or money paid by non-contract farmers for every quintal of sugar milled by sugar mill; (iii) proportion (amount) of credit interest to total transaction costs for contract farmers is very high (15%) because of the costs of paperwork, opportunity, and credit delay.[33] Therefore, although credit interest for non-contract farmers is very high, because they do not bear costs of paperwork, opportunity, and credit delay, the total percentage (amount) of their credit interest is lower than that for contract farmers; and (iv) although theoretically SPTA is given without charge by a cooperative/sugar mill to sugar farmers, in fact most farmers still have to pay the SPTA, especially in Malang District. Farmers usually buy SPTA as much as sugar owned, where for every quintal of sugar they must pay Rp 500.

Furthermore, when the percentage of contribution to the transaction costs is differentiated based on types of transaction costs, i.e. market, managerial, and political transaction costs, then the proportion of contribution is dominated by managerial transaction cost (around 70%). From the variables above, only land tax (including village and street taxes) is categorized as a political transaction cost, with a less significant contribution (<1.5%). When the analysis is differentiated based on the type

of sugarcane farmers, then the managerial transaction's proportion for contract farmers is higher than that for non-contract farmers. This happens because TMA (cut-load-carry) activities of contract farmers are organized by sugar mills whose enforcement often involves manipulation, for example transportation costs which contract farmers cannot control (Table 3). On the contrary, the proportion of market transaction costs for non-contract farmers is higher than that for contract farmers because non-contract farmers must pay a middleman fee.

In general, there are some interesting findings about transaction costs (Table 4). *First*, if the analysis is based on the location, then the transaction costs/ha in Kediri District are higher than those in Malang District, both for land size of ≤2 ha and >2 ha. There are at least five reasons for this finding: (i) almost all molasses (*tetes*) of non-contract farmers in Kediri District is taken by middlemen, so that the molasses loss is included in the transaction costs; (ii) credit management and information are handled by only one cooperative (KUB/*Koperasi Usaha Bersama*) in Kediri District, while in Malang District they are handled by many cooperatives so that manipulation can be avoided; (iii) in practice, SPTA in Kediri District is more difficult to get so that farmers must pay some fee to get it (in cooperation with other farmers), while in Malang District SPTA is easier to get because there are many cooperatives; (iv) sugar content determination in Ngadiredjo Sugar Mill (Kediri District) is less transparent as compared to Kebon Agung Sugar Mill (Malang District), due to the system of equal

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[33] Although paperwork, opportunity, and credit delay costs are excluded from credit interest variables, the percentage (amount) of credit interest for contract farmers is still higher than that for non-contract farmers. This happens because the average amount of credit that was borrowed by contract farmers is higher than that for non-contract farmers, i.e. Rp 4.5 million and Rp 2.4 million, respectively.

Tabel 4: Sugarcane Farmers' Transaction Costs Based on the Location and Type of Farmers (Rp 000)

Transaction Costs (TC)	Malang District		Kediri District	
	≤ 2 ha	> 2 ha	≤ 2 ha	> 2 ha
Average TC	3,083	11,574	6,530	16,980
Average TC/ha	2,835	2,944	4,138	4,227
Percentage of TC/ha	2,890 (40.9%)		4,183 (59.1%)	
Transaction Costs (TC)	TRKs		TRMs	
	≤ 2 ha	> 2 ha	≤ 2 ha	> 2 ha
Average TC	7,294	13,938	4,721	13,527
Average TC/ha	3,799	3,569	3,645	3,758
Percentage of TC/ha	3,684 (49.9%)		3,701 (50.1%)	

Source: Processed primary data

treatment for all sugarcane farmers; and (v) transportation cost is higher in Kediri District because their productivity/ha is higher (resulting in higher total production).

