CHAPTER 5

ECONOMIC IMPACTS OF GDL PROCESSING COMMUNITY ENTERPRISES' OPERATIONS

This chapter presents the findings on the economic impacts of GDL processing community enterprises' operations on income and employment in Tambon Makhuea Chae, Mueang District, Lamphun Province and the backward and forward linkages, as well as the calculated outcomes in various variables under different scenarios such that proposed plans and policies can be drawn up for further development of the GDL processing community enterprises in compatibility with the Tambon's potential and within the local community's resource, economic, social, and environmental contexts.

5.1 Analysis on economic activities and production environment in Tambon Makhuea Chae

From the production information concerning various economic sectors in Tambon Makhuea Chae presented in Chapters 3 and 4, it is apparent that rice and longan are the only two main agricultural sectors here. Rice (sector 1) is the rainy season crop grown in rain-fed condition outside the irrigated area. At the time of the present study, the total value of the rice output was 14.82 million baht per year. The majority of the rice output or 73.35 % was utilized locally and the remaining 26.65 % was exported to markets outside the Tambon at 3.95 million baht value. As shown in

Table 5.1, the local utilization of rice output comprised 3.14 million baht purchase by rice millers, 0.08 million baht consumption by poor households (less than 23,000 baht annual income). 3.34 million baht consumption by medium income households (23,000 – 100,000 baht annual income), and 1.45 million baht consumption by high income households (more than 100,000 baht annual income). At the same time, the rice sector spent 0.21 million baht in the grocery store sector, 0.51 million baht in the agricultural chemical store sector, 0.01 million baht for the repair of trucks, 0.02 million baht for drinking water and water supply, 0.01 million baht in the fresh food market sector, 0.04 million baht in the market fair sector, 0.06 million baht in the fuel stations sector, 0.44 million baht for household labor, 2.53 million baht for daily farm labor, 0.05 million baht as tax to the Municipality Office, while keeping 2.85 million baht as savings or returns and importing 8.10 million baht raw materials from outside the Tambon. Apparently, the spending of the rice sector in the other 9 local economic sectors was relatively small compared to its total expenditure.

Longan production (sector 2) obtained a total output valued at 50.14 million baht, 16.16 million baht or 32.23 % out of which was from the export to markets outside the Tambon and 33.98 million baht or 67.77 % from the sale in local market where the GDL sector made 23.59 million baht purchase of longan fruits. At the same time the longan sector spent 1.25 million baht in the Grocery store sector, 4.18 million baht in the agricultural chemical store sector, 0.07 million baht in the garage sector, 0.05 million baht for drinking water and water supply, 0.15 million baht in the fresh food market sector, 0.01 million baht in the market fair sector, 1.42 million baht for fuel, 3.36 million baht for household labor, 4.5 million baht for daily farm labor, 0.05 million baht as land tax to the Municipality Office, while keeping 10.40 million

baht as savings or entrepreneurial profit and importing factor inputs at the value of 24.71 million baht. Evidently, the longan production sector made total spending locally in 10 other economic sectors more than the rice sector did.

The two major cottage industries in Tambon Makhuea Chae are the GDL processing and the teak lamp production sectors. At the time of this investigation, the GDL processing (sector 3) produced a total output valued at 160.54 million baht (page 63). This sector spent 23.59 million baht for buying raw material from the longan production sector, 0.10 million baht for LPG, 1.36 million baht in the Grocery store sector, 0.09 million baht in the garage sector, 0.06 million baht for drinking water and water supply, 0.09 million baht in the mobile shops sector, 0.01 million baht in the fresh food market sector, 0.03 million baht in the market fair sector, 1.71 million baht for fuel, 14.62 million baht for household labor, 23.25 million baht for daily off-farm labor, while paying 6.59 million baht of loan principle and interest to the community enterprises group and network, donating 0.06 million baht to temple as a social institution, paying 0.06 million baht as tax to the Municipality Office, saving 18.20 million baht from the production returns, and importing factor inputs from markets outside the Tambon valued at 70.72 million baht. It is clear that the GDL sector is economically significant in terms of relationship with other 15 local economic sectors especially the purchase of raw materials from the longan production sector which has the implication on the local agricultural sector as a whole, while it is also significant in terms of spending a large sum of money higher than any other economic sectors in Tambon Makhuea Chae for importing factor inputs from outside markets.

Table 5.1 Social Accounting Matrix of Tambon Makhuea Chae in 2011

(Unit: Million baht)

Sector	1	2	3	4-32	33	34	35	Export	Total
1=Rice	0.00	0.00	0.00	…	0.08	3.34	1.45	3.95	14.82
2=Longan	0.00	0.00	23.59	…	0.00	0.00	0.00	16.16	50.14
3=GDL	0.00	0.00	0.00	…	0.00	0.00	0.00	116.71	160.54
4-32	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
33=Poor households (annual income less than 23,000 baht)	0.00	0.00	0.00	…	0.00	0.00	0.00	0.63	11.30
34=Medium income households (annual income 23,000 – 100,000 baht)	0.00	0.00	0.00	…	0.00	0.00	0.00	191.40	310.79
35=High income households(annual income more than 100,000 baht)	0.00	0.00	0.00	…	0.00	0.00	0.00	139.99	244.39
import	8.10	24.71	70.72	…	3.83	128.68	79.64	0.00	595.13
Total	14.82	50.14	160.54	…	11.30	310.79	244.39	595.13	2114.68

Source: Survey, 2012

Note: Detail in Appendix table 1

Teak lamp production (sector 19) is a home based industry and was found to make a total 45.28 million baht income. This sector spent 0.18 million baht in the construction material shop sector, 0.01 million baht in the grocery store sector, 0.01 million baht for drinking water and water supply, 0.13 million baht in the mobile shops sector, 0.93 million baht for fuel, 11.40 million baht for household labor, 0.24 million baht for daily off-farm labor, 0.08 million baht as tax to the Municipality Office, while keeping 7.91 million baht of producer's return and importing 24.40 million baht worth of factor inputs from outside the Tambon. The teak lamp sector had the economic activities in 9 local economic sectors at the value comparable to that of the rice sector and it was the second largest self-employment source of household labors next to the GDL sector.

From the statistics of the Tambon Makhuea Chae Municipality Office as presented in Chapter 4 and the field survey, the main GDL production areas were in Moo 7 Ban San Pa Hiang, Moo 5 Ban Mueang Guak, Moo 8 Ban Kiew Muen, Moo 19 Ban Mai Mueang Guak, and Moo 17 Ban San Ton Pheung while the main teak lamp production areas were Moo 1 Ban Makhuea Chae and Moo 2 Ban Sa Laeng. The survey also found that household labors in the teak lamp sector were employed as peeling and pitting workers in the GDL sector in longan drying season but none of the household labors in GDL sector were employed in the teak lamp sector because teak lamp making needs special craftsmanship and skills.

The analysis of economic impacts was undertaken for each of the four major economic sectors in Tambon Makhuea Chae. It was found that the increase in production by 1 million baht in the rice sector (sector 1) will involve the money transfer to the following sectors: Grocery store 0.01 million baht, agricultural

chemical store 0.03 million baht, household labor 0.03 million baht, daily farm labor 0.17 million baht, producer's return 0.19 million baht, and imports 0.55 million baht (Table 5.2). The increase in 1 million baht worth of output in the rice sector will be utilized and consumed in the following sectors: rice millers 0.21 million baht, poor household (less than 23.000 baht annual income) 0.01 million baht, medium income household (23,000 – 100,000 baht annual income) 0.23 million baht, high income household (more than 100,000 baht annual income) 0.10 million baht, and exports 0.27 million baht (Table 5.3). The increase in rice output will be mainly absorbed by the local market leaving only 27 % for exports.

In case longan (sector 2) output increases by 1 million baht value, this change will occur with the additional spending in the following sectors: Grocery store 0.03 million baht, agricultural chemical store 0.08 million baht, fuel station 0.03 million baht, household labor 0.07 million baht, daily farm labor 0.09 million baht, producer's return 0.21 million baht, and imports 0.49 million baht (Table 5.2).

The comparison between rice sector and longan sector on input use levels revealed that the longan sector used agro-chemicals, fuel, and household labor more than the rice sector while the latter used more daily farm labor than the former (Table 5.2) while the producer's return was slightly higher in the longan sector and the imports was relatively higher in the rice sector. Based on these findings, longan cultivation should be promoted if local daily farm labor supply is limited because the rice production sector demands twice as many hired farm hands compared to the longan sector. On the contrary, rice production should be encouraged to replace longan if there is a need to lower the use of agro-chemicals in the local area since longan production uses relatively more chemical inputs.

Table 5.2 The A Matrix (fixed proportion of total output on demand-side) of Tambon Makhuea Chae

Sector	1	2	3	4-32	33	34	35	Export
1=Rice	0.00	0.00	0.00	…	0.01	0.01	0.01	0.01
2=Longan	0.00	0.00	0.15	…	0.00	0.00	0.00	0.03
3=GDL	0.00	0.00	0.00	…	0.00	0.00	0.00	0.20
4-32	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
33=Poor households (annual income less than 23,000 baht)	0.00	0.00	0.00	…	0.00	0.00	0.00	0.00
34=Medium income households (annual income 23,000 – 100,000 baht)	0.00	0.00	0.00	…	0.00	0.00	0.00	0.32
35=High income households(annual income more than 100,000 baht)	0.00	0.00	0.00	…	0.00	0.00	0.00	0.24
import	0.55	0.49	0.44	…	0.34	0.41	0.33	0.00
Total	1.00	1.00	1.00	…	1.00	1.00	1.00	1.00

Source: Survey, 2012

Note: Detail in Appendix table 2

Table 5.3 The B Matrix (fixed proportion of total output on supply-side) of Tambon Makhuea Chae

Sector	1	2	3	4-32	33	34	35	Export	**Total**
1=Rice	0.00	0.00	0.00	…	0.01	0.23	0.10	0.27	1.00
2=Longan	0.00	0.00	0.47	…	0.00	0.00	0.00	0.32	1.00
3=GDL	0.00	0.00	0.00	…	0.00	0.00	0.00	0.73	1.00
4-32	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	
33=Poor households (annual income less than 23,000 baht)	0.00	0.00	0.00	…	0.00	0.00	0.00	0.06	1.00
34=Medium income households (annual income 23,000 – 100,000 baht)	0.00	0.00	0.00	…	0.00	0.00	0.00	0.62	1.00
35=High income households(annual income more than 100,000 baht)	0.00	0.00	0.00	…	0.00	0.00	0.00	0.57	1.00
import	0.01	0.04	0.12	…	0.01	0.22	0.13	0.00	1.00

Source: Survey, 2012

Note: Detail in Appendix table 3

In the case that the production of GDL (sector 3) increases by an economic worth of 1 million baht, this will take place in association with the additional money flows to the following sectors: longan for raw material 0.15 million baht, Grocery store 0.01 million baht, fuel station 0.01 million baht, household labor 0.09 million baht, daily off-farm labor 0.14 million baht, interest payment to the community enterprises group 0.04 million baht, producer's return 0.11 million baht, and imports 0.44 million baht. In case teak lamp sector (sector 19) wants to increase another 1 million baht value of production, there will be the demand for additional inputs from the following sectors: fuel 0.02 million baht, household labor 0.25 million baht, daily off-farm labor 0.01 million baht, producer's return 0.17 million baht, and imports 0.54 million baht.

