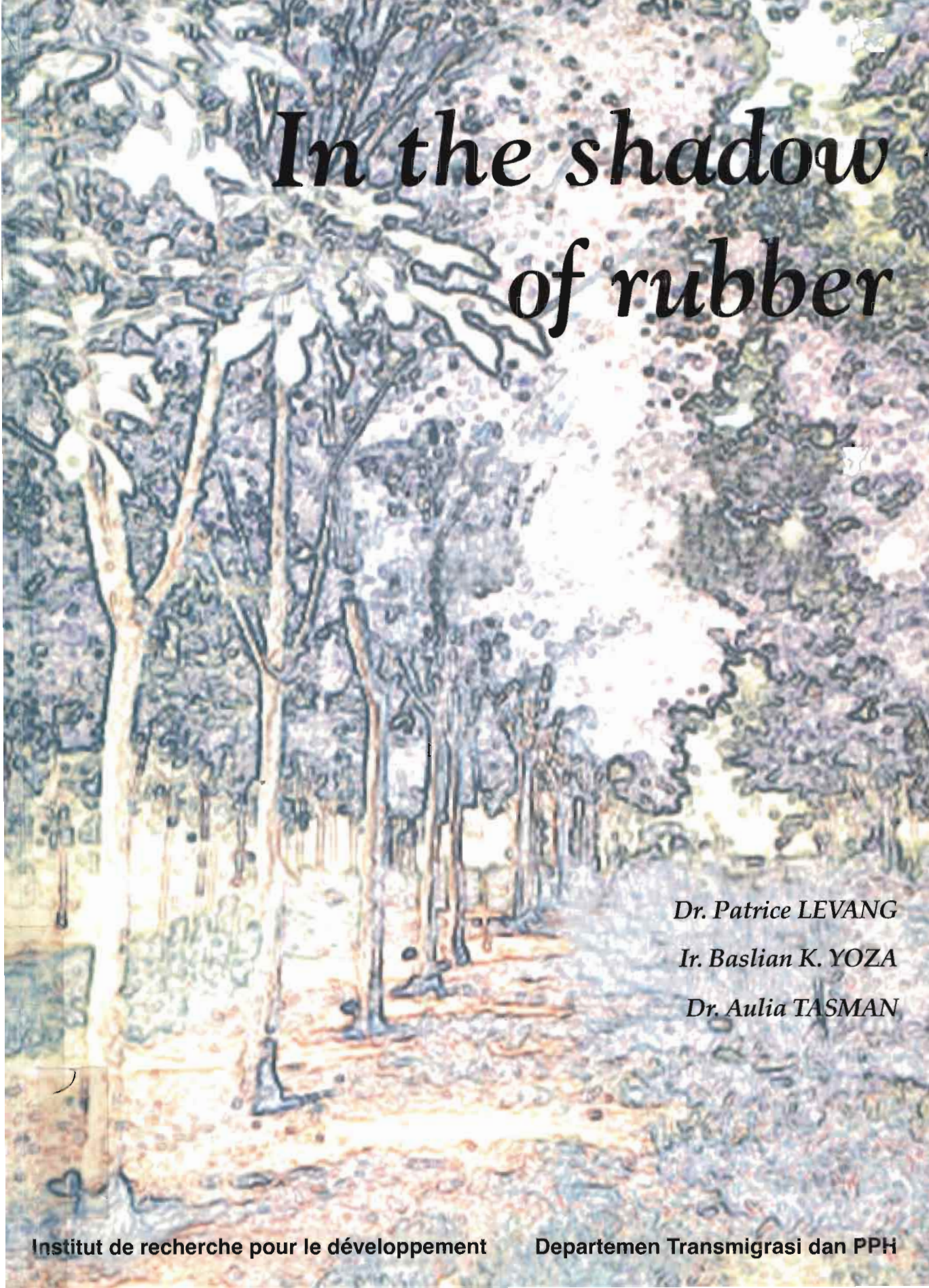
In the shadow of rubber



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Alternative agricultural development perspectives in Jambi

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In the shadow of rubber

Alternative agricultural development perspectives in Jambi

Since the beginning of the XXth century the economy of Jambi has been dominated by rubber. Rubber fixes the level of opportunity costs. To be adopted by Jambi's farmers, any alternative agricultural activity must be more lucrative than rubber cultivation. National and regional development programs often fail because they forget to take into consideration this absolute rule.

