

JSPS DGHE
Core University Program in Applied Biosciences

PROCEEDINGS OF THE 3rd SEMINAR

**TOWARD HARMONIZATION BETWEEN
DEVELOPMENT AND ENVIRONMENTAL
CONSERVATION IN BIOLOGICAL PRODUCTION**



December, 3rd - 5th, 2004
Serang, Banten (INDONESIA)

Organized Jointly by



Bogor Agricultural University



The University of Tokyo



Government of Banten Province



PT. Krakatau Tirta Industri

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Printed by IPB Press, Bogor, Indonesia

ISBN 979-493-103-9

Photo : Cidanau River viewed from small boat, small village
in Serang, swamp forest, paddy field and
rainfall station

Welcome Message

Dean of Graduate School, Bogor Agricultural University

Nearly eight years has passed since the JSPS-DGHE Core University Project was started under the title "Toward Harmonization between Development and Environmental Conservation in Biological Production". The moves of the Core University Program are (1) Cooperative research, (2) Scientific research, (3) Exchange scientist, (4) Exchange students, and (4) Exchange of scientific information.

Graduate School, Bogor Agricultural University (IPB) and Graduate School of Agricultural and Life Sciences, The University of Tokyo have been actively involved in this research project and imbedded activities. Many other universities of both countries, such as ITB, UNPAD, UGM, UNUD, UNSRAT from Indonesia side, and Kyoto University, Okayama University, from Japanese side have participated in this core university program. Even new bilateral cooperation have developed.

Under title above, this activities of the research program are divided into four groups :

1. Studies on Environmental Change and Sustainable Development
2. Studies on Sustainable Utilization of Botanical Resources in Arable Land
3. Socio-Economic Studies on Sustainable Development in Rural Indonesia
4. Landscape-Ecological Studies on Sustainable Bio-resources Management System in Rural Indonesia

Research progress between Indonesia side and Japanese side were reported on Annually Workshop in Bogor. Most of results were presented in the Tokyo Seminars. The first joint seminar was held in Tokyo in February 2001. In this seminar, researchers focused their discussion on problem identification. The second joint seminar was conducted also in the same city, two years later in February 2003. Some recommendation on specific technologies were offered to resolve related problems encountered as the results of the research activity.

The main purpose of the present seminar of 2004 is to offer valuable insight to policy makers and practitioners involved in defining proper methodologies for sustainable rural development. For Indonesia, this seminar will provide added values to the regional decision-makers in designing sustainable rural development strategies that take into account a region's unique characteristics.

Expert from research institution, universities, central and regional governments, non-governmental organizations, and those interested in sustainable rural development are invited to contribute papers and participate in the discussion.

At the end we do hope that there will be a more positive discussion throughout the seminar for further researches.

Bogor, October 2004
Prof.Dr. Syafrida Manuwoto

Welcome Message **Dean of Graduate School of Agricultural and Life Sciences, The** **University of Tokyo**

Developing ways to increase biological production while simultaneously protecting the environment has become major and urgent global concerns. In order to address these problems on a local scale in Indonesia, a joint research program in the field of applied bioscience entitled "Harmonization between Development and Environment Conservation in Biological Production" was started in 1998 between the Graduate School of Agricultural and Life Sciences, the University of Tokyo and Bogor Agricultural University as a core university program financially supported by JSPS and DGHE. In this program, following research topics were identified and joint research groups were organized for each topic: (1) Studies on environmental changes and sustainable development, (2) Studies on sustainable utilization of botanical resources in arable land, (3) Studies on socio-economic sustainable development in rural Indonesia, and (4) Landscape ecological studies on sustainable bioresources management system in rural Indonesia.

Thereafter two seminars were organized in February 2001 and 2003 in order to evaluate the research achievements and progress and to provide opportunities for the scientists to hold discussions among themselves. The second seminar held at the University of Tokyo aimed at interim assesment of the project. In this seminar, external evaluation was conducted by six experts from Japan, Indonesia and the third world countries. In general, scientific papers published based on the results obtained by the four joint research groups led to a higher evaluation of this project. However, important issues that arose from the research findings of these groups, and projected as major future tasks for the next five years of the project were: (1) Exchange of scientific findings within/among the research groups and integration of the results for future development, (2) Use of these results for societal benefit, and (3) Development of a suitable model of rural society.

Out of the five years period of the last phase of this project, almost two years have passed after the second seminar in 2003. Therefore, this third joint seminar was organized to discuss and evaluate the recent research achievements and progress made towards the fruitful completion of this joint research program in March 2008. I, as one of the representatives of this core university program, would like to welcome all of you to this joint seminar and look forward to your interesting research presentations, fruitful discussions, critical evaluations and recommendations.

Finally, I thank Professor A.A. Mattjik, Rector of Bogor Agricultural University, Professor Syafrida Manuwoto, Dean of Bogor Agricultural University and all those who put in great efforts to make preparations for organizing this joint seminar. I also thank Dr. Djoko Munandar, Governor of Banten Province for his kind support to this joint seminar.

Tokyo, October 2004
Prof.Dr. Katsumi Aida

PROCEEDINGS OF THE 3rd SEMINAR

"TOWARD HARMONIZATION BETWEEN DEVELOPMENT AND ENVIRONMENTAL CONSERVATION IN BIOLOGICAL PRODUCTION"

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BROWN SUGAR INDUSTRY AND ITS SUSTAINABILITY IN KEMANG VILLAGE

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Center for Southeast Asian Studies (CSEAS) – Kyoto University.

