

# **LIVELIHOOD STRATEGY OF SHIFTING CULTIVATOR AGAINST MARKET PRESSURE: A CASE FROM PASAMAN DISTRICT, WEST SUMATRA PROVINCE, INDONESIA**

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## **ABSTRACT**

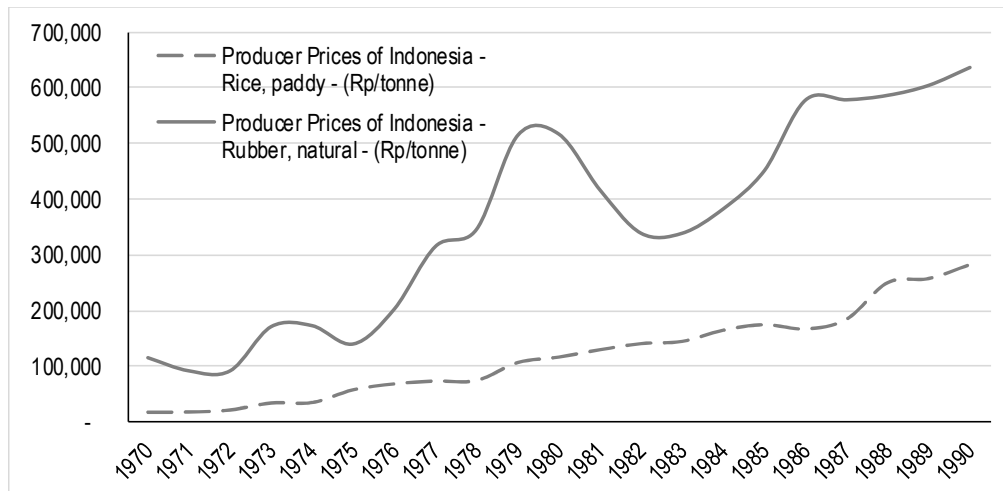
Shifting cultivation has declined in last two decades. However, due to both declining marketed-farming produces and increasing food price leads to resurgence of shifting cultivation in Indonesia. This paper studies livelihood strategies of shifting cultivators against pressure on their livelihood especially from the reducing rubber price, when rubber was their main source of income. Based on a case study in an upland village of Pasaman District, West Sumatra Province, Indonesia, this paper describes that shifting cultivator combine three livelihood strategies to deal against low price of rubber; i.e. clearing more land for rice cultivation, enhancing social cohesiveness and adjusting household expenditures. Declining world's price of rubber pushes the farmer clear more land for shifting cultivation especially for rice production. They form group to work together in forest clearing and field maintenance as most the works were manually done. Threatening of food insecurity pushes them to work collaboratively that leads to enhancing social cohesiveness among the cultivators. At the same time, most households tend to reduce expenditure including reducing food quality. The first strategy leads to environmental problem. When farmers cleared old growth forest for shifting cultivation, it has a serious effect on the environment as it reduces carbon stock and increases carbon emission. The third strategy leads to reducing household well-being that impacts negatively on human resources development in long run. Based on these findings, we need to diversify their livelihood and food consumption to maintaining environment on the one hand and to ensure livelihood security on the other hand.

**Keywords:** livelihood strategy; shifting cultivation; rice; rubber; upland; West Sumatra

## INTRODUCTION

Shifting cultivation has declined in last two decades in Indonesia as some sedentary farming programs were introduced since 1980s (Dendi 2003). They had shifted to permanent agriculture mostly for rubber, coffee, cocoa and cinnamon. Consequently, shifting cultivators are becoming more exposure to market economy because most of their livelihood incomes come from commercial commodities on the one hand and their food supply is from market on the other hand. As Dendi (2003) reported that most shifting cultivators in Pasaman District of West Sumatra province, for example, have been became sedentary farmers by managing mostly for rubber smallholding as their main livelihood. At the same time forest encroachment due to shifting cultivation dramatically decline. In addition, most of bare land from previous shifting cultivation practice had been transformed to be rubber smallholding.