1. An inadequate political will

At the provincial level and even at the district level, the political will is strictly in line with policies decided at the national level. Thus, self-sufficiency, which is typically a national goal, becomes a provincial and district goal as if the latter were nations on their own. The predominant basic assumption is that imports are costly and that producing locally must be cheaper. Unfortunately, efficiency, opportunity cost, economies of scale and market capacity are seldom taken into account.

That the political will is imposed from the top to the bottom of the pyramid is actually not surprising. What is more surprising is that it never takes into account local conditions, be they physical, economical, social or cultural. That Jambi's environment may not be suitable for soybean cultivation has never been questioned. Problems and constraints are only tackled from a

technical point of view. That farmers may not be interested is entirely overlooked. The dominant perception among upper level civil servants is that peasants lack the basic knowledge of what is best for them. At the intermediate level, the civil servants are squeezed between their superior's will and the farmers' reluctance. They thus develop a double language for the only sake of their position as civil servants. At the lowest level, the farmers listen politely and carefully to the message delivered by the extension workers... and follow their own way.

2. Some opportunities and many constraints

Thanks to rubber, Jambi is a rich province. Rubber is a blessing because it thrives on the poor acid soils of Jambi, because it survives in the forest re-growth without requiring much maintenance, because it is not very sensitive to pests and diseases... and because its latex provides the tapper with a high return for his labor. Rubber is most suited to Jambi's physical and human conditions: much land and little labor. But every rose has its thorn. Rubber fixes the opportunity cost of labor at a high level. Only very few activities can compete with such high returns to labor.

Jambi faces indomitable physical constraints, al least at smallholders' level: poor soils, high rainfall and aggressive pests. Jambi's red-yellow podzolic soils are leached by heavy rainfall, acid, poor in organic matter and deficient in most nutrients. Local people chose to adopt crops adapted to the physical conditions... while authorities often prefer to adapt conditions to adopted crops. The first choice limits opportunities to a few crops like rubber. The second has a cost farmers are generally not willing to pay.

In spite of the numerous migrants who joined the Province, Jambi only counts 2 million inhabitants, which gives an average population density of 27 inhabitants per square kilometer in the intermediate districts and consequently a very restricted local market. For all these reasons, in Jambi, labor is expensive, rather unskilled and rare. Migrants from Java and Sulawesi possess more skills and are willing to work harder and for lower wages than local people. At least for a start. As soon as they come to owning tree crop plantations, the same economic rules apply to them.

3. Rich villages with some poor

According to Indonesian standards, Jambi's villages are rich. The IDT concept, elaborated according to Javanese perceptions and criteria, is not operating in the outer islands. Thanks to rubber, oil palm, timber and other resources, the people of Jambi are rich. In all villages, there are more

potential employers than people ready to work. Says a head of village: "If you own rubber or workforce you cannot be poor in Jambi". The corollary of this statement is that there are poor people in Jambi: those who possess neither rubber nor workforce. The poorest of the poor are generally elderly people not or no longer owning productive rubber, disabled persons living on charity, and over all, women on their own: widows, divorced or repudiated. Having no husband they are regularly overlooked in village development schemes and never in a position to tap IDT credits.

4. Recommended "supporting" activities

4.1. Fish farming

At present, the most promising sector of activity in Jambi is probably fish farming. Managed by well-off smallholders and small entrepreneurs, it represents the safest investment and the highest returns. At the growers' level, cage culture develops by itself, as basic investment is relatively low. On the contrary, pond-farming development is still hampered by the costlier works required for digging the ponds and for ensuring proper water control. These works can be organized at a neighborhood level as they generally concern more than one family. The know-how is available but the farmers need credit to buy the material and to pay the labor. Hatchery owners face the same problems as the fry is produced in ponds. Their high and secure income enables them to accept individual loans. Increasing the production capacity of existing hatcheries is primordial to the development of the whole sector. Therefore highest priority should be given to hatcheries. More upstream, the availability of good quality broodstock is fundamental. This responsibility should be devolved to the Dinas Perikanan.

4.2. Cattle fattening

Cattle fattening also provide high returns to the farmers. Many fatteners no longer ask for credit or share systems but prefer buying the calves cash. The development of the activity is only restrained by the insufficient availability of calves. The farmers would welcome any program aiming at introducing calves (on a cash, credit or share basis).