Abstract

In the agricultural based village, including the upland area, business other than farming which most of the people favored is agro industry. The type of product selected more determined by raw materials availability factor -local resources base industry. Rural agro industries in general are home and informal --without legal entity-- industries. Brown sugar industry is one of agro-industry that conducted in dry land area which aren tree grows.

The development of agro industry is relatively slow, yet it continues as one of alternative for income source in rural area and as business choices for survival. Therefore, a question rises whether home industry in rural area can be considered sustainable? The main focus of this study is to observe the sustainability of the brown sugar industry especially in Kemang Village. The sustainability parameters used in this study are gross income as economic indicator and yield trend as environmental indicator (Becker, 1997).

The Economic (gross income) and environmental (yield) indicators, both indicate that the brown sugar industry in Kemang Village is continuously improving. However, it should be noted that the real price of brown sugar shows declining. Thus, the increasing of income is only pushed by production. Brown sugar production sustainability can be maintained by expanding the market and the raw material availability.

Key words: Brown Sugar Industry, Sustainability

Introduction

In village area with agriculture base, including upland area, business other than farming which most of the people favored is agricultural product processing industry. This industry or what so called as agro industry generally processes agricultural product produced by local area. It means that the type of product selected more determined by raw materials availability factor (local resources base industry). Rural agro industries in general are home and informal --without legal entity-- industries, thus frequently unrecorded on industrial statistical data. Development of agro industry is relatively slow, yet it continues as one of alternative for income source in rural area and as business choices for survival. This industry tends to be maintained and inherited through generation.

Based on Central Statistics Board (CSB) data, the amount of informal manufacturing industry tends to increase leveling 5% per year in 1998-2001. Compare to total industry, proportion of manufacturing industry about 15-17% with tendency to increase. Number of labors absorbed by manufacturing industry also tends to increase with proportion of 20-23% from total workers in informal industry. Each manufacturing industry unit absorbs about 2 labors. This industry also contributes around 23-24% towards gross output value of the whole informal industry (Appendix 1). According to the number of informal industry, West Java is second rank after East Java with proportion of 18-21% from total informal industry in Indonesia.

Product market accessibility, capital, technology and management are classic problems which generally found in home industry in rural area. Those factors are the causes of why this industry is not well developed seeing from volume of production and productivity as well as from income earned. Therefore, a question rises whether home industry in rural area can be considered sustainable? Industry sustainability is

important to notice due to its role as household source of income can not be neglected. Measuring the sustainability of home industry, particularly industry of processing agricultural product, should cover various aspects such as economy, social and environment aspects.

One of home industries in rural West Java is brown sugar industry. The raw material for brown-sugar industry is sap called *nira* which is produced from sugar palm (*aren*). Compare to other region, West Java has a great potency of *aren*. Cianjur Regency has the largest area of *aren* in West Java (20.3%). From the market point of view, the business opportunity in brown sugar is still wide open, especially if it's related to development of food industry that use brown sugar as one of their raw material. Those food industries are baby food and soy sauce industries. In addition to industrial consumer, brown sugar is also used by households as cooking spices or as food and drink sweetener. Consumers relatively like *aren*'s brown sugar better for its fragrant.

Based on the description mentioned above, the main focus of this study is to observe the sustainability of the brown sugar industry especially in Kemang Village. Two objectives of this study are (1) describing the business of brown sugar industry, and (2) analyzing the sustainability of brown sugar industry.

Research Site and Data

Research conducted in two hamlets which are Beber and Cikupa, located in Kemang Village, Bojong Picung Sub-District, Cianjur District, West Java. Main data used in this study is primarily data based on survey upon 62 households which conducted in 1998, 1999, 2000 and 2003. Under the consideration of data completeness, only 56 of 62 households analyzed (37 households in Beber and 19 households in Cikupa). Other sources of data and information are local brown sugar traders, starch producers and local village officers.

Sustainability Parameter

Referring to Becker's (1997), there are four indicators to measure sustainability which are economy, social, environment, and composite indicators. Each indicator has several parameters. However, parameters used in this study are gross income as economic indicator and yield (production) trend as environmental indicator. The income parameter used is real income obtained by multiplying the nominal income with Consumer Price Index ratio (CPI) at base year of 2003, with CPI at certain year. Based on data from Central Bank of Indonesia (CBI), CPI year 1998, 1999, 2000, and 2003 in sequence are 165.31, 202.63, 210.27, and 278.84.

Brown Sugar Industry in Kemang Village

Brown sugar industry in Kemang Village is a business that has been inherited through generations and has been lasting for quite a long time. However, no one knows for sure the exact time when this business started. This can be seen from more than 70% respondent's knowledge on brown sugar industry came from their parents and the time of running in this business which reached 26 years. The average age of the respondents, which is 51 years, shows that the respondents have been in brown sugar business since the age of 25. At that age, people usually start to have a family of their own, thus comes a responsibility as head of the family to have a steady source of income. Some of the respondents have even started the brown sugar industry since they were 12 years old, although at that time, they were still only helping their parents. In addition to raw material availability, which is palm sugar tree, having no other job alternatives is the reason why respondents have chosen brown sugar industry.