Market and food security as well as infrastructure development policy of Indonesian Government provided incentive for changing from shifting to sedentary agriculture. High and stable price of rubber was the main incentive for this tremendous achievement in agricultural development in upland areas of Indonesia. As shown in figure 1, average Indonesia's rubber producer price was steadily increasing during 1970-1990. Rubber price increased more rapidly than increasing price of rice that lead to higher divergence between the two. This good market signal encouraged shifting cultivators to invest more in rubber smallholding and becoming sedentary farmers. On the other hand, low and stable price of rice, their staple food, provided another incentive for the changing agricultural practice. Low and stable rice price was the direct impact of Indonesia's government policy on food security. Within this time, Indonesia was introduced ceiling and floor price policy to encourage "green revolution" in paddy production. Floor price will be enacted when price decline till reach the floor to protect farmers, while ceiling price will be taken when rice price jump up beyond allowed highest point to protect the consumers. This policy stabilized rice price that indirectly benefited shifting cultivators to be sedentary farming. Selling rubber and buying rice were more profitable than producing rice through shifting cultivation.



Source: faostat.org, retrieved 15 April 2017

Figure 1. Producer prices of Indonesia's rubber and rice during 1970-1990

In addition, Indonesian government was also investing more in rural infrastructure development during this period, especially constructing road to open up remote areas, mostly in upland. Sedentary program benefited more from this policy that easily connect the farmers to market.

For the last two decade, Indonesia economy has been changed tremendously. Structural adjustment has been taken in response to financial crisis in the end of 1990s (Mahdi, Shivakoti, and Schmidt-Vogt 2009). The economy is becoming more liberal. Ceiling and floor price policy for rice was taken out (Mahdi et al, 2016). At the same time, global rice market was under pressure due to slow increasing supply in opposite to rapid increasing demand that led to increasing rice price in Indonesia's domestic market. In January 2012, for example, average producer rice price was Rp 4,708.08 increased to be Rp 5,447.14/kg in December 2015 (Statistical office of Indonesia, 2017). At the same period, rapid increasing supply of natural rubber flooded international market. Increasing rubber smallholding in mainland Southeast Asia, Thailand, South China, Laos and Vietnam (Fox, Castella, and Ziegler 2014) entered global rubber market since last decade. This situation led to dramatically decline producer rubber price. In January 2012, Indonesia average producer rubber price was Rp 8,213.00/kg downed to Rp. 6,915.00/kg in December 2015 (faostat.org, 2017). So, in this paper, we study how have farmers in Pasaman District response to this change by studying their livelihood strategies

## RESEARCH METHOD

A household survey has been carried out in Nagari<sup>1</sup> Muaro Sungai Lolo, Kecamatan Mapat Tunggul Selatan, Pasaman District of West Sumatra Province, see figure 2. Respondent were sampled with multiple stage techniques. There are four Jorongs, or sub-nagari, i.e. Jorong Muaro, Jorong Pangian, Jorong Sei Lolo and Jorong Patamuan. We selected 15 heads of households for each jorong, then interviewed 59 households sample. Respondents were selected 15 head of households which sampled multiple stage techniques from The social characteristics of the respondent are recapitulated in Table 1.