4.3. Broiler production

Broiler production seems promising again after the collapse of the poultry sector in Indonesia. Prices are up again, and broilers could represent an interesting additional income for smallholders. But farmers are still reluctant to take the risk and prefer joint ventures with sponsors where they

can get a secure net income. These sponsors should be encouraged to involve smallholders in their activities.

4.4. Home industries

Small home industries have rather good prospects. Clever entrepreneurs who should be supported by the local banking system manage them. They are all prisoners of a vicious circle: their output being to small they are not in a position to conquer new markets; and if they try to increase their production they face harsh marketing problems. Thus, they are condemned to remain small. Investing in the sector may pay, but is rather risky. The safest way would be to organize joint ventures with wholesalers in big cities.

Home industries on a cooperative basis like Kopinkra Terpadu in Bangko should be promoted. Without being very efficient, such an industry gives work to 55 women on a part time basis close to their home. They are free to organize their working time according to their needs and have the feeling to work for themselves.

4.5. Horticulture

The Province produces all kinds of fruit, which the local market proves unable to absorb during high yielding years. Local strains of *duku* and mangosteen are very palatable and renown as far as neighboring provinces. The main constraint to the development of horticulture in Jambi is less a matter of quality and quantity than of marketing. Even during high yielding years, the production is scattered over large areas and among a great number of smallholders, which implies high collection costs and impedes efficient marketing. The specialization of small areas in a restricted number of horticulture crops would help to promote local brands, while intensification would increase the output and thus facilitate the collection of the product.

4.6. Food crops

For more socially oriented projects, *payo* development could be recommended in some villages along the Batang Hari. It would consist in the building of small dams and levees in order to protect the *payo* from the big floods and to secure their use for rice cultivation. The investment is rather big and not very safe. First, the dams and levees need to be maintained and rebuilt regularly; second, they may not withhold excessive floods. But as most of the cost consists in labor, it may give work to many villagers, especially the poorest day laborers. Once the *payo* converted into rice field, tilling, planting, weeding and harvesting would also give work to the poorest villagers.

Specific projects concerning the development of upland food crops in Jambi are not recommended in the present situation. Upland food crops should be considered as *tumpang sari* crops during the first years of rubber or oil palm establishment and thus integrated in the latter's packages.

Conclusion: The keys to success

In Jambi's intermediate districts, the high income provided by tree crops puts the opportunity cost of labor at a high level. As depending on a single crop may be hazardous – especially for a commodity exported on the world market – farmers are looking for additional income-generating activities.

In the present situation, the adoption of any additional activity is subordinated to four conditions:

- low initial capital requirement;
- low labor requirement;
- high and quick return;
- low risk.

The farmers, without any outside intervention, will quickly adopt any activity responding to these conditions, like cage farming or cattle fattening. Activities with high initial capital requirement may still interest farmers if cheap credit is made available. Risky activities could also be considered if returns are proportional to risk, or if a sponsor shares the risk. Activities with high labor requirements have little chance to be adopted, while those with a low return to labor have none. The worst combination is obtained with upland food crops: high input cost, many labor requirements, small return and high risk.

Things may change over time. The rubber and oil palm market may well not remain flourishing, or phytosanitary problems may destroy large areas of plantations. Then, Jambi's farmers will have to reconsider less interesting opportunities. But for the time being, any activity will have to develop in the shade of rubber.

Photo 1. Sawah *kincir* in Sungai Manau (Sarko)

Introduction

A long-standing food crop deficit

At a time when Jambi was still renown as the wealthy Malayu Kingdom (XIIth-XIVth century), the province already had the reputation of not being self-sufficient in rice. Pepper and forest resources (gums, resins, birds' nests and precious wood) were bartered for Javanese rice on a rather regular basis. Since the introduction of rubber (*Hevea brasiliensis*) at the start of the XXth century, the province seems to have definitively renounced to food self-sufficiency and specialized in natural rubber production.

The importance of rubber is such that any alternative agricultural development proposal must be compared to rubber. Rubber cultivation fixes the opportunity costs. Any activity procuring lower returns to labor, needing higher investments and implying higher risks than rubber cultivation has little chance to be adopted by Jambi's farmers. Even Javanese transmigrants with a strong food crop producers' background turn into tree crop planters only a few years after having settled down in Jambi. Most efforts by authorities to develop food crop projects are diverted by farmers into rubber (and lately oil palm) plantation development.