Aren farming mostly belongs to farmers themselves, but only 40 – 50 % of them conducting tapping and sugar processing. Around 20-34 % *aren* owners who

conduct tapping and sugar processing using profit sharing system i.e. 60 – 70 % for the tapper and the rest for the owner. Meanwhile, respondents who are not having their own *aren* but conducting sap (*nira*) tapping and sugar processing are about 17 %. This phenomenon was indicated that production relation among the *aren* owners and the tappers and sugar processing has been done.

The brown sugar industry in Kemang Village is considered as a home industry because it could only absorb averagely two labours which are the husband and the wife. The education level of the brown sugar producers is also relatively low, averagely elementary graduated. Also, land ownership especially the wetland which is relatively small. The average of wetland ownership is relatively small (0, 16 hectare) compared to dry land (1, 1 hectare) ownership in 2003. Both size of wet and dry land have increase about 19.3 % for wetland and 33.7 % for dry land compared to the size in 1998.

Product and Production Process

The brown sugar industry produces two products which are the block and granular brown sugar. Both products require the same raw material which is sap (*nira*), obtained by tapping a ten years old palm sugar.

The processing of brown sugar is relatively simple but it requires a lot of time. Generally, brown sugar processing activities can be done by both men and women, except in the tapping stage that is usually done by men. Tapping is done by men because in order to put on the tapping tools, they need to climb over the palm sugar. According to Mugniesyah and Kosuke Mizuno (2002), in brown sugar industry women contributed around 6.3% of the total productive working hours. The average productive working hours per month in brown sugar industry was 21.5 hours for men and 17.8 hours for women. In general, the processing of block and granular brown sugar are similar.

Block Brown Sugar Processing

The process of making block brown sugar consists of several stages starting from tapping, cooking, blocking, and packaging (Appendix 2). Details of each process are described below.

1) Preparation of *Nira* Tapping

Nira (sap) tapers conduct several activities at this stage. First, selecting ready to tap sugar palm (*aren*) flower stalk (known as *leungeun* in *sundanese*). Second, placing *sigai*, which is a bamboo ladder (for amount of 2) with its height, adjusted to the height of the stalk. By climbing the ladder, tapers will cut dangle part of the flower leaving only its stalk. Cut stalk than cleaned from fibrous and dirt attached. Further, cleaned stalked is hammered by wooden hammer called "paninggur"; usually done once a week for about one month. This activity is done to stimulate *nira* (sap) production. This treatment follows by making incision at the end of the flower stalk and left it for a few minute to wait for *nira* to drop. If there are any *nira*'s dropping, than the tapers will decide that the stalk (*leungeun*) is ready to be tapped.

2) Preparation of Tapping tools

Tools used in *nira* tapping called *lodong* that made from bamboo. A large *lodong* could contain about 15 liter, while the medium one could contain around 5 – 10 liter. Because of *nira*'s natural characteristic, which is very good for the growth of microorganism, *lodong* firstly need to be free from microorganism. In order for that, *lodong* is smoked by putting flaming burning woods inside the *lodong* surface or by heating its surface in front of stove during sugar cooking process. In addition, tapers also put *kawao* roots known as *raru*, into heated *lodong* bamboo. This is to ensure further fermentation and to guarantee *nira*'s quality, from the tapping process until *nira* ready to cook into sugar.

3) Tapping

This stage is a critical one since it will influence the quality and quantity of resulted sugar. In this stage, prepared *lodong* is carried by tapers to the dry land (*pasir*), which then climb the bamboo ladder (*sigai*) and put the *lodong* right under the cut flower stalk so it can retain every drop of *nira* from the stalk. Tapping is conducted twice a day, from 16 to 17 pm in the afternoon and in the morning between 6 – 7 am. *Lodong*, which is placed in the afternoon, will be taken in the next morning and at the same time is replaced by new *lodong* to be taken in the afternoon.

4) Cooking Process

Although tapping is conducted twice, cooking on the other hand is only done once a day. The process of making block brown sugar in Kemang village use simple technology inherited through generations. In principle, the process of making block brown sugar is the process of cooking liquid *nira* to certain stage until thick liquid sugar obtained which then blocked and let it cold until block sugar is formed. Referring to flowchart of block brown sugar processing (Appendix 2), below are description of the cooking process:

- Liquid sap (*nira*) in the *lodong* is poured directly to the wok, which is placed over the stove. During the pouring process, above the wok is a straining cloth as a filter to clean the liquid *nira* from dirt, bugs, and *kawao* roots. Next, liquid *nira* is cook until boiling without any stirring. The result of this cooking process called *wedang*, with bright yellow color.
- The *wedang* is then boiled again still without stirring. This boiling process produces a brown liquid called *humanjuang*.
- This *humanjuang* liquid continues to be boiled until it reaches a condition of *nyeungka* that is above the sugar liquid surface emerge foam or bubbles with its high surpass the wok surface. To prevent the sugar liquid spilled off the wok, they put *jubung* over the wok, which is a bamboo-plaited mat in the shape of cylinder, and size about 30-40 cm.
- When the *nyeungka* stage occurred, they will put peanut/coconut oil/candlenut into liquid sugar, which they called as "*dipepes*". The result is "*peueut*", thick brown sugar syrup.
- *Peueut* then boiled further more but this time with stirring, which they called as *digujs*. The stirring is 5 to 6 round each with frequency of stirring around four to five times.
- The next stage is *diduga*, which is checking the clot of the sugar. When it considered appropriate then it is ready to block.
- Blocking is conducted by dipping up thick *duga* into a 10-14 cm height pieces of bamboo by using "*panitis*" which is a tool made from bamboo, designed to dip *duga* as well as to stir *duga* to prevent clod. The process then followed by cooling process.