Table 1. Social characteristics of respondents

No	Respondent Characteristics		Frequency (N=59)	Percent
1	Married status	Married	58	98.31
		Widow	1	1.69
2	Sex	Male	55	93.22
		Female	4	6.78
3	Household Size (persons)	< 4	15	25.42
		4 - 6	19	32.20
		> 6	25	42.37
4	Age (years)	< 40	20	33.90
		40 - 50	13	22.03
		> 50	26	44.07
5	House type	Permanent	27	45.76
		Semi Permanent	12	20.34
		Wood	20	33.90
6	Main source of livelihood	Farming	56	94.92
		Others	3	5.08
7	Monthly per capita expenditure	< Rp 300,000	12	20.34
		Rp 300,000 - Rp 600,000	30	50.85
		> Rp 600,000	17	28.81
9	Education of head of household	Primary School	52	88.14
		Yunior high school	5	8.47
		Higher education	2	3.39

Main features of the used questionnaire are; the practice of shifting cultivation in last seven years 2010-2016, detecting whether the household practicing the shifting cultivation in each year, shifting cultivation site, the size of land, land tenure, yield and other crops grown

<sup>1</sup> For more understanding on Nagari see (Benda-Beckmann and Benda-Beckmann 2001)

either annual or perennial crops. Aside from that, data on a number of labor on the household, rubber tapping activities, rubber price in last 7 years were also collected.

The data were analyzed qualitatively. How the respondents response against increasing rice price and decreasing rubber price. Livelihood strategies of the households are learned through livelihood activities which is currently taken in response those changing external factors for the last seven years. We correlate the trend of declining rubber price with number of respondent participating in, land clearing for shifting cultivation, rice production from. Then, we discuss the implication of their strategies on environment and on their future livelihood itself.

## **RESULTS AND DISCUSSION**

### **Research site and dynamic of shifting cultivation**

Nagari Muaro Sungai Solo, Kecamatan Mapat Tunggul Selatan is located in eastern part of Pasaman District. Geographically, it is mountainous region that is the up-stream of East Rao watershed, see figure 2 and figure 3. The watershed is the catchments of Batang Kampar River which is the main source of water for Koto Panjang Dam. The dam generates hydropower and irrigation in the downstream to east. Its latitude varies from around 150 – 2.281 meter USL. It area size is 471.72 km<sup>2</sup>. Land cover is mostly forest, as seen in table 2, however, bare land is sufficiently big portion, 25%. Bare land is mostly due to previous massive shifting cultivation which has not transformed yet to be smallholding, as the soil fertility was sharply dropt.

This nagari can be accessed by motor vehicle in last ten years, but the better access was only in place since 2010. The local government developed infrastructure to connect Silayang and Muaro Sungai Lolo, two nagaris in kecamatan Mapat Tunggul Selatan, to Trans-Sumatra highway near Rao, local business center.