By comparison, the GDL sector uses fewer household labors and more daily off-farm labors than the teak lamp sector, while the latter has relatively higher producer's return and imports and uses local factor inputs as a whole less than the former. Consequently, the policy to deal with off-farm labor shortage in the local area is to promote a greater extent of teak lamp production because the GDL sector needs to employ many off-farm labors each day of drying operation to finish off the longan fruit peeling and pitting process. However, the support for the expansion of one sector has to take into consideration the potential of other related sectors. For example, the support for enlarging the number of longan drying ovens must be accompanied by the increase in longan output with efficiency and good fruit quality to supply raw material for longan drying activity. Meanwhile, the problem of peeling and pitting labor scarcity may be solved by funding research attempts to develop peeling and pitting tools to replace the manual process.

5.2 GDL sector's impacts on backward and forward linkages

The study on the economic impacts of GDL processing operations has two main objectives namely to compare the economic impacts of the GDL impacts with other economic sectors and to study the economic impacts of GDL processing operations on other economic sectors.

5.2.1 Comparison of economic impacts of the GDL sectors with those of other sectors was pursued because the GDL sector is the major economic activity in the Tambon with a total value of 160.54 million baht. The investigation by SAM provided the evidence that the GDL sector compared to other sectors has the largest absolute value of value added to the Tambon's economy at 56.07 million baht (Table 5.1&5.6) as the result of employment of factor inputs including daily off-farm labor for 23.25 million baht, household labor for 14.62 million baht, and entrepreneur's saving or profit for 18.20 million baht. Meanwhile, the total output value of the GDL was accounted by 116.71 million baht of exports and 43.83 million baht of sale in the local area. However, by the criteria of the proportion of value added to total output value, the teak lamp and the garage sectors appeared to have the greatest economic impacts due to the large share of labor cost in these two sectors.

The comparative study on backward linkages indicated that the GDL sector has the strongest impact in terms of use of factor inputs with the total backward linkages value of 2.80 (Table 5.6), meaning that the increase in final demand of GDL output by 1 million baht value is associated with additional employment or use of factor inputs at the total value of 2.80 million baht (Figure 5.1), followed by the teak lamp sector (2.57), the longan sector (2.53), the garage sector (2.52), the rice sector (2.50), and the teak furniture sector (2.46). On forward

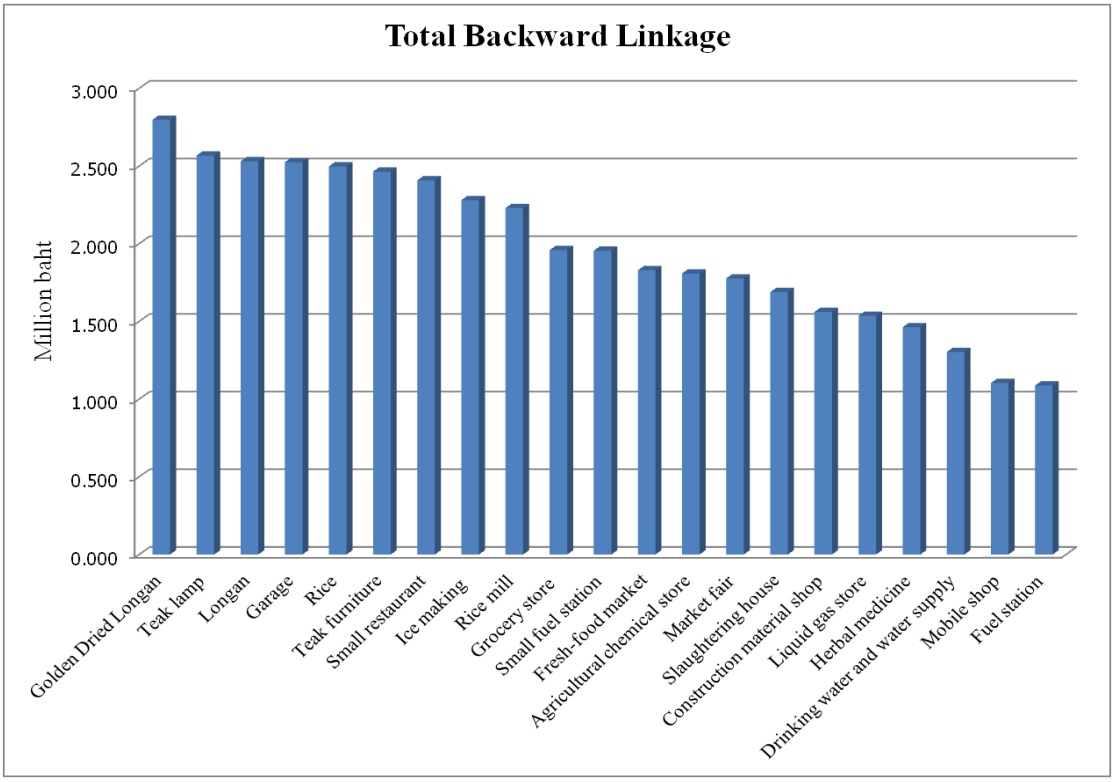

Figure 5.1 Total backward linkage

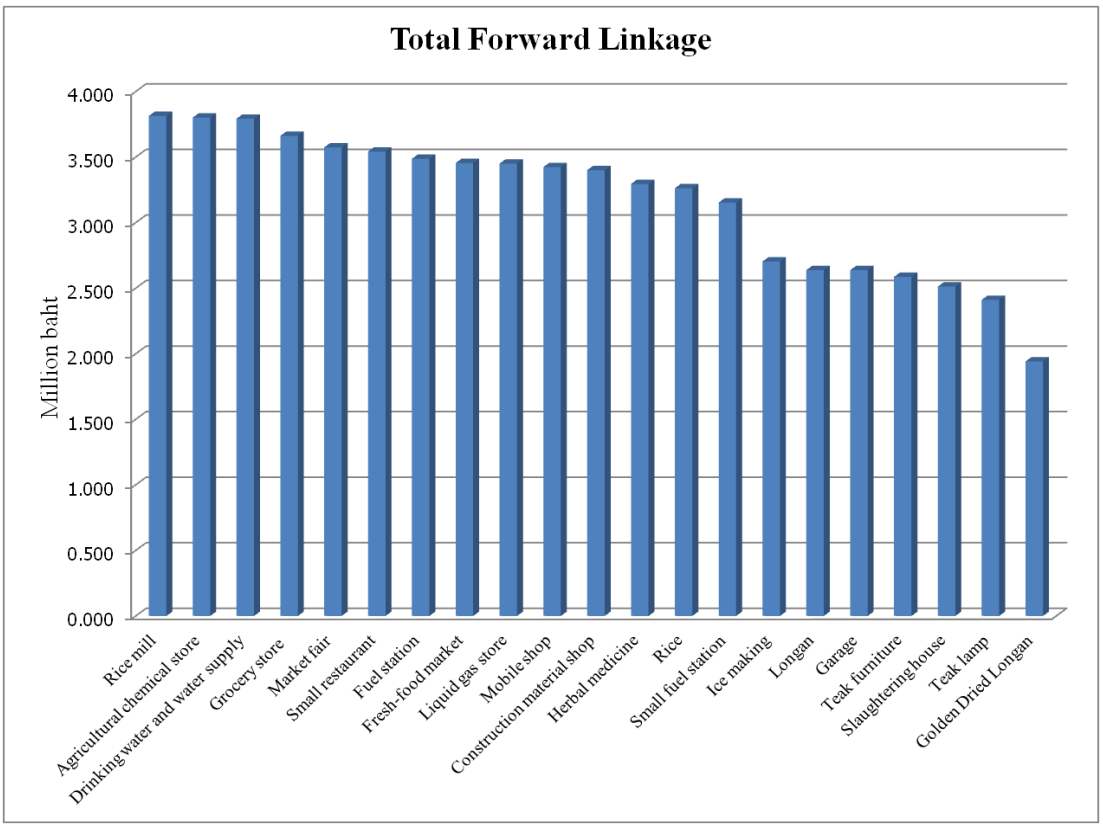

Figure 5.2 Total forward linkage

linkages, the rice mill sector was found to have the largest total forward linkages value of 3.81 (Figure 5.2) or generate the most direct and indirect value addition, followed by the sectors of agricultural chemical store (3.80), drinking water and water supply (3.79), grocery store (3.66), and market fair (3.57). It can be concluded that the GDL sector has the highest impact on backward linkages with the largest direct and indirect money flows to other sectors but it has very low total forward linkages value meaning that there is a small extent of the use of GDL as raw material in other sectors or industries.

On impacts on community's income, the study found the teak lamp sector to be most crucial as it has the income backward linkages value of 0.62 (Figure 5.3) followed by the sectors of garage (0.61), GDL (0.61), rice (0.58), teak furniture (0.58), and longan (0.56). The highest income forward linkages value was found in the rice sector at 1.28 (Figure 5.4) trailed by the garage sector (1.14), the teak lamp sector (1.04), the teak furniture sector (1.03), and the longan sector (0.96), respectively. By comparison, the GDL sector apparently was the third most significant after the teak lamp and the garage sectors in generating income in the respective backward linkages locally.

For employment backward linkages, the rice sector was found to exert the strongest impact with the value of 0.19 (Figure 5.5) meaning that the 1 million baht worth rice output will involve the direct and indirect employment as high as 0.19 million baht value. The next most important sectors in this aspect included GDL (0.18), garage (0.11), longan (0.11), drinking water and water supply (0.08), respectively. The rice sector was also the most significant in generating both