5) Packaging

After getting cold, the blocking bamboo shell is lifted up to obtain block sugar which weighted about 0.8 – 1 kg each block. In a case where there is still *duga* left over to be blocked, they will let it stay in the wok which then will produced what is known as *kukurut*, in which will be used for their own consumption. This block sugar then will be packed using young sap leaf called *daun kawung ngora* and ready to be sold.

Granular Brown Sugar Processing

The process of making granular brown sugar is slightly different compare to the brown sugar. Beside the tools used in cooking block sugar; some extra tools are required such as wooden fork, scraper, strainer and winnowing tray. The scraper is made from piece of coconut shell; strainer is provided from rustproof material with the diameter of 20 meshes. The strainer is used to strain granular sugar and to separate

it from the unnecessary sugar clods. The winnowing tray is used to retain the granular sugar obtained from the scraping process.

The stages in producing the granular sugar quite similar with those in producing block sugar, from the preparation stage to the cooking stage, particularly until the *diduga* stage, which is the phase where the thickness of the liquid *peueut* is checked. However, differences occurred from the *peueut* condition until the *diduga* condition, in which during the cooking, stirring is conducted intensively. The stirring is stopped when *diduga* has reached jelly form, by taking a few of thick liquid and putting it into cold water. This indicates that the water level of *nira* (sap) is low enough to form granular brown sugar. After that, the wok with thick liquid sugar is lifted but still the stirring continues. During the stirring process, which is also the cooling process, thick liquid sugar begins to change into crystal. Then the crystals produced are being pounded by using scraper. The result is granular sugar dust which will be strained and retained in winnowing tray. The unstrained part of the crystals are usually used for own consumption.

Granular sugar with a golden light brown color shows the finest quality, mean while the dark brown color shows less quality. The dark brown color is usually caused by the low quality of the sap material (*lahang*) and the high temperature during the cooking process.

Unlike the brown sugar, granular brown sugar's packaging is usually stored in bulk or in a plastic package size in various sizes as desire.

Brown Sugar Market

Block brown sugar market is different from granular brown sugar. There are five patterns of block brown sugar marketing channel, which are (1) Producers → Village Collector Trader → Retail Trader in Market of Ciranjang or Bandung → Consumer; (2) Producer → Village Small Shop → Consumer; (3) Producer → Village Small Shop → Retail Trader in Market of Ciranjang → Consumer; (4) Producer → Peddler → Consumer; and (5) Producer → Retail Trader in Market of Ciranjang. Pattern (1) is the most dominant pattern since almost 75% of block brown sugar are marketed through this channel. Whereas, pattern (5) is the least favored because the price augment of block brown sugar could not cover the high transportation cost from the Village to the market in Ciranjang.

Brown sugar traders mostly are men, except peddlers are women which mostly are elder. They would sell brown sugar by moving around the villages outside Kemang Village. Sugar usually sold by credit with time duration of 1 -2 weeks.

Mean while, marketing channel of granular brown sugar which routinely is only one which is producers sell to the traders come from outside the village—Mr. Ag from Tanjung Sari-Bandung- which come to Kemang Village twice a month, in the middle and the end of the month. The traders then sell the granular brown sugar to PT. Indofood as a sweetener for soy sauce. Granular brown sugar sold to village small shop, village traders or end customer only occurred occasionally, if there is a demand with relatively small amount.

The price of block brown sugar received by the producers in one time is nearly the same even when it is sold through different marketing channel except for pattern (5). This similar with granular brown sugar, which in every selling, the price set by traders is the same for entire producers. However, the price of granular brown sugar is usually more expensive compare to block brown sugars. The difference ranges around Rp 500 – Rp 1000 per kg. Both price of block and granular brown sugar are determined mostly by traders. It means that brown sugar producer is a price taker so that do not have any bargaining power. However, traders usually pay in cash, except for the peddler that can delay the payment for 2-3 days.

Result and Discussion

Production Sustainability

Brown sugar producers in Kemang village are quite responsive toward market demand. This can be seen from data of brown sugar total production as well as production per industry which shows the tendency to increase with growth rate of 16% per year in 1998-2003 periods (Figure 1 and Table 1). The increase of total production is caused more by granular brown sugar's high rate of increasing production that can reach 57% per year. Whereas block sugar increasing production only 24% per year. Even though the increasing production of granular brown sugar is quite high, proportion of the latter upon total production of brown sugar still low. This shows that the demand of granular brown sugar is still wide open since sugar producers usually are likely to increase its production if there is any information on amount of sugar needed by collector traders.