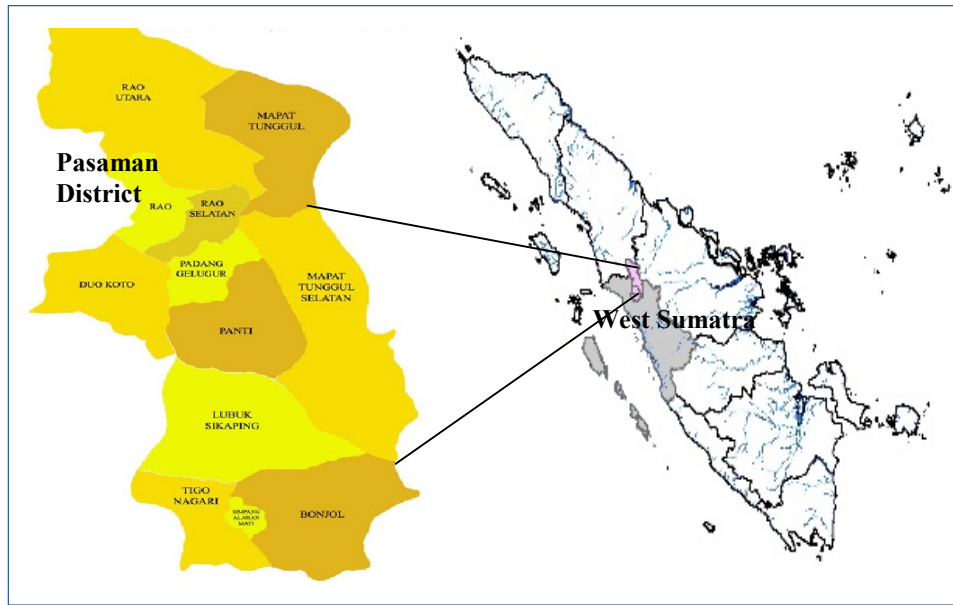


Figure 2. Research site Map: Kecamatan Mapat Tunggul Selatan of Pasaman District

Statistical office of Pasaman District reports that the population of this kecamatan is 9,237.00 in 2015. Almost all the population is belong to Minangkabau ethnic, the largest matrilineal society of the world, where descent and descent-group formation are organized according to the female line. (Kato 1978).



Figure 3. Mountainous region of Kecamatan Mapat Tunggul Selatan of Pasaman District

The Minangkabau people from various origins first settled in East Rao watersheds during the late 17th or early 18th centuries (Neumann (1884) in Dendi, 2003). Before settlement by the Minangkabau people, however, the watersheds had been sporadically inhabited by the Batak people, an ethnic group of north Sumatra origin who practiced forest slash-and-burn for the cultivation of annual crops primarily dry land rice. Gradually, the Minangkabau people drove out the Batak people and reinforced the occupation of nearly all watersheds. From the early 18th century until now, shifting cultivation has been a core means of livelihood of the people living in the watersheds. (Dendi 2003)p124.

Table 2. Land use of Kecamatan Mapat Tunggul Selatan, 2015.

No	Land use	Ha	Percent
1	Paddy field		
	Irrigated	200	0.42
	Un-irrigated	200	0.42
2	Dryland farming	2,300	4.88
3	Shifting cultivation	735	1.56
4	Smallholding	4,584	9.72
5	Pond and dyke	10	0.02
6	Settlement	125	0.26
7	Forest		
	State owned forest	13,076	27.72
	Private owned forest	14,230	30.17
8	Bareland	11,712	24.83
<b>Total</b>		<b>47,172</b>	<b>100.00</b>

Source: Statistical office of Pasaman District, 2016

The main reason for practicing shifting cultivation was for food security. So it was dominant agricultural practice within the watershed (Balzer et al. 1987; Mahdi, Pheaxay, and Qingsong 2005; Yonariza 1996). As seen in table 3, from Dutch colonial era to new order era, dry land rice is the main source of food. As lack of road infrastructure till new order era, trading with outside economy was less, while their environment was mountainous, so planting dry rice was the only way to supply food of the household. Although rubber was well known among farmer since Japanese colonial era, but it is not becoming main crops till new order era.

Sedentary farming program, with support of some institutional, infrastructures, extensions, and assistants as well as market interventions, was the reasons for accepting of rubber smallholding in this nagari.