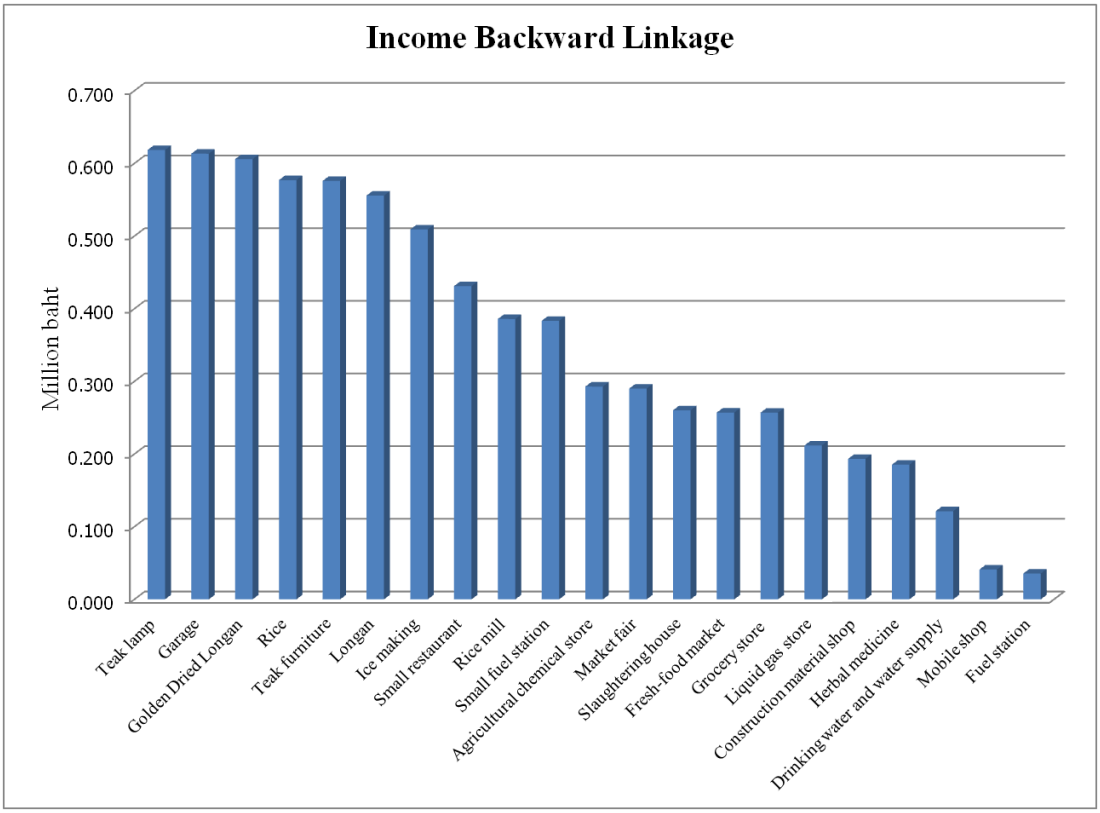

Figure 5.3 Incomes backward linkage

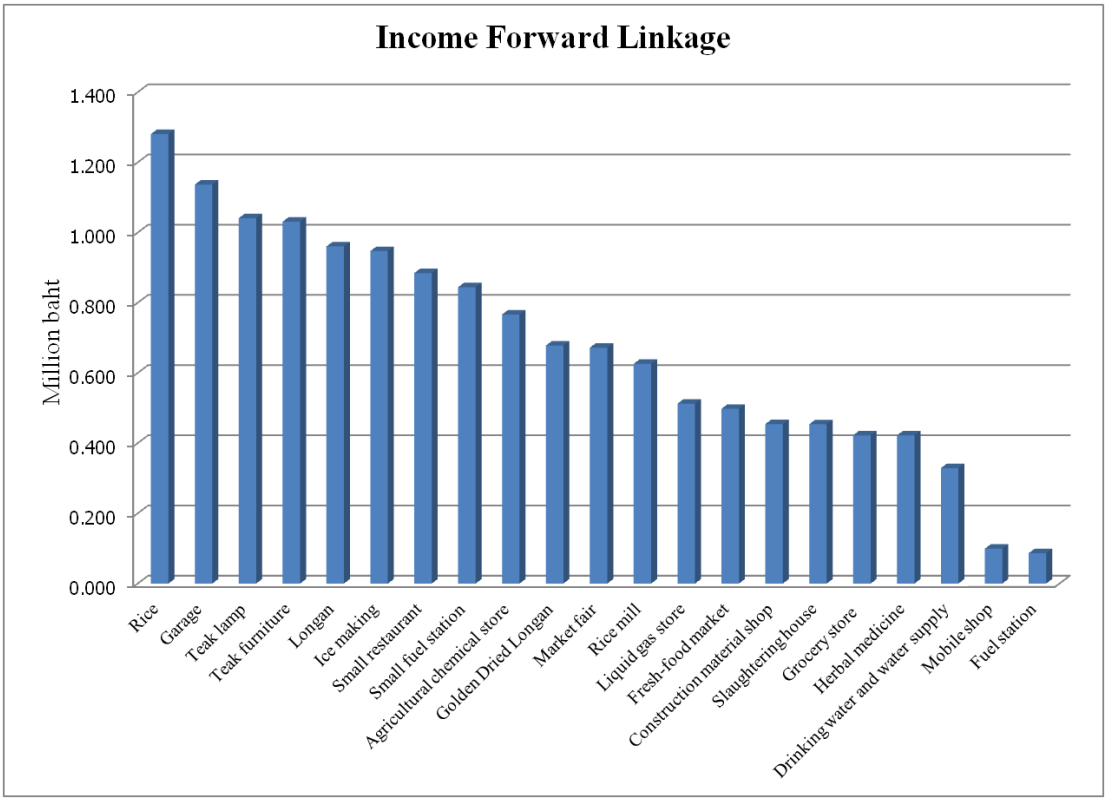

Figure 5.4 Incomes forward linkage

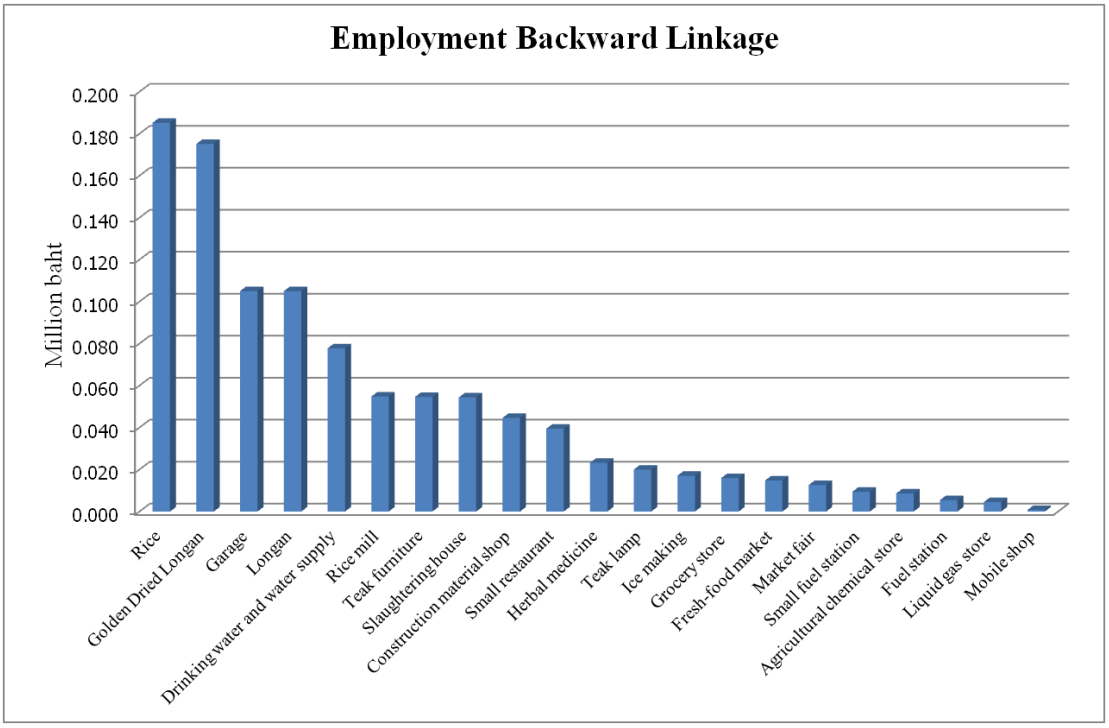

Figure 5.5 Employments backward linkage

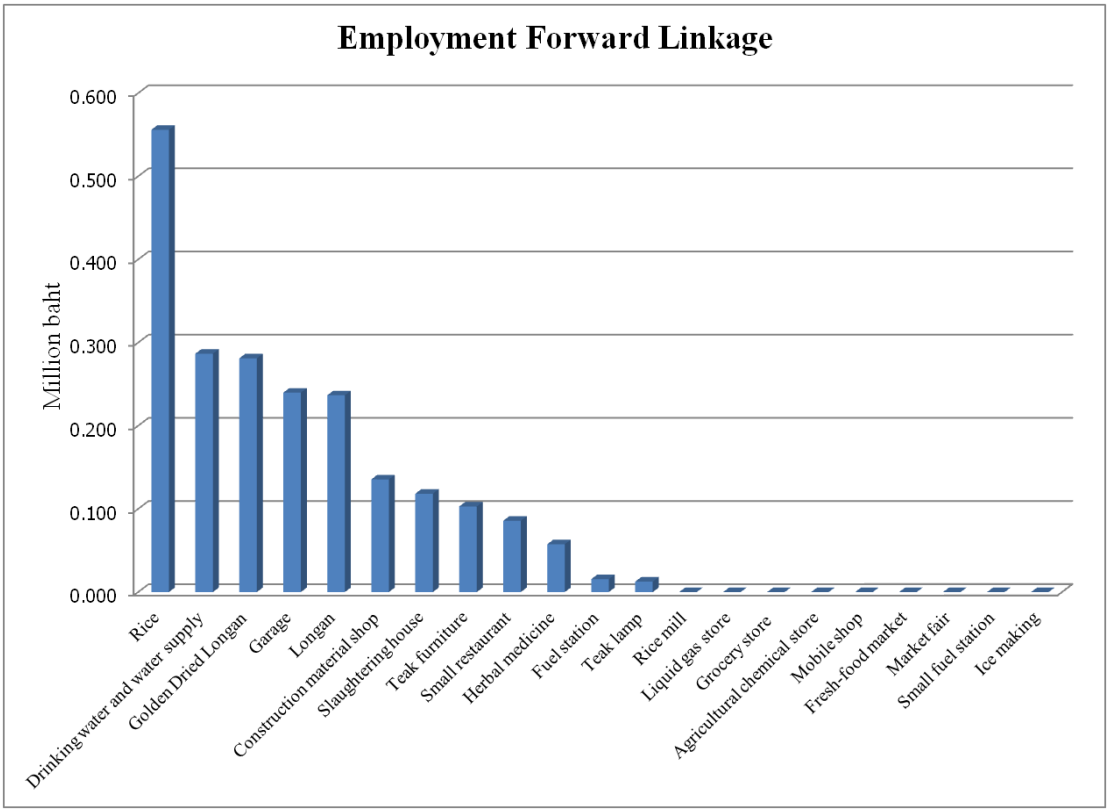

Figure 5.6 Employments forward linkage

direct and indirect employment in its forward linkages with the employment forward linkages value of 0.56 (Figure 5.6) as its one million baht output value will be associated with the direct and indirect employment in its forward linkages sectors at the value of 0.56 million baht. The next most significant local sectors in this nature were drinking water and water supply (0.29), GDL (0.28), garage (0.24), and longan (0.24), respectively.

By means of comparative analysis, the GDL sector was found to have the strongest impacts on local source of factor inputs as the backward linkages but have the weakest relationship with its forward linkages, when compared to all other local sectors. This implies that the increase in GDL production will generate a derived demand for factor inputs available locally, but the increase in output will be destined limitedly to its own final output characteristics. Its forward linkages industries are usually exported to domestic markets outside Tambon. In the aspect of the impacts of the GDL operations on community's income from the use of local factor inputs or backward linkages, the GDL sector can create a high impact particularly on the four important local non-farm sectors including teak lamp, garage, teak furniture, and GDL. The important local agricultural sectors in terms of income impacts thus are the rice and the longan sectors. Meanwhile, the local sectors having strong impacts on forward and backward linkages appear to be those involving farming and agricultural raw materials namely rice, GDL, and longan.

5.2.2 The study on the impacts of GDL operations on other local sectors was based on the criteria of total linkages value. The total backward linkages value of the GDL sector was 2.80 (Table 5.6) which comprised the most direct and indirect impacts on the GDL sector itself at the value of 1.06, followed by the sectors of

medium income household (0.26); high income household (0.24); longan (0.18); daily off-farm labor (0.16); household labor (0.15); savings group, cooperative, community enterprise, and network (0.08); fuel stations (0.06), Grocery store (0.05); fresh food market (0.04); agricultural chemical store, market fair, teak furniture, teak lamp, daily farm labor, and poor household (0.02); rice, rice mill, small restaurant, construction material shop, mobile shops, slaughtering house, ice making, temple, and Municipality Office (0.01). There are a number of local sectors that receive no impact from the GDL sector including liquid gas store, garage, drinking water and water supply, small fuel stations, traditional medicines, monthly off-farm labor, funeral welfare group, and school. In a nutshell, the expanding activity of the GDL sector will impact most strongly on the consumption extent of the medium and high income households as well as the daily off-farm labors.