The market structure of granular brown sugar in Kemang village is monopsony thus sugar producers do not have bargaining power which made them in weak and vulnerable position when market shock occurred. This phenomenon can be clearly seen since June 2004, in which brown sugar producers in Kemang village have almost stopped producing granular brown sugar since collector trader –i.e. Mr.Ag— stopped buying granular brown sugar. Mr Ag has temporary stopped the buying because of the abundant stock of granular brown sugar in his storehouse. This abundant stock was due to PT. Indofood which stopped the buying of granular brown sugar. So far, Mr. Ag did not know definite cause of PT Indofood decision to stop the buying of granular brown sugar since PT Indofood it self has never been transparent on determining the amount of granular brown sugar needed nor its delivery time. All this time, the relationship between Mr.Ag and PT. Indofood was not based on a clear contract. According to few sugar producers, this has clearly decreased the total production and income of brown sugar. However, business is still running since granular brown sugar producers have shifted their product from granular into block sugar. Fortunately at the same time, block sugar demand tends to increase as entering Moslem's holy month of Ramadhan.

Figure 1. Trend of Brown Sugar production in Kemang Village

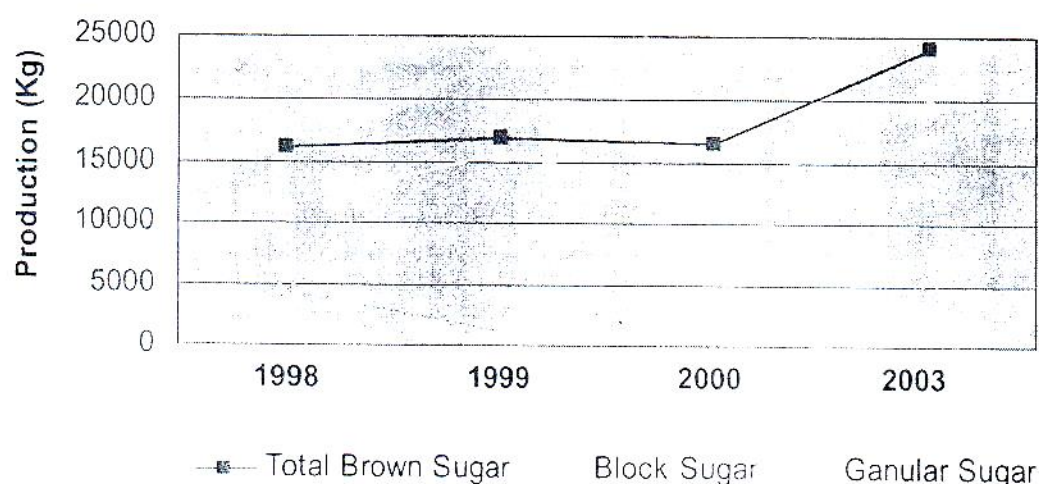


Table 1. Trend of Total Production, Number of Industry, and Average Production of Brown Sugar in Kemang Village

Items	1998	1999	2000	2003	Trend (%/Year)
Number of Industry (HH)	27	29	15	40	41.93
Total Production of BS (Kg)	16101	16867	16482	23975	15.98
Block Sugar Production	11606 (72.08)	15615 (92.58)	12248 (74.31)	19483 (81.26)	24.01
Ganular Sugar Production	4495 (27.92)	1252 (7.42)	4234 (25.69)	4492 (18.74)	57.38
Average Production (Kg/HH)	287	301	294	428	15.98
Block Sugar Production	207	279	219	348	24.01
Ganular Sugar Production	80	22	75	80	57.38

Note : HH : Household; BS: Brown Sugar

The increasing production of brown sugar is not always followed by the increasing number of tapped trees. Appendix 3 shows yield fluctuation per tree but still with tendency to increase. This is assumed that the potency of *aren* has not been fully benefited as raw material for brown sugar industry. Thus, when there are demand changes which affected production, then brown sugar producers would arrange the intensity of tapping. Other possibilities is because *nira* content in each trees varies and difficult to detect precisely since *aren* are not cultivated. As an illustration, every *aren* able to produce 3 to 10 *leungeun* and each *leungeun* could be tapped for 1 to 3 months.

Other than demand factor, brown sugar production is also determined by the availability of *aren* as source of raw material. Although there are no accurate data yet, however the present of two unit of starch industry in Kemang Village has put some concern on brown sugar producers. The raw material for starch industry is starch which is contained inside *aren* stem. It means that the increasing needs of raw material for starch industry would implicate the decreasing number of *aren*. In other words, if starch industry existence maintained, it will trigger the termination of brown sugar industry in Kemang Village.

The emerging of starch industry in Kemang Village is as consequence of weakening enforcement of regional regulation on prohibition of *aren* cutting which has actually been decreed long before the era of reformation. Both village and sub district government previously have given severe law sanction to the *aren* cutter. In contrast, according to the brown sugar producers, it seems that recently the authorities act do not pay attention to *aren* cutter. They said that if there are any government officers checking starch industry usually compromise is taken by producers by giving money to government officers.

Those regional regulations enforcement is not only benefit to preserve the sustainability of brown sugar industry but also to conserve environment especially slope land area. Several literature sources stated that *aren* be considered able to reduce land erosion since dry land area in Kemang village generally has slope level around 26 percent. This statement is based on *aren*'s characteristics with deep and strong roots. However, data on how significant the role of *aren* in reducing erosion on slope land area is not available yet.

Income Sustainability

Unlike total production, the increasing rate of real income in brown sugar industry is relatively slow, around 9 % per year (Figure 2 and Table 2). The real price of brown sugar which suffers decreasing of 4.34 % per year is assumed to have contribution over the slow increasing rate of total income of brown sugar industry (Figure 3). The decreasing price of block brown sugar (4.9 % per year) is relatively higher than the decreasing price of granular sugar (3.7 % per year). The decreasing of real price level shows that the value of money is also declining. In the year of 1998 – 2003, the highest ratio CPI reached in 1998, thus the increasing of nominal price does not cause brown sugar real price increasing.