Table 3: Dynamics and changes of farming systems in East Rao Watersheds

	<b>Dutch Colonial era (1821-1941)</b>	<b>Japanese colonial era (1942-1945)</b>	<b>Early Independence era (1945-1965)</b>	<b>New Order era (1965-1997)</b>	<b>Early reform era (1998-2010)</b>	<b>Market volatile era (2010-present)</b>
Primary goal of agrarian policy	Famine protection, Revenue/Exports	Food sufficiency/surplus Revenue/Exports	Basic needs Revenue/Exports	Self sufficiency in food, cheap food for urban dwellers/industrial labors Poverty alleviation Revenue/Exports	Food security, social safety net, Revenue/Exports	Market oriented economy
Driving physical environment changes/ infrastructure	Forced development of small-scale irrigation canal and wetland rice fields in Sungai Lolo (1892), and in Silayang (in 1902)		Commercial outboard engine boat services to and from Rao, local commercial centre	Development of roads to Rao (local economic centre) in early 1990s; Extension and improvement of irrigation canal in Sungai Lolo (1991); <i>El-Nino</i> since 1997.		Road construction to most remote areas; Development of 1 unit of micro hydropower (electricity) in Muaro Sungai Lolo; Weekly market is
Livelihoods	Early 20 <sup>th</sup> century: swidden fallow rice cultivation; non-timber forest products, and rubber	Swidden-fallow rice cultivation; Rubber as primary cash crops, coffee of secondary important	Swidden-fallow rice cultivation; Rubber as main cash crops, coffee of secondary important	Swidden-fallow rice cultivation; Rubber, Cinnamon, Coffee	Swidden-fallow rice cultivation; increased diversity of cash crops; increased Small-scale agro-processing	Re-surgence of shifting cultivation Gambier, increased diversity of cash crop
Main crops	Dry land rice, Tobacco In Sungai Lolo, few farmers began wetland rice cultivation	Dry land rice, leguminous (soybean, mung bean, peanut ), castor ( <i>Ricinus communist, L.</i> )	Dry land rice	Dry land rice, peanut, rubber	Dry land rice, peanut, patchouli ( <i>Pogostemon cablin</i> ) Wetland rice	Dry land rice, gambier, Nilam, red cilly, Wetland rice
Fallow	10-15 years natural fallow cycle	7-10 years natural fallow cycle	6-8 years natural fallow cycle	4-5 years natural fallow cycle		

Source: Dendi (2003) and Yonariza (2017)

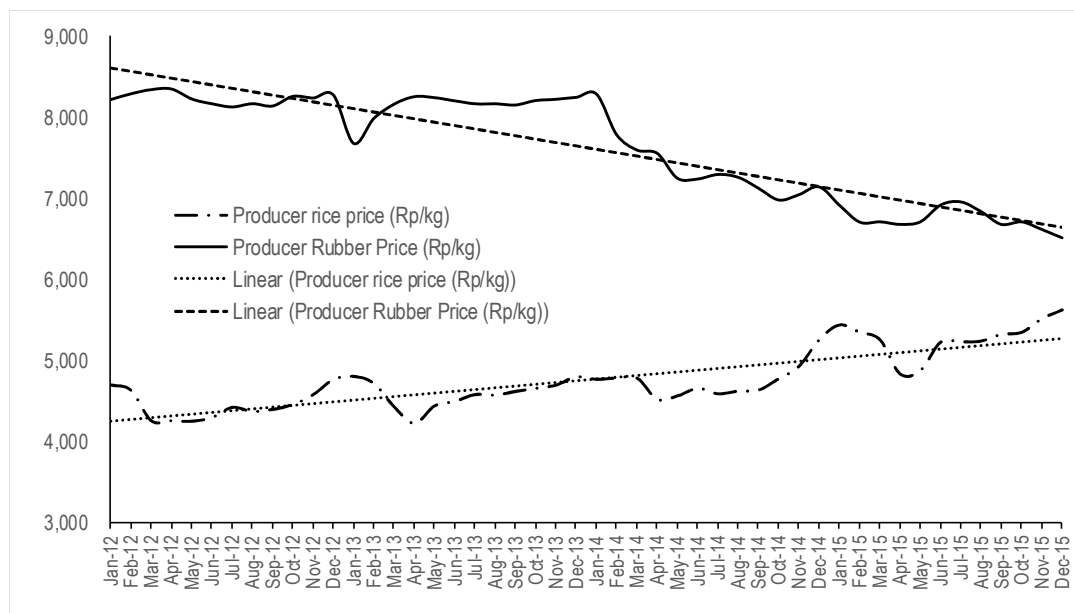
Presently, market economy is already rooted within this areas as the consequences of previous intervention. Volatility of market price affects directly their livelihood and food security. In addition, due to increasing population and scarcer land for agriculture, fallow is



becoming shorter. Yonariza, et. al. (2017) report that some sedentary farmers leafed their rubber smallholding and re-surge shifting cultivation

## Market Pressure to Livelihood

Market pressure in this paper means the reducing price of rubber for the main source of income for the people inhabitants of up-stream East Rao watershed and at the same time increasing price of rice, the staple food of the people. This pressure pushed the up-stream inhabitants, whom depend their livelihood mostly from rubber, to adjust with this changing external environment. As shown in figure 4, from January 2012 to December 2015, producer rubber price of Indonesia sharply decline from around Rp 8,200/kg to Rp 6,700/kg.