The total forward linkages value of the GDL sector was calculated at 1.05 and the total impact was shared mostly by the following local sectors: saving/investment (0.20); savings group, cooperative, community enterprise, and network (0.18); and consumption of medium income household (0.13). The sectors that get relatively small impacts are longan (0.04), rice (0.02), off-farm labor (0.02), teak furniture (0.01), teak lamp (0.01), and slaughtering house (0.01).

The study on the GDL's impacts on income of other local sectors was based on the total linkages value, both backward and forward. Both values are comparable at 0.61 and 0.68 levels. The total backward linkages value of the GDL sector at 0.61 rendered the most impact on this sector itself at 0.37 value followed by the sectors of longan (0.06), high income household (0.06), and medium income household (0.05), respectively (Table 5.6). The reason for poor households not getting any impact from

the GDL sector is the fact that most population in Tambon Makhuea Chae belong to the medium income group with 23,000 – 100,000 baht annual income and the high income group with more than 100,000 baht annual income (Table 4.3). Most of the total forward linkages value of the GDL sector was shared by this sector itself (0.37) and the rest by the sectors of investment and high income household (0.07 each); savings group, cooperative, community enterprise, and network (0.06); and medium income household (0.05). Therefore, the GDL sector can create positive impact on high income households more than on medium income households and none at all on the poor families. Furthermore, it contributes positive impact on the savings, cooperative, community enterprise, and network including the GDL processing operators in the form of profit or saving enabled by the producer's return which in turn can be used for strengthening as well as enabling the self-reliance capacity of the GDL processing community enterprises in the long run.

The investigation on the impacts of the GDL sector on the employment in other sectors locally was also made in reference to the total employment backward linkages and the total employment forward linkages which were found to the values of 0.18 and 0.28, respectively. It should be noted that these values cannot be applied to the employment of those labors residing outside the Tambon especially the large number of peeling and pitting labor from external source which were needed to compensate for the scarce local daily off-farm labors and to speed up the longan fruit peeling and pitting operation for the fruit flesh drying process within the same day. The sector found to get the strongest positive impact on the employment of factor inputs as the GDL sector itself with the backward linkages value of 0.15, followed by the sectors of longan production (0.02); and savings group, cooperative, community enterprise, and

network (0.01). The direct impacts on the employment in the GDL sector itself involved the peeling and pitting labors to prepare the fruit flesh for drying process, while the indirect impacts was associated with the employment of labors in the longan production sector to supply raw material for the GDL sector. The largest impact on the employment in the forward linkages also occurred in the GDL sector itself at the value of 0.15 which was trailed by the following local sectors: savings group, cooperative, community enterprise, and network (0.03), GDL producer's return in the form of profit or saving (0.03); high income household (0.03); medium income household (0.03); longan production (0.01), and household labor (0.01). Apparently, the GDL sector could generate the most positive employment impact on backward linkages of raw material supply or the longan production sector. Any supports for the GDL sector therefore will help not only the local community enterprises but also the local and out-of-Tambon longan cultivators that supply the raw materials. In addition to the raw materials, the GDL sector also makes spending to other sectors for the purchase of goods and services such as fuel wood from died or no-use parts of longan trees which is mostly imported from outside the Tambon and which generates the fuel wood trading occupation; repair of manufacturing equipment like oven, drying tray, iron pipe for transmitting heat to oven chamber, and fan for heat diffusion; cooking gas for further drying of oven-dried longan flesh in case there is not enough solar heat to reduce moisture in open air condition; gasoline for transportation of fresh fruits to peeling and pitting operation site; repair of trucks used in GDL activities. It is thus clear that the GDL sector has a great role in utilizing local resources and contributing to an increase in employment and income in the local community.

In essence, the study on the economic impacts of the GDL sector on backward linkages especially the raw material source and forward linkages in terms of employment and income revealed that this sector was crucial in the local economy as it generated the highest value addition, produced the largest output value, and affected the most the backward linkages for use of factor inputs, in comparison with all other sectors in the Tambon. The impacts of the GDL sector on the backward linkages in the aspect of income was the third strongest after the teak lamp and the garage sectors, and that in the aspect of employment was the second highest next to the rice sector. It is also worth highlighting the roles of the GDL sector in the local agricultural economy regarding the demand for fresh longan fruits for raw material in the glut harvesting season thus helping improve the price particularly of the off-grade fruits and consequently the income of longan growers, and the employment of peeling and pitting labors thus helping improve household income of the off-farm workers in all age groups.

Table 5.4 The Leontief Inverse Matrix of Tambon Makhuea Chae

Sector	1	2	3	4-32	33	34	35
1=Rice	1.01	0.01	0.01	…	0.03	0.02	0.02
2=Longan	0.03	1.03	0.17	…	0.02	0.03	0.03
3=GDL	0.05	0.05	1.06	…	0.05	0.07	0.08
4-32	⋮	⋮	⋮	⋮	⋮	⋮	⋮
33=Poor households (annual income less than 23,000 baht)	0.02	0.02	0.02	…	1.02	0.02	0.02
34=Medium income households (annual income 23,000 – 100,000 baht)	0.24	0.22	0.26	…	0.16	1.15	0.17
35=High income households(annual income more than 100,000 baht)	0.20	0.19	0.24	…	0.15	0.14	1.17
Total	2.50	2.53	2.80	…	2.60	2.47	2.70

Source: Survey, 2012

Note: Detail in Appendix table 4

Table 5.5 The Output Inverse Matrix of Tambon Makhuea Chae

Sectors	1	2	3	4-32	33	34	35	**Total**
1=Rice	1.05	0.10	0.11	⋯	0.02	0.48	0.38	3.26
2=Longan	0.02	1.05	0.54	⋯	0.00	0.17	0.21	2.64
3=GDL	0.02	0.04	1.05	⋯	0.00	0.13	0.20	1.94
4-32	⋮	⋮	⋮	⋮	⋮	⋮	⋮	
33=Poor households (annual income less than 23,000 baht)	0.12	0.24	0.26	…	1.01	0.44	0.48	4.35
34=Medium income households (annual income 23,000 – 100,000 baht)	0.06	0.12	0.11	…	0.00	1.15	0.17	2.30
35=High income households(annual income more than 100,000 baht)	0.06	0.13	0.11	⋯	0.00	0.16	1.19	2.44

Source: Survey, 2012

Note: Detail in Appendix table 5

Table 5.6 Valued Added, Gross Output Value and Linkages in SAM

No	Sector	1=VA	2=TO	1/2	3.TBL	4.TFL	5.TL	6.IBL	7.IFL	8.TIL	9.EBL	10.EFL	11.TEL
1	Rice	5.82	14.82	0.39	2.50	3.26	5.76	0.58	1.28	1.86	0.19	0.56	0.74
2	Longan	18.25	50.14	0.36	2.53	2.64	5.17	0.56	0.96	1.52	0.10	0.24	0.34
3	Golden brown dried longan	56.07	160.54	0.35	2.80	1.94	4.74	0.61	0.68	1.28	0.18	0.28	0.46
4	Rice mill	1.99	12.12	0.16	2.23	3.81	6.04	0.39	0.63	1.01	0.05	0.00	0.05
5	Small restaurant	2.97	11.90	0.25	2.41	3.54	5.95	0.43	0.88	1.32	0.04	0.09	0.13
6	Construction material shop	2.23	16.67	0.13	1.56	3.40	4.96	0.19	0.45	0.65	0.04	0.14	0.18
7	Liquid gas store	0.62	4.14	0.15	1.54	3.45	4.99	0.21	0.51	0.72	0.00	0.00	0.00
8	Grocery store	4.28	37.09	0.12	1.96	3.66	5.62	0.26	0.42	0.68	0.02	0.00	0.02
9	Agricultural chemical store	1.07	5.33	0.20	1.81	3.80	5.61	0.29	0.77	1.06	0.01	0.00	0.01
10	Garage	0.72	1.67	0.43	2.52	2.64	5.16	0.61	1.14	1.75	0.11	0.24	0.34
11	Drinking water and water supply	0.36	4.17	0.09	1.30	3.79	5.10	0.12	0.33	0.45	0.08	0.29	0.36
12	Mobile shops	0.28	9.70	0.03	1.10	3.42	4.53	0.04	0.10	0.14	0.00	0.00	0.00
13	Fresh food market	6.20	43.03	0.14	1.83	3.46	5.28	0.26	0.50	0.75	0.01	0.00	0.01
14	Market fair	3.01	16.03	0.19	1.78	3.57	5.35	0.29	0.67	0.96	0.01	0.00	0.01

Table 5.6 (Continued)

No	Sector	1=VA	2=TO	1/2	3.TBL	4.TFL	5.TL	6.IBL	7.IFL	8.TIL	9.EBL	10.EFL	11.TEL
15	Fuel station	1.20	48.56	0.02	1.09	3.49	4.57	0.04	0.09	0.12	0.01	0.02	0.02
16	Small fuel stations	0.10	0.36	0.27	1.96	3.15	5.11	0.38	0.84	1.23	0.01	0.00	0.01
17	Slaughtering house	1.96	10.83	0.18	1.69	2.51	4.20	0.26	0.45	0.71	0.05	0.12	0.17
18	Teak furniture	12.82	32.16	0.40	2.46	2.59	5.05	0.58	1.03	1.61	0.05	0.10	0.16
19	Teak lamp	19.55	45.28	0.43	2.57	2.41	4.98	0.62	1.04	1.66	0.02	0.01	0.03
20	Herbal medicines	0.79	6.19	0.13	1.46	3.30	4.76	0.19	0.42	0.61	0.02	0.06	0.08
21	Ice making	2.18	6.22	0.35	2.28	2.70	4.98	0.51	0.95	1.46	0.02	0.00	0.02
22	rent and use of land, commercial buildings, etc.	0.00	2.06	0.00	3.57	3.50	7.06	0.41	0.00	0.41	0.02	0.00	0.02
23	household labor	0.00	65.37	0.00	3.57	3.86	7.44	0.41	0.00	0.41	0.02	0.00	0.02
24	farm labor (daily)	0.00	7.02	0.00	3.57	2.95	6.52	0.41	0.00	0.41	0.02	0.00	0.02
25	off-farm labor (daily)	0.00	25.27	0.00	3.58	1.72	5.30	0.42	0.00	0.42	0.02	0.00	0.02
26	off-farm labor (monthly)	0.00	13.34	0.00	3.49	3.50	6.99	0.39	0.00	0.39	0.02	0.00	0.02
27	Savings group, cooperative, and community enterprise network	0.00	62.58	0.00	3.65	3.41	7.07	0.00	0.00	0.00	0.09	0.00	0.09
28	Funeral welfare group	0.00	5.29	0.00	3.64	3.58	7.22	0.00	0.00	0.00	0.02	0.00	0.02
29	Temple	0.00	15.74	0.00	1.08	4.39	5.48	0.00	0.00	0.00	0.00	0.00	0.00

Table 5.6 (Continued)