If the analysis is based on the farmers' type, then the transaction costs/ha for non-contract farmers is a bit higher than for contract farmers, especially for those who have land >2 ha. The high non-contract farmers' transaction costs result from the fact that they receive no assurance that their sugarcane will be milled by a sugar mill. Therefore, non-contract farmers have to ask for middlemen or other sugarcane farmers who have SPTA to enter their sugarcane in the sugar mill. If they use a middleman service, non-contract farmers will not get molasses because all of it is taken by middlemen as compensation for their service entering their sugarcane to sugar mill. If non-contract farmers use the service of other sugarcane farmers who have SPTA, payment is based on the weight of sugarcane milled (usually non-contract farmers must pay Rp 5000/quintal). Besides, non-contract farmers also have to pay high interest (40%) to get loans from middlemen during sugarcane planting time. This makes non-contract farmers' transaction cost higher than contract farmers, although

they do not interact with many institutions, like cooperatives and sugar mills.

Further, the high transaction costs for contract farmers are caused by many 'manipulative practices,' both at cooperatives and sugar mills, such as illegally high interest rates, low sugar content valuation, fees paid to cooperatives, higher price of seed/fertilizer, obscure deduction of transportation costs, and so on.[34] With this description, it can be concluded that the institution of contract

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[34] For example, cooperatives often take advantage of sugarcane farmers who do not understand (asymmetric information) in various ways, for example, by increasing seed/fertilizer price and cutting sugarcane income to return credit. Almost every income report received by sugarcane farmers from a cooperative is not accompanied by detailed explanation, but only explains about total income received and payment paid by farmers. With this condition, of course, sugarcane farmers do not know whether there is manipulation or not in the report made by the cooperative. This survey shows that there are even many sugarcane farmers who do not know how much seed or fertilizer was bought from cooperatives (through credit), so that cooperatives can easily manipulate the payment (cutting) of the credit (seed/fertilizer). This practice can be conducted by cooperative because, unfortunately, it is not easy to get accurate data, both because cooperative management is not transparent and because sugarcane farmers do not know exactly the amount of seed/fertilizer that they bought (credited). However, all of these are transaction costs that are charges to sugarcane farmers.

farmers is better than the institution of non-contract farmers, but because of the low bargaining position of sugarcane farmers in facing the cooperative/sugar mill, there are many chances for manipulation. This is the point that must be improved if the government, in the long term, still wants to continue its credit grant program to farmers.

Second, if the analysis is not averaged per hectare, the research shows that transaction costs will be higher as the land size increases, based both on the location and farmers' type. As with production costs, the reason is that there are higher variable costs, which result from increasing the land size (total production), such as transportation costs, sack purchase, and food/cigarette for drivers. This is why the transaction costs for sugarcane farmers with more land are higher than for those with less land (≤2 ha). Another finding is that the percentage of transaction costs of sugarcane farmers in Kediri District are higher than transaction costs in Malang District, that is 59.1% compared with 40.9%. This applied both to sugarcane farmers who have more land (>2 ha) and those who have less land (≤2 ha). The reason is the same with the above explanation: (i) almost all molasses (*tetes*) of non-contract farmers in Kediri District is taken by middlemen, so that the molasses loss is included in the transaction costs; (ii) in practice, SPTA in Kediri District is more difficult to get so that farmers must pay a fee to get it (cooperate with other farmers), while in Malang District SPTA is easier to get because there are many cooperatives; and (iii) transportation costs are higher in Kediri District because their productivity/ha is higher than in Malang District.

In the short term sugarcane farmers who join credit programs (contract farmers) have advantages in terms of certainty. Without certainty, it is difficult for economic actors to make decisions. However, certainty by itself is not enough, because economic actors also want to get efficient institutional design. This institutional efficiency is assessed with the low transaction costs. Unfortunately, in some parts, forms of contract farmers' institutions are less efficient as indicated by high transaction costs. On the other hand, non-contract farmers' institutions are more simple, because sugarcane farmers need not interact with many economic actors. However, collusion between middlemen and sugar mill staff (officers) makes it difficult for non-contract farmers to submit their sugarcane to the sugar mill. In this respect, non-contract farmers' institutional factors have weakness in the form of uncertainty, which contributes to high transaction costs. Therefore, certainty and institutional efficiency are two important things that have to be considered in reforming institutional design in the sugar industry.