Source:

Producer rice price: Subdirektorat Statistik Harga Produsen, 2016, and BPS

Producer rubber price: faostat.com, retrieved 15 April 2017

Figure 4. Monthly average producer rice and rubber price of Indonesia 2012-2015

Based on our household survey data, the reducing price of rubber directly affect the price in Nagari Muaro Sungai Lolo, see figure 5. Normally, for an hectare of rubber smallholding, the farmer get around 240 kg of latex a month that value Rp 1,608,000 – Rp. 1,968,000. This amount of household revenue is not sufficient to cover their increasing living cost. Table 4 recapitulated that average monthly expenditures of the household is Rp 2,680,916. Of course, continuing

rubber tapping is not a good choice. This situation push the farmer to find others livelihood strategies.

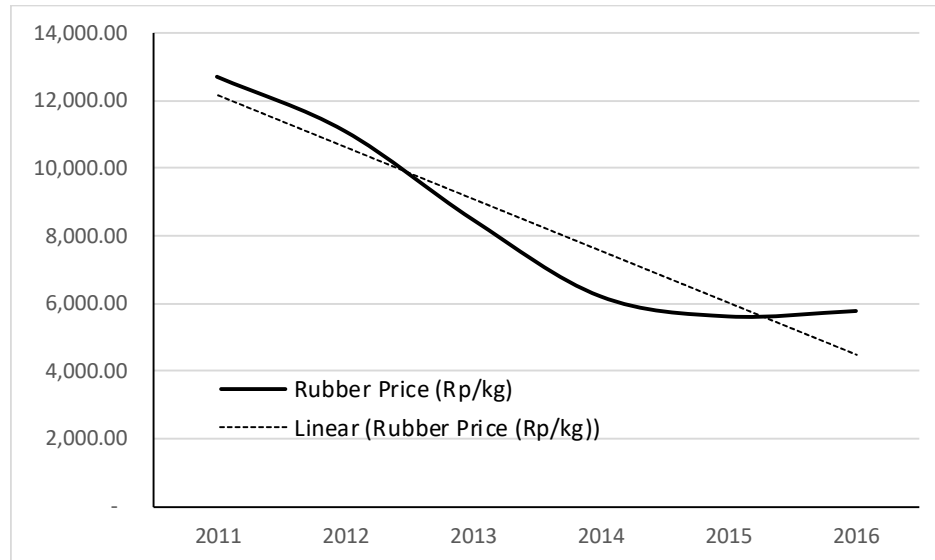
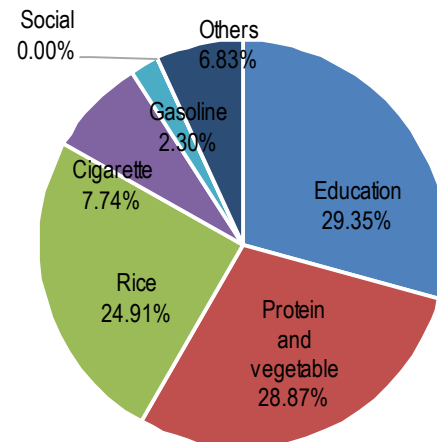


Figure 5. Yearly average producer rubber price at Nagari Muaro Lolo 2011-2016

Tabel 4. Average monthly expenditure and percentages

No	Items	Expenditures (Rp/month)
1	Education	786,085.71
2	Protein and vegetable	773,038.10
3	Rice	667,119.05
4	Cigarette	207,266.67
5	Gasoline	61,476.19
6	Social	106.14
7	Others	182,885.71
<b>Total</b>		<b>2,680,916.47</b>
Per Capita		504,747.83