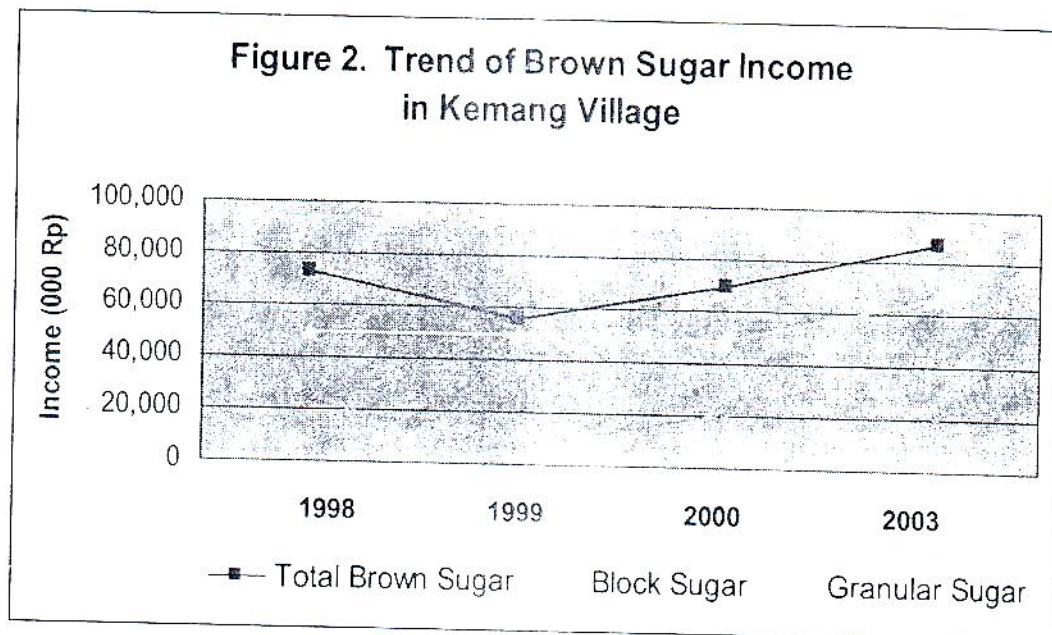


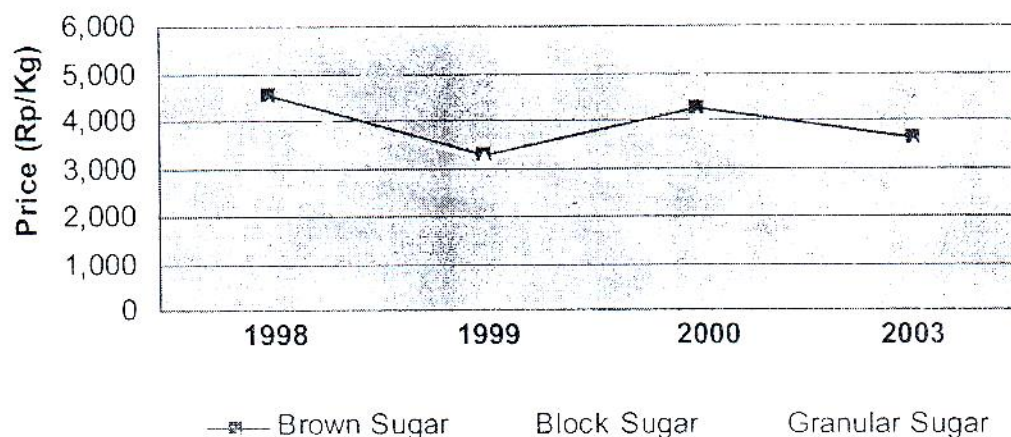
Table 2. Trend of Brown Sugar Price and Income in Kemang Village

Items	1998	1999	2000	2003	Trend (%/Year)
Income of Brown Sugar (000 Rp):					
Block Brown Sugar	72,927	55,351	69,665	86,861	8.81
Granular Brown Sugar	49,803	49,280	48,829	66,282	11.26
	23,124	6,071	20,836	20,579	56.07
Price of Brown Sugar (Rp/Kg)					
Block Brown Sugar	4,529	3,282	4,227	3,623	-4.34
Granular Brown Sugar	4,291	3,156	3,987	3,402	-4.93
	5,144	4,849	4,921	4,581	-3.72

Therefore, it can be concluded that the increasing of brown sugar's real income is caused by the increasing of production. In line with the increasing rate of production, the real income of granular brown sugar is also reaches five times the increasing rate real income of block brown sugar. Seeing from the proportion of sold brown sugar which is over 95 % except in the year of 2000, it means that most of

brown sugar income is received in cash (Appendix 4). This also shows that the income of brown sugar holds an important role in the households' liquidity in Kemang Village.

Figure 3. Trend of Brown Sugar Price in Kemang Village



However, seeing from the contribution of brown sugar's income upon total households' income, shows a declining of 10.9 % per year (Figure 4 and Table 3). The decreasing proportion of income is also occurred in all agricultural activities, thus the contribution in agriculture sector has suffered a total decrease of 11 % per year. In contrast, the contribution from non-agriculture sector has increased around 15.3 % per year. This indicates that agriculture sector has becoming less reliable as a source of income for the people of Kemang Village.