Theoretically, the sources of this problem are incomplete contracts and lack of enforcement. We can analyze incomplete contracts by two approaches. *First*, a version of incomplete contract theory, in which incompleteness is assumed to be the result of information asymmetries between contracting parties on the one hand, and third parties on the other hand. *Second*, a version of transaction cost economics, in which contractual incompleteness is assumed to be the result of this behavioral (opportunistic) assumption (Saussier, 2000:377-378). In the case of sugarcane farmers, incomplete contracts occurred because of the opportunistic behaviour of participants. We can identify lack of enforcement as missing from self-enforcing contracts. Understood very loosely, all contracts can be said to be self-enforcing in that they always involve mechanisms for implementing clauses, for solving distributes, and for penalizing the responsible party in case of breach (Ménard, 2000:242). In the case of a sugarcane farmer's contracts, self-enforcing contract is lacking because there are no detailed arrangements among participants; therefore, there is no punishment when either party breaks the agreement.

4. Relationship between Transaction Costs and Categorical Variables

The above description has provided adequate information about magnitude, variables, and proportions of sugarcane farmers' transaction costs. At least, the general conclusion can be drawn that the proportion of transaction costs is very high for sugarcane farmers, and even reaches almost 50% of total costs incurred by sugarcane farmers. However, these transaction costs exclude other difficult (implicit) variables; therefore, transaction cost data in this research is virtually lower than in reality. Finally, from all above explanations, there are some important points that state the relationship between transaction costs and categorical variables chosen, such as land tax, TMA (cut-load-carry), sack cost, cooperative fee and donation, credit interest, letter of delivery order fee (SPTA), interest margin, middleman fee, paperwork, opportunity costs, and credit delay. The following are some comments on the main findings:

1. **Kind of location.** In the cases of some categorical variables the transaction costs differ according to the kind of location, i.e. Malang and Kediri Districts. *First*, the contribution of cooperative fees and donations in Kediri District is higher than that in Malang District. In Kediri District, cooperative donations were higher because there is only one cooperative, so that there is no other option for sugarcane farmers. Given such a monopoly, cooperatives may take high donations from their members with the hope that their sugarcane can be milled at sugar mills. This is different with Malang District, where there are many cooperatives so they cannot demand high donations from sugarcane farmers. If this happens, sugarcane farmers will move to other cooperatives which have lower donations. Therefore, new cooperatives in Kediri District need to be established. *Second*, the proportion of SPTA fees in Malang District is higher than that in Kediri District. According to the head of

the technical unit in Kebon Agung Sugar Mill, most of the sugarcane farmers in Malang District are middleman. So, besides planting sugarcane, they are also traders (collecting other farmers' sugarcane). As a result, there are some sugarcane farmers who find it difficult to get SPTA from sugar mills so that they must use middlemen to get their sugarcane milled in a sugar mill.

2. **Type of sugarcane farmers.** Based on the type of sugarcane farmers, there are two transaction cost variables that differentiate between contract and non-contract farmers. *First*, percentage of cut-load-carry (TMA) costs (including transportation and sack costs) on contract farmers is higher than on non-contract farmers. The high proportion of TMA costs on contract farmers due to all processes are held by the sugar mill, so that there is an open possibility of manipulation because sugarcane farmers cannot control the cut-load-carry process. Conversely, on non-contract farmers, all TMA processes are organized by themselves so that the costs can be kept lower. *Second*, non-contract farmers are burdened with high transaction costs in paying a middleman fee, while contract farmers do not pay transaction costs for a middleman. The problem is simple: non-contract farmers must pay a middleman fee because they do not have access to sugar mills where their sugarcane can be milled. The middleman fee could be eliminated if officials (sugar mill) do not collude with middlemen to profit by hampering SPTA for non-contract farmers.

3. **Size of land**. In general, the configuration of transaction costs is not influenced by variations in cultivated land size by sugarcane farmers. Land size influences production costs (through land rent) more than transaction costs. However, there is one interesting thing to observe: the proportion of land tax/ha to total transaction costs on sugarcane farmers who

have land >2 ha is smaller than for sugarcane farmers who have land ≤2 ha. There are two possible reasons for this: (i) because most landowners who have land >2 ha get land by renting, the possibilities of rent costs are paid by the landowner, not the renter (sugarcane farmers); and (ii) some sugarcane farmers who have land >2 ha do not pay tax because it is customary in villages not to do so. The government (through village officials) is reluctant to take the tax because the amount of the tax is small.