No	Sector	1=VA	2=TO	1/2	3.TBL	4.TFL	5.TL	6.IBL	7.IFL	8.TIL	9.EBL	10.EFL	11.TEL
30	School	0.33	3.80	0.09	2.22	1.41	3.63	0.25	0.12	0.37	0.10	0.12	0.22
31	Municipality Office	0.62	53.84	0.01	1.40	3.45	4.85	0.06	0.04	0.10	0.02	0.04	0.06
32	Investment	0.00	161.81	0.00	3.51	3.50	7.01	0.45	0.00	0.45	0.05	0.00	0.05
33	Poor households (annual income less than 23,000 baht)	2.11	11.30	0.19	2.60	4.35	6.95	0.39	1.00	1.38	0.02	0.00	0.02
34	medium income households (annual income 23,000 – 100,000 baht)	61.23	310.79	0.20	2.47	2.30	4.77	0.39	0.65	1.04	0.02	0.00	0.02
35	high income households(annual income more than 100,000 baht)	57.48	244.39	0.24	2.70	2.44	5.14	0.45	0.81	1.26	0.02	0.00	0.02

Source: Survey, 2012

Note: 1. VA =Value Added (Million baht)
2. TO =Total Output (Million Baht)
3. TBL = Total Backward Linkages
4. TFL = Total Forward Linkages
5. TL =Total Linkages
6. IBL =Income Backward Linkages
7. IFL =Income Forward Linkages
8. TIL =Total Income Linkages
9. EBL =Employment Backward Linkages
10. EFL=Employment Forward Linkages
11. TEL=Total Employment Linkage

Table 5.7 Linkages of GDL

No	Sector	Total Backward Linkage	Total Forward Linkage	Income Backward Linkage	Income Forward Linkage	Employment Backward Linkage	Employment Forward Linkage
1	Rice	0.01	0.02	0.00	0.01	0.00	0.00
2	Longan	0.17	0.04	0.06	0.01	0.02	0.01
3	Golden brown dried longan	1.06	1.05	0.37	0.37	0.15	0.15
4	Rice mill	0.01	0.01	0.00	0.00	0.00	0.00
5	Small restaurant	0.01	0.00	0.00	0.00	0.00	0.00
6	Construction material shop	0.02	0.00	0.00	0.00	0.00	0.00
7	Liquid gas store	0.00	0.00	0.00	0.00	0.00	0.00
8	Grocery store	0.05	0.01	0.01	0.00	0.00	0.00
9	Agricultural chemical store	0.02	0.00	0.00	0.00	0.00	0.00
10	Garage	0.00	0.00	0.00	0.00	0.00	0.00
11	Drinking water and water supply	0.00	0.00	0.00	0.00	0.00	0.00
12	Mobile shops	0.01	0.00	0.00	0.00	0.00	0.00
13	Fresh food market	0.04	0.00	0.01	0.00	0.00	0.00
14	Market fair	0.02	0.00	0.00	0.00	0.00	0.00
15	Fuel station	0.06	0.00	0.00	0.00	0.00	0.00
16	Small fuel stations	0.00	0.00	0.00	0.00	0.00	0.00
17	Slaughtering house	0.01	0.00	0.00	0.00	0.00	0.00

Table 5.7 (Continued)

No	Sector	Total Backward Linkage	Total Forward Linkage	Income Backward Linkage	Income Forward Linkage	Employment Backward Linkage	Employment Forward Linkage
18	Teak furniture	0.02	0.01	0.01	0.00	0.00	0.00
19	Teak lamp	0.03	0.01	0.01	0.00	0.00	0.00
20	Herbal medicines	0.00	0.00	0.00	0.00	0.00	0.00
21	Ice making	0.01	0.00	0.00	0.00	0.00	0.00
22	rent and use of land, commercial buildings, etc.	0.00	0.00	0.00	0.00	0.00	0.00
23	household labor	0.15	0.04	0.00	0.01	0.00	0.01
24	farm labor (daily)	0.02	0.00	0.00	0.00	0.00	0.00
25	off-farm labor (daily)	0.16	0.02	0.00	0.01	0.00	0.00
26	off-farm labor (monthly)	0.00	0.01	0.00	0.00	0.00	0.00
27	Savings group, cooperative, and community enterprise network	0.08	0.18	0.00	0.06	0.00	0.03
28	Funeral welfare group	0.01	0.00	0.00	0.00	0.00	0.00
29	Temple	0.01	0.00	0.00	0.00	0.00	0.00
30	School	0.00	0.00	0.00	0.00	0.00	0.00
31	Municipality Office	0.01	0.00	0.00	0.00	0.00	0.00
32	Investment	0.28	0.20	0.00	0.07	0.00	0.03
33	Poor households (annual income less than 23,000 baht)	0.02	0.00	0.00	0.00	0.00	0.00
34	medium income households (annual income 23,000 – 100,000 baht)	0.26	0.13	0.05	0.05	0.00	0.02
35	high income households (annual income more than 100,000 baht)	0.24	0.20	0.06	0.07	0.00	0.03

Table 5.6 (Continued)

No	Sector	Total Backward Linkage	Total Forward Linkage	Income Backward Linkage	Income Forward Linkage	Employment Backward Linkage	Employment Forward Linkage
	import						
	Total Linkage of GDL	2.80	1.94	0.61	0.68	0.18	0.28

Source: survey, 2012

5.3 The analysis of policy impacts through CGE Model

The CGE model was employed for the analysis of policy impacts especially from the minimum wage and budget allocation perspectives on the GDL sector in particular and the local economy in general under different scenarios and under the basic assumption that the impacts can be either positive or negative.

The operational assumptions for CGE model application are presented below.

- Fixed amount of money circulation in the studied area.

- The Elasticity of Substitution (σ) between factor inputs equals or approach zero (sigma = 0 because of production using Leotife's input-output technique), due to the facts that, in the GDL sector, fresh longan fruit is the only kind of raw material and the peeling and pitting labors cannot be replaced by efficient peeling and pitting tools, and fuel wood is the most suitable source of heating energy to turn out beautiful gold color dried longan flesh.

- Fixed Elasticity of Transformation (η) because the producers cannot use the existing factor inputs for production of other products in the short run.

- The only condition for change in this model is the change in GDL production or output affected by the following policies:

- The internal variables in this model include the wages for daily farm labor, daily off-farm labor, monthly off-farm labor, and the intermediate input costs

- The social institutions in the community receiving money transfer from the government are the savings group, the village fund, the community enterprises group, and wood products processing cooperative

- Household consumption differs among the three groups namely poor household (less than 23,000 baht annual income), medium income household (23,000

– 100,000 baht annual income), and high income household (more than 100,000 baht annual income)

- Government's money injection into the Tambon economy can be through the GDL related community or the budget for the Tambon Municipality Office

Consequently, the model calculations of the policy impacts were performed under the following scenarios:

1) Increase in minimum wage to 300 baht/day.

2) Changes in GDL's intermediate input cost.

3) Increase in money supply for village fund or community enterprises.

4) Increase in money supply directly for the GDL processors.

5) Increase in government budget allocation to the Tambon Municipality Office.

The results of model calculation are detailed below.

1. Scenario A: Impacts of increase in minimum wage rate to 300 baht/day

The government's policy to increase the minimum daily wage rate to 300 baht has the objectives to provide poverty safety net for the poor workers to escape the severe poverty and have adequate income to afford the basic spending, as well as to help the labor class to have a better life quality under the condition of general economic growth. This policy will affect all economic sectors in Tambon Makhuea Chae. The increase from the existing official Lamphun Provincial wage rate at 238 baht to 300 baht per day means the 27 % increase in labor cost and income. The increase in personal and household income of labors will generate positive impacts on other sectors from the greater extent of consumption expenditure or the more

purchasing power of consumers as far as the government can control the consumer products' prices to rise reasonably. The increase in labor cost encourage the producers/firms to substitute skilled and educated workers for the unskilled and less educated alternatives to make the money worth. The negative impacts are likely to occur with the increase in labor cost if the producers/firms have no savings or working capital to pay for the increased cost and thus cut down the production volume resulting in lowering economic activities in all other sectors. On the contrary, if the producers/firms can have enough capital to finance the increased cost, their continuing operations will still enable the growth in other sectors for being their backward and forward linkages.

The policy impacts may vary according to the different assumed conditions.

A1: Wage rate increases by 27 % and producers/firms cut down labor employment due to the unavailability of working capital or the absence of government subsidy.

This will stunt the growth of all economic sectors by 19.4 % (Table 5.8) on the average. The most affected will be the savings group, cooperative, community enterprise, and network sector since its production will be reduced by 44.4 %. The GDL sector will shrink by 41.2 %, so will the sectors of high income household (24.6 %), monthly off-farm labor (23.8%), rent and use of land, commercial buildings, etc (23.7 %); daily off-farm labor, and house hold labor (23.4 %); and medium income household (23.2%). On the contrary, the least affected sectors will be temple, small fuel stations, and mobile shops, respectively.

This policy will hurt the most the labor-intensive production sector like the GDL, if there is not enough working capital or no government support. In the

Table 5.8 Impacts of increase in minimum wage on products

No	Sector	increase in wage to 300 baht/day=27%	
		A1	A2
1	Rice	0.868	1.019
2	Longan	0.865	1.020
3	Golden brown dried longan	0.588	1.076
4	Rice mill	0.911	1.009
5	Food shop	0.926	1.006
6	Construction material shop	0.965	0.999
7	Liquid gas store	0.961	0.999
8	Grocery store	0.944	1.004
9	Agricultural chemical store	0.950	1.002
10	Garage	0.828	1.029
11	Drinking water and water supply	0.976	0.998
12	Mobile shop	0.992	0.998
13	Fresh food market	0.953	1.004
14	Market fair	0.950	1.002
15	Fuel station	0.994	0.999
16	Small fuel station	0.917	1.006
17	Slaughtering house	0.942	1.005
18	Teak furniture	0.780	1.039
19	Teak lamp	0.783	1.038
20	Herbal medicine	0.929	1.005
21	Ice making	0.871	1.017
22	Rent and use of land, commercial buildings, etc.	0.763	1.042
23	Household labor	0.766	1.041
24	Farm labor (daily)	0.766	1.039
25	Off-farm labor (daily)	0.763	1.040
26	Off-farm labor (monthly)	0.762	1.041
27	Savings group, cooperative, and community enterprise network	0.556	1.082
28	Funeral welfare group	0.773	1.040
29	Temple	0.998	0.996
30	School	0.954	1.002
31	Municipality Office	0.878	1.020
32	Investment	0.776	1.038
33	Poor households (annual income less than 23,000 baht)	0.907	1.009
34	Medium income households (annual income 23,000 – 100,000 baht)	0.768	1.040
35	High income households(annual income more than 100,000 baht)	0.755	1.044
	Total Products	0.806	1.033

Source: Calculation using KS-CGE model Type III in Matlab

Note: A1= No increase in money supply (no producers' investment)

A2=increased money supply to all sectors by private investment (increase in producers' investment by 27%)

light of production reduction, the high income household sector which comprises mostly the GDL processors will get lower household income and all labors working in labor-intensive industries will be adversely affected such as the peeling and pitting labor for GDL, the longan drying oven attendants, and workers in teak lamp and teak furniture sectors. The sectors receiving less or no impact mostly involve services or limited labor employment or use of household labor or are social institutions.

A2: Wage rate and money supply increase by 27 %

Under the assumption that the government has the policy to assist SMEs by injection of money supply to increase the local capital fund by 27 % to enable all producers to shoulder the increased labor cost and sustain their operations. In this case, all economic sectors will grow on the average at the rate of 3.3 %. The largest growing sector will be the savings group, cooperative, community enterprise, and network at 8.2 %. This is followed by the sectors of GDL (7.6 %), high income household (4.4 %), rent and use of land, commercial buildings, etc (4.2 %), household labor as well as monthly off-farm labor (4.1 %); medium income household, daily off-farm labor, funeral welfare group (4.0 %); daily farm labor, teak furniture (3.9 %); saving/investment, teak lamp (3.9 %), respectively.