If brown sugar industry is classified into agriculture sector – due to its tight relation with dry land agriculture-, thus in the year of 1998 and 1999 the contribution of brown sugar income is still higher than any other agricultural activities. Whereas, in year 2000 and 2003 brown sugar income contribution has been overcome by banana's leaf income which increasing rapidly. However, up to the present, the increasing of banana's leaf business has not yet shows negative impact on the brown sugar business. It is because the land used to plant leaves banana does not substitute palm sugar land. Farmers usually plant leaves banana in land that usually used for dry land rice or in any other dry land commodities; even wetland is starting to be planted by leaves banana.

Figure 4. Trend of Income Contribution in Kemang Village

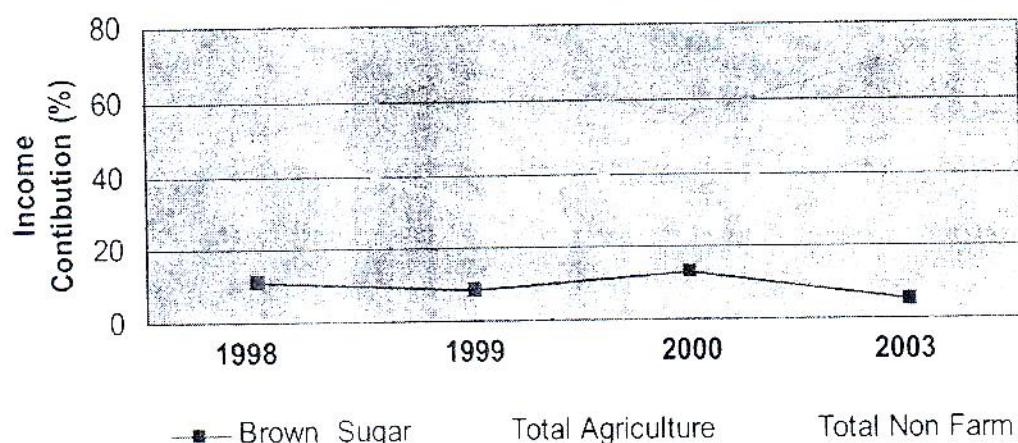


Table 3. Trend of Brown Sugar Income Contribution towards Total Household Income in Kemang Village

Sources of Income	1998	1999	2000	2003	Trend (%/Year)
	(%)	(%)	(%)	(%)	
Rainy Season Rice	6.19	4.45	4.07	1.70	(31.62)
Dry Season Rice	11.49	5.30	5.93	2.59	(32.75)
Banana Leaf	7.87	6.44	14.56	9.92	25.33
Other Commodities	9.21	6.91	3.88	6.88	2.90
Agric. Hired Labor	1.73	0.36	0.82	0.00	(17.79)
Livestock	1.15	0.27	2.96	1.17	292.88
Brown Sugar	11.34	8.40	12.78	5.27	(10.85)
Non Farm Activities	51.01	67.87	55.00	72.46	15.28
Total	100.00	100.00	100.00	100.00	

In line with the increasing of total production and income brown sugar's acceptance in Kemang Village; brown sugar producers at household's level are also experiencing total production and income increase. This means that the development of brown sugar industry in Kemang Village, not only causing business expansion (number of unit increase), but also increasing production scale per unit of industry as well as the prosperity –if its measured by income-- of producer's households.

Conclusion

The economic (gross income) and environmental (production) indicators, both indicate that the performance of brown sugar industry development in Kemang village is continuously improving. However, it should be noted that the real price of brown sugar shows declining tendency. Thus, the increase of income is only pushed by production.

Production increase would be disturbed particularly if there is market shock as happening in granular brown sugar. Anticipations are required by looking market

alternatives for brown sugar. Brown sugar consumer identification – especially industrial consumer – should be done to discover new market opportunities. Other aspect that predicted would disturb the continuity and quantity of brown sugar production in Kemang Village is the activities of cutting down *aren* as an implication of the starch industry establishment. In order to solve this problem, distinct action from the government – especially from the village authority – in enforcing the regulation on prohibition of cutting down productive *aren* by stopping the starch industry and legally punishing the *aren* cutter. The village authority should also conduct assessment to community in order to prevent productive *aren* selling.

The sustainability of brown sugar industry in Kemang Village eventually depends on the efforts to maintain both output market continuity and raw material resources. The sustainability of brown sugar industry will also support the effort of environment sustainability which is reducing erosion on slope land area.