## Livelihood Strategies against market pressures

Livelihood strategies of the farmers of the up-stream East Rao Watershed learned in two strategies i.e. short-run and long-run strategies. Short-run strategies are the response of the

farmer in facing shock during last seven years such as, natural disaster, conflicts, and others emergency situation. While long-run strategies are the response of the farmers against trend both internal and external factors of livelihood, especially the trend of reducing rubber price and increasing rice price.

### ***Short-run strategies***

Figure 6 shows the short-run strategies of households against shock for last seven years. When they faced emergency for their livelihood, most farmers fell in-debt to local traders, whom are also their patron. It was 50.85% of respondent chosen this strategy. It is more like taken by the lowest income of the community, when they did not have any valuable assets and other resources. Consequently, this strategy leads to worsen further livelihood outcome. Paying back loan to traders may be lowering their further disposable income.

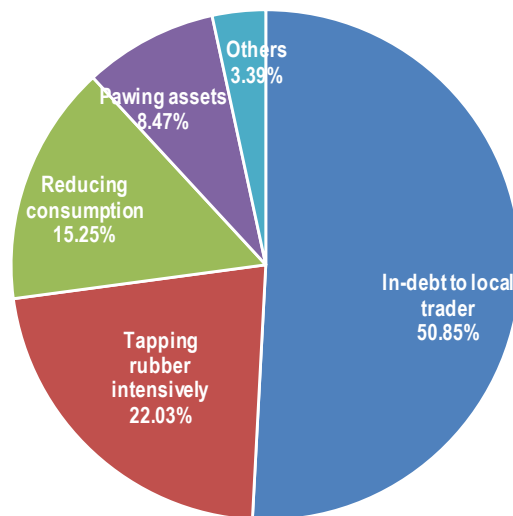


Figure 6. Short-run strategies of the respondents against shocks during last seven years

Second short run strategy is tapping rubber intensively. This strategy was taken by 22% of respondents. Interestingly, although low rubber price, the farmers did more frequently rubber tapping to produce more latex than the normal tapping. This strategy was mostly taken by households which have bigger rubber smallholding size. The third strategy is reducing household consumption. This strategy was also mostly taken by lowest income households, which has no access to get in-debt to local traders. They are mostly the household with less number of working age family members such as elderly couples. This situation leads to malnutrition Fourth strategy is pawning assets. This strategy was taken by middle income household

which have sufficient assets. The last is others such as migrate to other village or even to nearby city for looking for job and send remittance home, and do motorbike taxi (ojek).

The short-run strategy affects livelihood outcome, then affect long-run strategy to face trends.

### ***Long-run Strategies***

Figure 7 shows the long-run livelihood strategies of the household in response to reducing rubber price and increasing rice price. There were six strategies of household in response to the price trend.

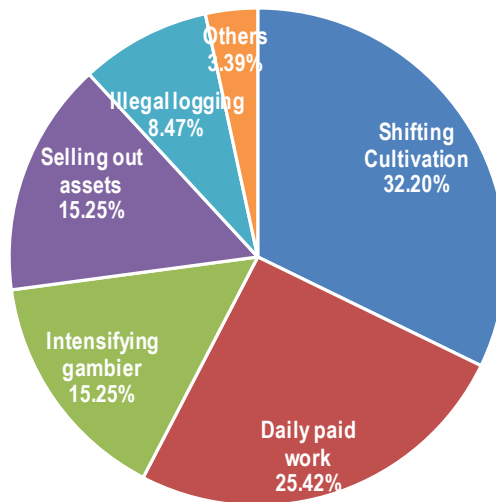


Figure 7, Long-run strategies of the respondents in response to reducing rubber price