Under this wage and money supply increase situations, the positive impacts are related to the increase in investment and the higher labor income which in turn involve the money flows to other production and service sectors and enable the latter's growth. The sectors that get the negative impacts or no impact at all are temple, mobile shops, drinking water and water supply, small fuel stations, liquid gas

store, and construction material shop because they are social institutions or enterprises that employ few labors and use household labors in the most part.

Under the above conditions, all economic sectors on the average will have the growth rate reduction by 1.2 %. The hardest hit sector will be the savings group, cooperative, community enterprise, and network where the output will reduce by 2.0 %. The next largest output reduction will occur in the sectors of GDL (1.8 %); daily off-farm labor, daily farm labor, poor household (1.4 %); monthly off-farm labor, saving/investment, small fuel stations (1.3 %). The reasons for the output of production sectors and the income of owners of production factor become lower are that the increase in consumption causes the money to flow out of the local economy as most consumption goods are imported, considering the total import value of 595.13 million baht which accounts for 28.14 % of the total output value of 2,114.68 million baht. This outflow of money although is negative for the local economic growth, it contributes the expansion of the macro economy to produce more consumption goods.

In essence, under the condition of wage increase to 300 baht per day according to the recent policy, the CGE model calculation was carried out under 2 specific scenarios. **Scenario A1:** The government's promulgation of minimum wage rate without providing any measures to assist the SMEs in the studied area to shoulder the burden of increased cost will cause the saving or capital poor enterprises in Tambon Makhuea Chae to cut down production volume thus leading to the contraction of output of all sectors in general by 19.4 % on the average and that of the GDL sector in particular by 41.2 %. **Scenario A2:** If the government provides a financial measure to enable producers/firms to have more working capital to deal with

the increase in labor cost, the growth rate of all sectors under study on the average will increase by 3.3 % while that of the GDL sector will go up by 7.6 %. The final impacts of wage increase and consumption increase will be manifested by the outflow of money from the Tambon and the shrinkage of all local economic sectors meaning that the policy to increase the minimum wage rate will render no positive impacts on the local economy. Part of the higher household income as the result of increased wage rate will be spent on imported consumption goods and services and thus benefiting the capital intensive industrial sector at the macro level. The outflow of money from the local system will stunt or even negate the growth of local production sectors and eventually will lead to lowered employment level, decreased household income, and then lesser extent of household consumption.

2. Scenario B: Impacts of the change in intermediate input cost of the GDL sector

The relevant intermediate inputs are fresh longan raw material, longan drying energy from fuel wood and LPG for cooking, food and beverage provision to labors, fuel for transportation activities, drinking water and water supply, communications, and production waste treatments. With the increase in costs, producers have to pay more to other sectors meaning that the money supply in the local economic system will be increased. Thus, under Scenario B, the increase in the intermediate input cost by 20, 40, and 60 % will have effects on the local economy at varying extent. However, the GDL producers are price takers in competitive market. They equate marginal value product to input prices. With the higher intermediate input prices, less input is used and thus the output of GDL declines. Consequently, other sectors in the

Tambon will be directly and indirectly affected. The sensitivity analysis in this study was thus performed under 3 specific scenarios.

Scenario B1: Intermediate input cost increase by 20 %

The calculated results indicate the average growth rate of all production sectors will decline by 5.2 % (Table 5.9). The sector affected the most is the GDL in which production will decrease by 6.9 %, followed by the sectors of saving group, cooperative, community enterprise, and network (6.5%), and saving or investment (6.0 %). The impact on factor input sectors will also be negative. Reduction in income by 6.1 % will occur in the sectors of rent and use of land, commercial buildings, etc; household labor; daily farm labor; and daily off-farm labor. Monthly off-farm labor sector will get a decrease in income by 7.3 % while the high income household, medium income household, as well as the poor household sectors will experience the drop in income level by 6.1, 6.0, and 4.4 %, respectively.

Scenario B2: Intermediate input cost increase by 40 %

Under this scenario, the overall growth rate of all sectors will decrease by 8.1 %. The GDL sector is adversely affected most as its production will drop by 10.8 % while the production of saving group, cooperative, community enterprise, and network will decline by 10.1 %, and the transaction in saving or investment sector will shrink by 9.4 %. The negative impact in terms of income decrease will occur in such factor input sectors as rent and use of land, commercial buildings, etc (9.5 %); household labor, daily farm labor (9.4 %); daily off-farm labor (9.5 %); monthly off-farm labor (11.3 %), high income household (9.4 %), medium income household (9.3 %), and poor household (6.8 %).

Table 5.9 Impacts of intermediate cost increase on products

No	Sector	**intermediate cost increase**		
		B1: 20%	B2: 40%	B3: 60%
1	Rice	0.948	0.920	0.902
2	Longan	0.948	0.919	0.901
3	Golden brown dried longan	0.931	0.892	0.868
4	Rice mill	0.956	0.932	0.917
5	Food shop	0.956	0.931	0.916
6	Construction material shop	0.974	0.960	0.952
7	Liquid gas store	0.973	0.958	0.948
8	Grocery store	0.966	0.946	0.935
9	Agricultural chemical store	0.968	0.950	0.939
10	Garage	0.936	0.901	0.879
11	Drinking water and water supply	0.957	0.933	0.919
12	Mobile shop	0.993	0.989	0.987
13	Fresh food market	0.967	0.948	0.937
14	Market fair	0.967	0.949	0.937
15	Fuel station	0.991	0.987	0.984
16	Small fuel station	0.958	0.934	0.920
17	Slaughtering house	0.953	0.927	0.911
18	Teak furniture	0.937	0.902	0.880
19	Teak lamp	0.940	0.906	0.885
20	Herbal medicine	0.961	0.939	0.926
21	Ice making	0.949	0.920	0.902
22	Rent and use of land, commercial buildings, etc.	0.939	0.905	0.884
23	Household labor	0.939	0.906	0.885
24	Farm labor (daily)	0.939	0.906	0.885
25	Off-farm labor (daily)	0.939	0.905	0.883
26	Off-farm labor (monthly)	0.927	0.887	0.862
27	Savings group, cooperative, and community enterprise network	0.935	0.899	0.876
28	Funeral welfare group	0.940	0.906	0.885
29	Temple	0.998	0.997	0.996
30	School	0.952	0.925	0.909
31	Municipality Office	0.942	0.910	0.890
32	Investment	0.940	0.906	0.885
33	Poor households (annual income less than 23,000 baht)	0.956	0.932	0.916
34	Medium income households (annual income 23,000 – 100,000 baht)	0.940	0.907	0.886
35	High income households(annual income more than 100,000 baht)	0.939	0.906	0.884
	Total Products	0.9481	0.9193	0.9014

Source: Calculation using KS-CGE model Type III in Matlab

Scenario B3: Intermediate input cost increases by 60 %

The results from model calculation show that the growth rate on the average of all production sectors will reduce by 9.9 %. Similarly, the GDL sector will be negatively affected the most as its production is expected to reduce by 13.2 %, followed by the sectors of saving group, cooperative, community enterprise, and network (12.4 % decrease), and saving or investment (11.5 % decrease). Reduction in income will occur in the factor input sectors including rent and use of land, commercial buildings, etc (11.6 %); household labor, daily farm labor (11.5 %); and monthly off-farm labor (13.8 %). The high income, medium income, as well as poor household groups will also face the decline in income by 11.6, 11.4, and 8.4 %, respectively.

It can be seen that the increase in intermediate input cost by 20 - 60 % will cause the reduction in the GDL sector's growth rate. Specifically, the increase in such cost by 20, 40, and 60 % then the output of the GDL sector will decrease 6.9, 10.8, and 13.2 %, respectively. Under this scenario, however, all other sectors will face the reduction in growth rate. From Table 5.9, it is found that when the production cost of the GDL sector increases by 20 %, the average growth rate of all sectors decreases by 5.2 %; when the cost of GDL increases by 40 %, the overall economy will have decrease in the growth rate by 8.1 %; when the cost of GDL increases by 60 %, the rate of output expansion in all sectors on the average will drop by 9.9 %.

The above calculation findings on the negative bearing of increase in production cost on the output level of the GDL sector can be further interpreted as the case of increasing returns to scale industry because the GDL output reduces less than the proportional increase in production cost, and this also implies that the GDL output

will expand greater than a unit of one if there is a reduction in a unit of production cost. This interpretation is consistent with the empirical findings in Chapter 6 (Table 6.13) that 39 out of 48 samples of GDL processors or 81.25 % of the total are operating in the increasing returns to scale range of production curve or function which is the range for policy intervention to encourage production expansion because an incremental increase in investment will result in a more than proportional incremental increase in producer's return.

From the previous analysis, it can also be concluded that the increase in production cost of the GDL sector will be corresponded by the economic shrinkage in general in all local sectors. This is because GDL is the sector having the highest backward linkage value (2.80) compared to other sectors (Table 5.6). The reduction in output level or production activities of the GDL sector will definitely have direct effect on other production sectors considering the GDL sector has to buy raw materials from longan sector, hire daily off-farm labor for longan fruit peeling and pitting operation, buy food and drinks from grocery store to provide for the longan drying workers, and fill gasoline at fuel stations for powering trucks to transport raw materials or products to market. Furthermore, the extent of the GDL sector's activities also has indirect effect on other sectors such as various labor groups that work for the longan sector, applying fertilizers, watering, spraying agricultural chemicals, and harvesting; and the local agricultural chemical supply stores that sell inputs to the longan sector.

3. Scenario C: Policy impacts of increased money supply to village fund or community enterprises which are the main formal credit source for GDL processors.

The local sectors eligible for the money transfer from the government are village fund, community enterprises group, savings group, and wood products processing cooperative. The village fund in this study is the community organization established under the National Village and Urban Community Fund Act, B.E. 2547 with the objective to be a source of revolving funds for occupational development, income and employment generation, expenditure minimization, or for the promotion and development activities leading to the welfare or other public benefits of people in village and urban communities Most village funds give lending not exceeding 20, 000 baht to each member and most borrowers use the loans for crop and livestock farming activities (Masawang, 2008). Generally, the government has transferred 1 million baht as initial or seed fund to each village fund. The community enterprise is defined as the community's business in the production of goods, provision of services or other activities, undertaken by a group of individuals who share common ways of making living and thus form themselves to do business together and have their organization registered with the Department of Agriculture Extension as required by the Community Enterprise Promotion Act, B.E. 2548 (Office of Small and Medium Enterprises Promotion, 2000). Various GDL processing community enterprises in Tambon Makhuea Chae have formed themselves into a community enterprise network to gain an access to low interest loans from the government for use as working capital in the GDL operations which means the money supply in the Tambon's economic system will be enlarged thus likely leading to the change in local economic growth.

Therefore, specific scenarios were determined for the increase in local money supply by 20, 40, 60, 80, and 100 %.

Scenario C1: Increase in money supply by 20 % in the Tambon's economic system through money transfer to the savings group, cooperative, community enterprise, and community enterprises' network sector.