CONCLUSIONS AND POLICY IMPLICATIONS

1. Conclusions

From all explanations, there are some important conclusions that can be drawn about the transaction costs of sugarcane farmers. *First*, in general, the transaction costs percentage reaches almost 43% of total costs spent by sugarcane farmers; the remaining 57% is production costs. If costs of land rent are excluded from production costs, then the composition of production and transaction costs is approximately in balance (50% : 50%). This is true both in Malang and Kediri Districts, and for contract and non-contract farmers. *Second*, based on the location, transaction costs/ha in Kediri District are higher than in Malang District. This is caused by factors such as the following: (i) total cooperatives in Malang District are many, so the opportunity to manipulate is limited; (ii) for non-contract farmers in Kediri District almost all molasses is taken by a middleman so it becomes part of farmers' transaction costs; and (iii) transportation costs are higher in Kediri District because its sugar/ha productivity is higher than in Malang District.

Third, there is not a significant difference between transaction costs and sugarcane farmer's type. However, transaction costs of non-contract farmers tend to be higher than for contract farmers. Transactions costs of

contract farmers derive from contributions taken by cooperatives, opportunity costs, credit delay, and other illegal fees; whereas transaction costs of non-contract farmers are from high interest (more than 40%) and all molasses being taken by a middleman (because he has helped deliver sugarcane to the sugar mill). *Fourth*, in general, the configuration of transaction costs is not actually influenced by different sizes of land processed by a sugar mill. Land size has more influence on production costs (through land rent variable) than on transaction costs. There is one interesting thing to observe, which is that the proportion of land tax/ha to total transaction costs on sugarcane farmers who have land >2 ha is smaller than for sugarcane farmers who have land ≤2 ha. However, those with more land should pay higher land tax.

2. Policy Implications

Although the findings of this study indicate that different institutional designs have different impacts on the magnitude and configuration of transaction costs, some important policy implications can be derived from the experience of the sugar industry in East Java – Indonesia. The following key lessons may foster a transaction cost economics perspective that envisages the contractual arrangements for sugar industry parties. The implications are expected to provide useful information to policy makers and economic actors in the sugar industry, particularly for the future design and implementation of other contractual arrangements of the sugar industry:

1. APTR should be empowered as a sugarcane farmers' representative that works for their interests. The most important agenda is reforming APTR staff that are, at this point, dominated by '*leaf farmers*' (farmers who do not have sugarcane plants at all, but work only as sugarcane middlemen). APTR staff must be filled by '*root farmers*,' farmers whose sole activity is planting sugarcane, since they represent

the majority of sugarcane farmers in Indonesia.

2. Cooperatives should be restructured as institutions that help sugarcane farmers to get information, guidance/supervision, cheap seed/fertilizer, and credit quickly and at low interest, so that they can support the decline of production and transaction costs. So far the functions of cooperatives are only to distribute credit and fertilizer, but the imposition of high interest/deductions may generate high transaction costs for sugarcane farmers.

3. The government must open access for sugarcane farmers to be able to get credit from banks, especially for non-contract farmers (who are not bound in contract with a cooperative/sugar mill), so that they do not rely on getting their credit from a middleman with high interest (more than 40%). It is hoped that this can decrease transaction costs borne by sugarcane farmers, especially non-contract farmers.

4. There is a need to establish an intermediary institution that can be trusted by sugarcane farmers and sugar mills to determine sugar content. The problem is that sugarcane farmers cannot control the determination of sugar content because they do not have the technical capability. This demonstrates the importance of an intermediary institution as a mediator of sugarcane farmers' and sugar mills' interests.[2]

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[2] Another way this can be achieved is by making a cooperation laboratory as a way to determine sugar content that involves sugarcane farmers and the sugar mill. Farmers and the sugar mill can control the truth of analysis. If there is a difference in sugar content analysis, then the third independent party may be invited to be a mediator. See Kartono, Reformasi Sistem Penentuan Rendemen Tebu di Indonesia, *Gula Indonesia*, Vol. XXIV, No. 3, July – September, 1999, p. 47

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