#### **1. Shifting Cultivation**

Respondent more prefer to re-practice shifting cultivation. They did not cut down their rubber smallholdings instead they clear up forest frontier for planting dry land rice. This strategy can cope against higher rice price and at the same time save their rubber smallholdings for future livelihood when rubber price increasing. It was about 32.20% of respondent took this strategy. This strategy was possible as the institution for getting land is easy. Any one who would like to have land they need the permission from the “datuk” only. Datuk is the head of suku (clan) who has authority to make decision on its ulayat land. Because of available forest areas which is far from their settlement, datuk rarely rejected it.

Tabel 5. Percentage of respondent who clearing up forest for shifting cultivation, size, production and duration of consumption dry land rice 2010-2016 (n=59)

Year	Respondent clearing up forest for shifting cultivation		Average size of shifting cultivation (ha)	Rice production per household (kg/6 month)	Duration of rice consumption (month)
	Frequency	Percent (N=59)			
2010	8	13.56	1.38	798.89	5.83
2011	9	15.25	1.50	1,007.71	7.82
2012	10	16.95	1.75	1,559.38	7.68
2013	11	18.64	1.82	1,527.78	8.67
2014	13	22.03	1.93	2,266.67	7.67
2015	22	37.29	1.92	3,583.33	6.17
2016	28	47.46	1.80	6,270.00	8.10

In order to handle hard work in forest cut and land clearing as well as maintaining their plots, the shifting cultivators asking the permission and working in the group, from 10 to 15 households each. They cleared up forest for shifting cultivation in one small areas. Each household has about 1-2 ha of land. Group is, then, becoming importance during shifting cultivation activities. They worked collaboratively in the group and sequence from one plots to another.



Figure 8. Newly clearing up forest for shifting cultivation.

As shown in table 5, number of respondents who participate in shifting cultivation increase every year. The size of each plot also increase from 1.38 ha in 2010 to be 1.80 ha in 2016. Their main objective participating in shifting cultivation is to get securer food security. Clearing more land and planting more dry land rice are done to get more rice production and longer duration of rice consumption.

Re-practicing shifting cultivation strategy is likely more form households which are low to middle income which has less assets for invest more in sustainable agriculture. They do not have wet land paddy field, has more labor but low in education.

## 2. Daily paid work

Daily paid work is the second strategy which most taken by the respondents, 25.42%. Most lowest income household chose this strategy, especially which have more number of family member in working age. Daily paid work can be done both within the nagari Muaro Sungai Lolo and neighbor nagari. They worked in gambier smallholdings, wet land rice, and construction.

### 3. Intensifying Gambier smallholding

Intensifying gambier smallholdings is the strategy that more prefer by high income household. It was about 15% of respondent participating in intensifying gambier smallholding. Gambier price is relatively high and stable, but it needs higher investment that the lower income household could not participate. As shown in table 6, average size of gambier smallholding is 4.55 ha. Gambier can be harvested twice a year.

Table 6. Gambier smallholding of the respondents

No	Items	Value
1	Smallholding size (ha)	4.55
	In communal land	2.51
	In private land	2.04
2	Production 1st harvest (kg)	397.19
3	Price at 1st harvest (Rp/kg)	47,755.77
4	Production 2nd harvest (kg)	620.75
5	Price in 2nd harvest (Rp/kg)	55,375.00

### 4. Selling out assets

Selling out asset strategy is chose by 15% of respondents, which is likely from middle income households. Selling cattle, land and others asset to finance their children education.

### 5. Illegal Logging and others

Only small number of households took illegal logging as the cost to bring timber out is high. Others strategy is including migration and motorbike taxi as well as open up “warung”.

## **IMPLICATIONS**

Re-practicing shifting cultivation has tremendous effect on environment as this nagari is located in upstream of watershed.

## **CONCLUSION**

Local people response directly to changing market by shifting their livelihood strategy.

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