In the light of this policy, output of all sectors will grow averagely by 11.1 % and inflation will increase by 9.6 %. The highest growth will take place in the savings group, cooperative, community enterprise, and community enterprises' network sector at 41.6 % followed by the sectors of GDL (20.3 %), high income household (15.2 %), medium income household (14.6 %), rent and use of land, commercial buildings, etc as well as monthly off-farm labor (13.3%), daily off-farm labor (13.2 %), household labor as well as daily farm labor (13.1 %), while the sector the grows least will be temple at 0.1 % (Table 5.10).

Scenario C2: Increase in money supply by 40 % in the Tambon's economic system through money transfer to village fund and production groups in the community.

The consequences will be the growth in all sectors averagely 19.5 % and the increase in inflation at 16.4 % The sector with the largest growth will be savings group, cooperative, community enterprise, and community enterprises' network at 77.7 %, followed by the sectors of GDL (34.4 %), high income household (26.9 %), medium income household (25.9 %), monthly off-farm labor (23.1 %), daily off-farm labor (22.8 %), and daily farm labor (22.6 %); while the least growth will take place in temple sector at 0.1 %.

Table 5.10 Impacts of increase in money transfer to cooperative, village fund and community enterprise on products

No	Sector	Money transfer				
		C1: 20%	C2: 40%	C3: 60%	C4: 80%	C5: 100%
1	Rice	1.065	1.111	1.145	1.171	1.192
2	Longan	1.065	1.111	1.144	1.170	1.191
3	Golden brown dried longan	1.203	1.344	1.447	1.528	1.592
4	Rice mill	1.043	1.072	1.094	1.111	1.124
5	Food shop	1.036	1.062	1.081	1.095	1.107
6	Construction material shop	1.016	1.026	1.033	1.037	1.041
7	Liquid gas store	1.021	1.036	1.048	1.057	1.065
8	Grocery store	1.030	1.051	1.068	1.082	1.093
9	Agricultural chemical store	1.024	1.041	1.053	1.063	1.070
10	Garage	1.089	1.152	1.199	1.236	1.267
11	Drinking water and water supply	1.013	1.023	1.031	1.037	1.042
12	Mobile shop	1.004	1.008	1.010	1.012	1.014
13	Fresh food market	1.023	1.039	1.051	1.060	1.068
14	Market fair	1.021	1.035	1.045	1.052	1.058
15	Fuel station	1.003	1.005	1.006	1.007	1.008
16	Small fuel station	1.042	1.071	1.094	1.111	1.125
17	Slaughtering house	1.028	1.048	1.062	1.073	1.082
18	Teak furniture	1.109	1.186	1.243	1.288	1.323
19	Teak lamp	1.105	1.178	1.232	1.272	1.305
20	Herbal medicine	1.029	1.047	1.059	1.067	1.073
21	Ice making	1.055	1.090	1.115	1.134	1.148
22	Rent and use of land, commercial buildings, etc.	1.133	1.231	1.307	1.367	1.417
23	Household labor	1.131	1.227	1.301	1.360	1.408
24	Farm labor (daily)	1.131	1.226	1.300	1.359	1.408
25	Off-farm labor (daily)	1.132	1.228	1.301	1.360	1.408
26	Off-farm labor (monthly)	1.133	1.231	1.307	1.367	1.417
27	Savings group, cooperative, and community enterprise network	1.416	1.777	2.098	2.390	2.659
28	Funeral welfare group	1.124	1.214	1.282	1.336	1.380
29	Temple	1.001	1.001	1.002	1.002	1.002
30	School	1.024	1.041	1.055	1.065	1.073
31	Municipality Office	1.072	1.126	1.169	1.204	1.233
32	Investment	1.093	1.152	1.193	1.223	1.245
33	Poor households (annual income less than 23,000 baht)	1.057	1.100	1.135	1.165	1.191
34	Medium income households (annual income 23,000 – 100,000 baht)	1.146	1.259	1.352	1.431	1.501
35	High income households(annual income more than 100,000 baht)	1.152	1.269	1.365	1.447	1.519
	Total Products	1.111	1.195	1.262	1.317	1.364

Source: Calculation using KS-CGE model Type III in Matlab

Scenario C3: Increase in money supply by 60 % in the Tambon's economic system through money transfer to village fund and production groups in the community.

This policy will enable the growth of all sectors on the average 26.2 % and render the increase in inflation 21.5 %. The highest growing sector will be saving group, cooperative, community enterprise, and community enterprises' network at 109.8 % and the next largest expanding sectors include GDL (44.7 %), high income household (36.5 %), medium income household (35.2 %), monthly off-farm labor (30.7 %), daily off-farm labor (30.1 %), and daily farm labor (30.0 %), respectively. The least growth again takes place in temple sector.

Scenario C4: Increase in money supply by 80 % in the Tambon's economic system through money transfer to village fund and production groups in the community.

This condition will enable the growth in all sectors averagely by 31.7 % and cause the inflation to rise 25.5 %. The largest growth will occur in savings group, cooperative, community enterprise, and community enterprises' network at 139.0 % which is trailed by the sectors of GDL (52.8 %), high income household (44.7 %), medium income household (43.1 %), monthly off-farm labor (36.7 %), daily off-farm labor (36.0 %), and daily farm labor (35.9 %). The temple sector will grow marginally at 0.2 %.

Scenario C5: Increase in money supply by 100 % in the Tambon's economic system through money transfer to village fund and producer groups in the community.

This policy will lead to a 36.4 % growth in all sectors on the average and a 28.9 % rise in inflation. The output will expand the most in the savings group, cooperative, community enterprise, and community enterprises' network sector by 165.9 % and the next largest output or income growth in the sectors of GDL (59.2 %), high income household (51.9 %), medium income household (50.1 %), monthly off-farm labor (41.7 %), daily off-farm labor as well as daily farm labor (40.8 %), respectively. The least growing sector will still be temple at 0.2 %.

Under all specific scenarios involving the transfer of government's money at various levels to support the sector comprising savings group, cooperative, community enterprise, and community enterprises' network, or other occupational groups, the output and income of various sectors are expected to grow and most substantially in the savings group, cooperative, community enterprise, and community enterprises' network sector which is followed from high to low impacts by the sectors of GDL, high income household, medium income household, monthly off-farm labor, daily off-farm labor, and daily farm labor, respectively. Although inflation will rise with these policy options, its rate of increase is lower than those of sectoral growth. It is indicated in SAM that the economic activities of the savings group, cooperative, community enterprise, and community enterprises' network sector at the value of 62.58 million baht will involve the money flows to the following sectors: GDL 25.63 million baht or 40.95 %, Grocery store 0.59 million baht or 0.94 %, teak furniture 8.26 million baht or 13.20 %, teak lamp 12.39 million baht or 19.80 %, poor household 0.45 million baht or 0.73 %, medium income household 6.47 million baht or 10.34 %, and high income household 8.78 million baht or 14.03 %.

From the analysis, it can be concluded that the injection of government's money into a local economy will foster the economic growth in various sectors locally including income increase in the daily off-farm labor, high income household, and medium income household sectors which in turn will lead to an increase in the consumption of goods and services in the industrial sector and hence eventually benefit the overall macro economy.

Scenario D: Impacts of government's money transfer directly to the GDL processing groups

The money transfer can be either the low interest loans from the government for use as working capital of the GDL processors or credit provision for the processors to improve drying ovens. This also means the increase of money supply in the Tambon's economic system which will have impacts on local economic growth. Therefore, five specific scenarios were determined for impacts analysis involving the increase in money transfer directly to the GDL sectors by 20, 40, 60, 80, and 100 %.

D1: Policy to increase money supply in the GDL sector by 20 % .

The consequences will be the growth in all sectors on the average 20.5 % and the rise in inflation 18.6 %. The largest growth will take place in the GDL sector at 6.67 % (Table 5.11) followed by the sectors of savings group, cooperative, community enterprise, and community enterprises' network (53.8 %), high income household (23.7 %), saving/investment (23.6 %), rent and use of land, commercial buildings, etc (23.0 %), monthly off-farm labor (22.9 %), daily off-farm labor as well as daily farm labor (22.5 %), and medium income household (22.2 %). The temple sector as a social institution will grow limitedly only by 0.1 %.

Table 5.11 Increase in money transfer for GDL on products

No	Sector	Money transfer				
		D1: 20%	D2: 40%	D3: 60%	D4: 80%	D5: 100%
1	Rice	1.124	1.218	1.291	1.351	1.402
2	Longan	1.116	1.200	1.262	1.312	1.351
3	Golden brown dried longan	1.677	2.318	2.937	3.542	4.136
4	Rice mill	1.080	1.139	1.184	1.220	1.250
5	Food shop	1.064	1.110	1.145	1.172	1.193
6	Construction material shop	1.023	1.037	1.045	1.051	1.054
7	Liquid gas store	1.030	1.050	1.063	1.072	1.078
8	Grocery store	1.052	1.090	1.119	1.143	1.163
9	Agricultural chemical store	1.042	1.071	1.092	1.108	1.121
10	Garage	1.146	1.249	1.325	1.383	1.428
11	Drinking water and water supply	1.023	1.041	1.055	1.066	1.076
12	Mobile shop	1.006	1.009	1.011	1.013	1.014
13	Fresh food market	1.040	1.067	1.088	1.104	1.116
14	Market fair	1.046	1.080	1.106	1.128	1.146
15	Fuel station	1.005	1.009	1.012	1.014	1.016
16	Small fuel station	1.068	1.115	1.149	1.173	1.192
17	Slaughtering house	1.053	1.092	1.123	1.147	1.168
18	Teak furniture	1.183	1.311	1.404	1.474	1.529
19	Teak lamp	1.173	1.290	1.372	1.431	1.475
20	Herbal medicine	1.059	1.102	1.134	1.159	1.180
21	Ice making	1.119	1.207	1.276	1.333	1.380
22	Rent and use of land, commercial buildings, etc.	1.230	1.404	1.543	1.659	1.757
23	Household labor	1.225	1.395	1.530	1.642	1.737
24	Farm labor (daily)	1.225	1.396	1.532	1.645	1.742
25	Off-farm labor (daily)	1.225	1.393	1.527	1.637	1.730
26	Off-farm labor (monthly)	1.229	1.403	1.543	1.658	1.757
27	Savings group, cooperative, and community enterprise network	1.538	2.003	2.424	2.817	3.192
28	Funeral welfare group	1.219	1.384	1.516	1.625	1.718
29	Temple	1.001	1.002	1.002	1.002	1.002
30	School	1.041	1.070	1.093	1.111	1.126
31	Municipality Office	1.117	1.206	1.277	1.336	1.386
32	Investment	1.236	1.427	1.590	1.735	1.867
33	Poor households (annual income less than 23,000 baht)	1.083	1.142	1.188	1.224	1.253
34	Medium income households (annual income 23,000 – 100,000 baht)	1.222	1.390	1.523	1.633	1.727
35	High income households(annual income more than 100,000 baht)	1.237	1.416	1.559	1.678	1.779
	Total Products	1.205	1.371	1.511	1.635	1.746

Source: Calculation using KS-CGE model Type III in Matlab

D2: Policy to increase money supply in the GDL sector by 40 %

This will cause all sectors to grow, on the average by 37.1 % while giving rise to 33.0 % increase in inflation. The sector that will expand the most is GDL, 131.8 %. The next largest growing sectors include savings group, cooperative, community enterprise, community enterprises' network (100.3 %), high income household (41.6 %), rent and use of land, commercial buildings, etc (40.4 %), monthly off-farm labor (40.3 %), daily farm labor (39.6 %), daily off-farm labor (39.3 %), and medium income household (39.0 %). The smallest growth will occur in the temple sector at 0.2 %.