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Appendix 1. Number of Business Unit, Labor and Gross Output Value of Informal Manufacturing Industry in Indonesia, 1998-2001

Items	1998	1999	2000	2001
Number of Business Unit	2,179,064 (15.59)	2,514,816 (17.32)	2,598,704 (14.72)	2,538,283 (17.31)
Number of Labor	5,287,418 (20.32)	6,116,269 (22.89)	6,291,441 (22.74)	6,110,058 (22.46)
Gross Output Value (Billion Rp)	44,100 (23.79)	51,061 (24.06)	57,319 (22.92)	67,091 (23.18)

Source: Central Statistics Board (CSB)

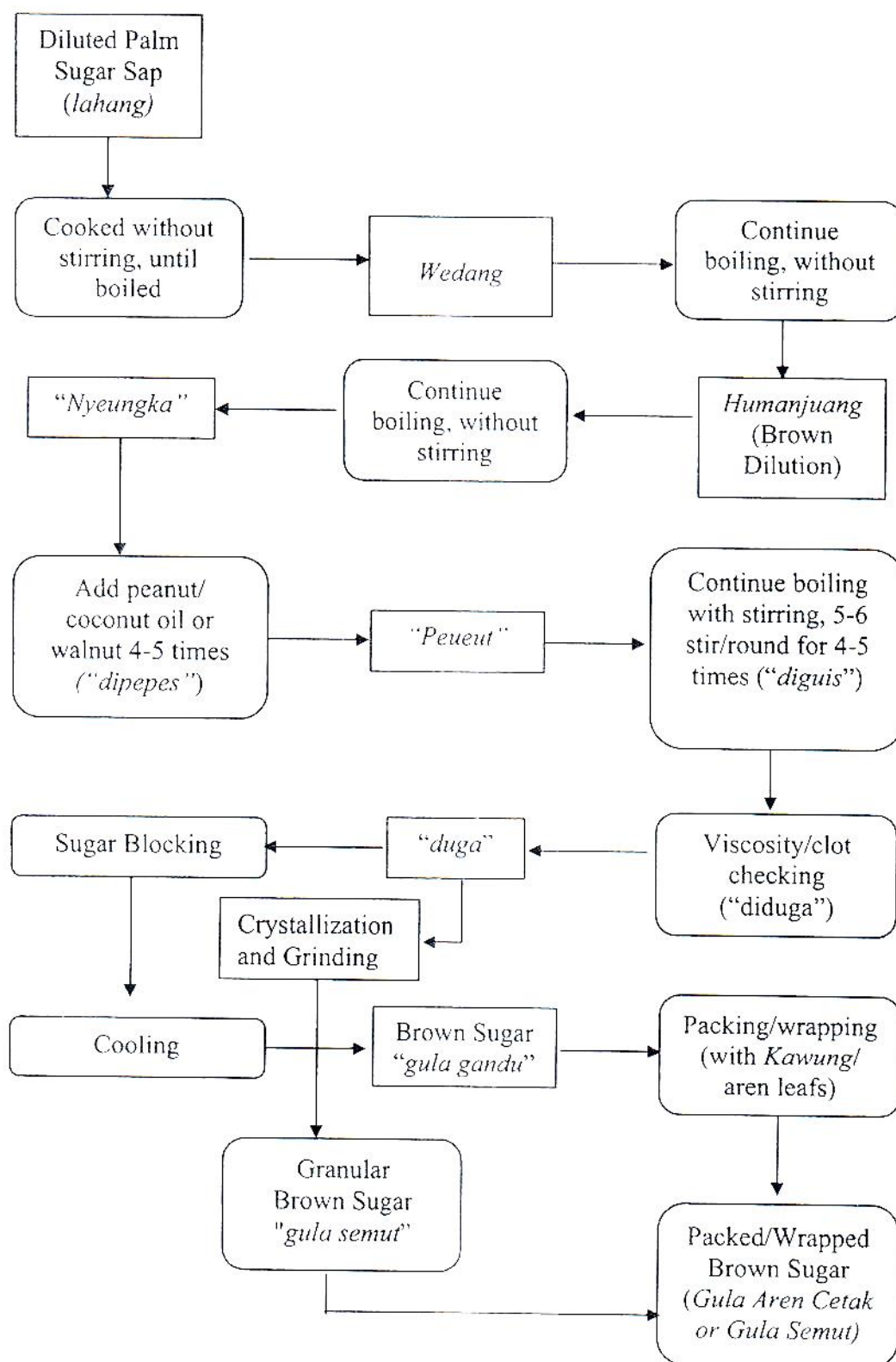
Appendix 3. Trend of Brown Sugar Yield per Tapped Tree in Kemang Village

Items	1998	1999	2000	2003	Trend (%/Year)
Total Production of BS (Kg)	16101	16867	16482	23975	15.98
Number of Tapped (Tree)	94	82	315	215	79.88
Productivity (kg/tree/year)	171	206	52	112	19.54

Note: BS : Brown Sugar

Appendix 4. Trend of Sold and Consumed Brown Sugar Proportion in Kemang Village

Uraian	1998	1999	2000	2003	Trend (%/Year)
Number of Sold Brown Sugar (Kg)	15268 (94.83)	16260 (96.40)	14833 (89.99)	23191.50 (96.73)	18.02
Block Brown Sugar	10858 (67.44)	15130 (89.70)	10691 (64.86)	18766.50 (78.28)	28.51
Granular Brown Sugar	4410 (27.39)	1130 (6.70)	4142 (25.13)	4425.00 (18.46)	66.33
Number of Consumed Brown Sugar (Kg)	833 (5.17)	607 (3.60)	1649 (10.01)	783.00 (3.27)	30.69
Gula Cetak	748 (4.65)	485 (2.88)	1557 (9.45)	716.00 (2.99)	43.95
Gula Semut	85 (0.53)	122 (0.72)	92 (0.56)	67 (0.28)	-2.74
Total Production of Brown Sugar (Kg)	16101 (100.00)	16867 (100.00)	16482.15 (100.00)	23975 (100.00)	15.98



Appendix 2. Flowchart of Brown Sugar Processing