D3: Policy to increase money supply in the GDL sector by 60 %

As the results, all sectors will grow averagely by 51.1 % and inflation will rise by 44.7 %. The largest growth will take place in the GDL sector at 193.7 % followed by the sectors of savings group, cooperative, community enterprise and network (142.4 %), high income household (55.9 %), rent and use of land, commercial buildings, etc as well as monthly off-farm labor (54.3 %), daily farm labor (53.2 %), daily off-farm labor (52.7 %), and medium income household (52.3 %); while the temple sector will grow the least at 0.2 %.

D4: Policy to increase money supply in the GDL sector by 80 %

As the consequences of this policy, all sectors will grow averagely by 63.5 % and the inflation will rise by 54. 8 %. The GDL sector itself will grow larger than any other sectors at 254.2 %. The next largest growing sectors will be savings group, cooperative, community enterprise, and community enterprises' network (181.7 %), high income household (67.8 %), rent and use of land, commercial buildings, etc (65.9 %), monthly off-farm labor (65.8 %), daily farm labor (64.5 %), daily off-farm

labor (63.7 %), and medium income household (63.3 %); while the smallest growing sector is temple at 0.2 %.

D5: Policy to increase money supply in the GDL sector by 100 %

This policy will enable the growth of all sectors on the average as high as 74.6 % and will cause the rise in inflation by 63.6 %. The GDL sector will be blessed by the largest growth by 313.6 %, followed by the sectors of savings group, cooperative, community enterprise, community enterprises' network (219.2 %), high income household (77.9 %), rent and use of land, commercial buildings, etc (75.7 %), monthly off-farm labor (75.5 %), daily farm labor (74.2 %), daily off-farm labor (73.0 %), and medium income household (72.7 %). The temple sector, however, will remain the least growing at 0.2 %.

Apparently, the government's injection of money into Tambon Makhuae Chae through the GDL sector will have a stronger impacts on local economic growth than that through the working of village fund, community enterprise, cooperative, or savings group; because in the latter case, the increased money supply will be channeled to various occupational groups and part of it will not be used for productive purpose but for consumption. The different policy impacts of increased money supply by 20, 40, 60, 80, and 100 % in the community between money transfer to village fund and various local community organizations and that to the GDL sector directly are the 11.1, 19.5, 26.2, 31.7, and 36.4 %, respectively, growth of all sectors in the former case (Table 5.10) and the 20.5, 37.1, 51.1, 63.5, and 74.6 %, respectively, in the latter case (Table 5.11). A total output value of 160.54 million baht of the GDL sector will involve the money transfers to the following sectors:

imports 70.72 million baht or 44.05 %, longan production 23.59 million baht or 14.69 %, daily off-

farm labor 23.25 million baht or 14.48 %, saving or profit 18.20 million baht or 11.34 %, household labor 14.62 million baht or 9.11 %, savings group, cooperative, and community enterprise' network group 6.59 million baht or 4.11 %, fuel stations 1.71 million baht or 1.07 %, Grocery store 1.36 million baht or 0.85 %, and so on.

5. Scenario E: Impacts of increase in budget spending by local government

The local government in this study is represented by the Tambon Municipality Office which currently has 53.84 million baht income out of which 44.64 million baht is the budget allocation from the central government and the rest is from local tax revenue. The Tambon Makhuea Chae Municipality Office generally spends most of it available budget on various projects and programs with the money transfers to such internal and social institution sectors as temple, school, cooperative or production groups as well as to sectors outside the Tambon mostly for the purchase of equipment and construction materials. Consequently, the present study sought to understand the impacts of increased spending by the local government under 5 specific scenarios involving the increase by 20, 40, 60, 80, and 100 %.

E1: Increase in the local government's spending by 20 %

This situation will lead to the growth of all sectors on the average by 4.7 %. The largest growing sector will be the Municipality Office itself by 16.9 % , (Table 5.12) which is trailed by the sectors of savings group, cooperative, community enterprise and network (10.3 %), GDL (9.6 %), high income household (6.1 %), and medium income household (5.7 %).

Table 5.12 Increase in municipality expenditure on products

No	Sector	increase in municipality expenditure				
		E1: 20%	E2: 40%	E3: 60%	E4: 80%	E5: 100%
1	Rice	1.031	1.063	1.096	1.130	1.165
2	Longan	1.032	1.064	1.097	1.131	1.166
3	Golden brown dried longan	1.096	1.194	1.294	1.397	1.503
4	Rice mill	1.021	1.042	1.064	1.087	1.110
5	Food shop	1.016	1.033	1.050	1.067	1.085
6	Construction material shop	1.008	1.016	1.024	1.032	1.041
7	Liquid gas store	1.010	1.020	1.030	1.041	1.052
8	Grocery store	1.013	1.026	1.039	1.053	1.067
9	Agricultural chemical store	1.011	1.023	1.035	1.048	1.060
10	Garage	1.034	1.069	1.105	1.141	1.178
11	Drinking water and water supply	1.001	1.002	1.003	1.004	1.006
12	Mobile shop	1.002	1.004	1.006	1.008	1.010
13	Fresh food market	1.011	1.022	1.033	1.044	1.056
14	Market fair	1.011	1.023	1.035	1.048	1.060
15	Fuel station	1.001	1.003	1.004	1.005	1.007
16	Small fuel station	1.020	1.040	1.061	1.082	1.104
17	Slaughtering house	1.012	1.024	1.036	1.049	1.061
18	Teak furniture	1.049	1.099	1.150	1.203	1.257
19	Teak lamp	1.051	1.103	1.157	1.212	1.268
20	Herbal medicine	1.017	1.034	1.051	1.069	1.088
21	Ice making	1.030	1.061	1.093	1.125	1.158
22	Rent and use of land, commercial buildings, etc.	1.055	1.112	1.170	1.230	1.291
23	Household labor	1.055	1.110	1.168	1.227	1.287
24	Farm labor (daily)	1.054	1.110	1.167	1.225	1.285
25	Off-farm labor (daily)	1.055	1.111	1.169	1.228	1.289
26	Off-farm labor (monthly)	1.054	1.110	1.167	1.225	1.285
27	Savings group, cooperative, and community enterprise network	1.103	1.209	1.317	1.428	1.542
28	Funeral welfare group	1.053	1.108	1.164	1.222	1.281
29	Temple	1.000	0.999	0.999	0.999	0.999
30	School	1.000	1.002	1.005	1.008	1.012
31	Municipality Office	1.169	1.345	1.529	1.721	1.922
32	Investment	1.052	1.105	1.160	1.216	1.274
33	Poor households (annual income less than 23,000 baht)	1.020	1.041	1.063	1.085	1.108
34	Medium income households (annual income 23,000 – 100,000 baht)	1.057	1.115	1.175	1.237	1.301
35	High income households(annual income more than 100,000 baht)	1.061	1.123	1.187	1.253	1.321
	Total Products	1.047	1.095	1.145	1.196	1.248

Source: Calculation using KS-CGE model Type III in Matlab

E2: Increase in the local government's spending by 40 %

The overall result will be the growth of all sectors averagely by 9.5 %. The Municipality Office in particular will grow the most by 34.5 % followed by the sectors of savings group, cooperative, community enterprise and network (20.9 %), GDL (19.4 %), high income household (12.3 %), and medium income household (11.5%), respectively.

E3: Increase in the local government's spending by 60 %

This will result in the expansion of all sectors on the average by 14.5 %. The largest growth will occur in Municipality Office sector by expanding 52.9 %. The next largest growing sectors are savings group, cooperative, community enterprise and network (31.7 %), GDL (29.4 %), high income household (18.7 %), and medium income household (17.5 %), respectively.

E4: Increase in the local government's spending by 80 %.

This extent of spending will be attended by the growth of all sectors averagely by 19.6 %. The Municipality Office sector will grow the most by 71.2 %, followed by the sectors of savings group, cooperative, community enterprise and network (42.8 %), GDL (39.7 %), high income household (25.3 %), and medium income household (23.7 %).

E5: Increase in the local government's spending by 100 %

This high level of spending will enable all sectors on the average to grow by 24.8 %. The Municipality Office sector itself will grow the most favorably by 92.2 %. The next largest growing sectors will be savings group, cooperative, community enterprise and network (54.2 %), GDL (50.3 %), high income household (32.1 %), and medium income household 30.1 %), respectively.

By comparison, the impacts of increased money supply in the context of Tambon Makhuea Chae on local economic growth will be weaker if the money transfer works through the local government's spending than through the village fund and various community groups or the GDL directly. This is because most part of the Tambon Makhuea Chae Municipality Office' spending was for imports at 43.81 million baht value constituting as high as 81.37 % of its available budget of 53.84 million baht. The Municipality Office in the same year spent the money in following local sectors: drinking water and water supply 0.54 million baht or 1.0 %, savings group, cooperative, community enterprise and network 0.20 million baht or 0.37 %, local temples 2.04 million baht or 3.78 %, local schools 3.45 million baht or 6.41 %; and for salary and wage 0.62 million baht or 1.15 %, as well as welfare supports for various households 3.16 million baht or 5.88 %. The temple sector however as a social institution receives no impact from the change in the local government's spending.

5.4 Summary

The analysis on the impacts of the GDL sector operations provided the conclusions that this sector employed relatively large extent of daily off-farm labors and used relatively more local factor inputs compared to other sectors. The GDL sector had the strongest impacts on the backward linkages but the weakest on the forward linkages. Therefore, the increase in GDL production will be associated with the increase in the use or employment of local factor inputs. The low GDL sector's impacts on the forward linkages came from the fact that most GDL products were exported to domestic markets outside Tambon. The strongest impact of the GDL

sector on the backward linkages was in terms of community income. The important local non-farm sectors in generating community income were found to be teak lamp, garage, teak furniture, and GDL. Meanwhile, the important local farming sectors in creating community income were rice and longan production. The study on the impacts of GDL sector on employment revealed the sectors with high employment impacts on the backward and forward linkages to be rice, GDL, and longan which involved farming and the use of farm output as raw material. The impacts of the GDL sector on longan sector as the result of raw material usage was positive for enabling more consumption in medium and high income households, including the daily off-farm labors and household labors, respectively.

The findings from the study on policy impacts consequential to the increase in minimum wage to 300 baht per day suggested that the household consumption can increase if the government has the measures to enable the GDL processors to get savings or working capital to compensate for the rise in labor cost. The final impacts of wage and consumption increases will be the flow of money out of the Tambon thus leading to the reduction in average growth of all local sectors. Therefore, the increase in the minimum wage ceiling will not generate positive impact on the community's economy at all because the outflow of money will go to consumption goods from the industrial sector and give positive impact on the economy of industrial sector or industrial towns more than on the small community under the present study. If production cost of the GDL sector increases, there will be a negative impact on the overall local economy as the average growth rate will decrease. The money transfer from the government will help expand the activities of various production sectors and consequently the daily off-farm labors will earn more income from greater

employment while high income households and medium income households will get more income. The greater income will lead to the more consumption of goods from the industrial sector thus increasing the aggregate demand and contributing to the overall economic expansion. The increase in money supply directly to the GDL sector will produce greater impacts compared to money transfer through village fund, community enterprises or various occupational groups and through local government. Due to, the GDL sector has far more extended linkages than any other sectors. Thus the goal of economic growth will be lower than the case of increase in money supply in the GDL sector directly.