But national and local authorities have not renounced yet. They still want Jambi to become self-sufficient in most agricultural commodities. As the rubber and oil palm sector develop by themselves and do not look as needing official support, all efforts are directed at developing alternative agricultural income generating activities. Potential activities include food crops and horticulture, fisheries and aquaculture, animal husbandry, handicrafts, post-harvest activities, processing of agricultural products and agribusiness investments.

Framework and objectives of the study

The objective of the present study is to assess various "supporting" farming/income-generating activities complementary to "primary" rubber- and/or oil palm-based systems. The activities concerned are those stated in the terms of reference of the Jambi Regional Development Project[1] (JRDP).

[1] The Jambi Regional Development Project is a cooperative programme between the World Bank and the Government of Indonesia, whose purpose is to foster economic

The main focus is to identify smallholder investment patterns and priorities outside the primary farming systems (rubber and oil palm) in relation with potential public sector investments aimed at developing these activities.

The study first documents and assesses existing development programs concerning "supporting" farming/income-generating activities at both provincial and district level. Secondly, it assesses smallholder investment priorities and constraints in relation to the same activities. Thirdly, it analyzes and recommends whether any "supporting" farming/income-generating activity should be further considered.

Methods

In order to fulfill these tasks, our team went on a field survey in Jambi from March 9 to March 17, 1998[2]. Under the auspices of Bappeda Tingkat I Jambi, we had several meetings with the head of Bappeda, the heads of the Dinas concerned by our study[3] and their staff. The same kind of meeting was held at the Bappedas Tingkat II in Muara Bulian (Batang Hari), in Bangko (Sarolangun-Bangko) and Muara Bungo (Bungo-Tebo). Half of the time was allocated to field visits and interviews with farmers in the three concerned districts. The results of the study (and of other related studies) were presented and discussed at a workshop in Jambi at Bappeda Tingkat I on April 30 and May 1st, 1998.

development and alleviate poverty in three districts: Batang Hari, Sarolangun-Bangko and Bungo-Tebo.

[2] The study was funded by the World Bank in the framework of the Jambi Regional Development Project. Our sincere thanks go to Mrs. Andrea Silverman and Mr. Kevin Boehmer for their support. The comments and opinions expressed in this study are the sole responsibility of the authors and do not reflect the World Bank's position.

[3] Dinas Tanaman pangan dan Hortikultura, Dinas Perikanan, Dinas Peternakan, Dinas Perindustrian dan Perdagangan, BIPP.

Chapter I

A strong political will... fading out from the top to the bottom of the pyramid

1. Provincial Bappeda level:

At the provincial Bappeda level, the major development priorities closely reflect the priorities decided at the national level. The objective of national self-sufficiency in all sectors is locally translated into regional self-sufficiency. In line with this objective, officials quite often feel more concerned with developing the weakest parts of the regional economy rather than further improving its strongest sectors. The main guidelines at the provincial level are as follow:

Food self-sufficiency remains the main concern. The resort to importing rice after ten years of national self-sufficiency – one of the main achievements of the new order policies – has been felt as a loss of face by all Indonesians. The province of Jambi being more or less self-sufficient in rice thanks to the production of the districts of Kerinci and Tanjung Jabung, the emphasis is put on the staples not yet produced locally in sufficient quantity: soybean, maize and groundnut.

Development of local products is not only a concern of pride. Locally, the recent drought and the monetary crisis woke up ancient peasant fears of food shortages. To overcome possible food shortages in the future, provincial authorities stress the necessity to develop alternative food sources like wild yam, sago palm, tubers, sugar palm, *tengkawang* (*Shorea spp.*) and not only soybean, maize, rice bean and groundnut. Too little attention has been given up to now to local products like *buah pidada*, which produces very palatable syrup. In the same line, some areas of Jambi produce very appreciated varieties of *duku* (*Lansium domesticum*), durian and mangosteen. These varieties should be ameliorated (in order to shorten their unproductive period) and multiplied by grafting and tissue culture.

Jambi's strategic location close to Batam, Singapore and Malaysia's huge marketing opportunities has not yet been taken advantage of. At the first Cides meeting in 1991, Singapore's head of State told the governor of Jambi that Singapore was ready to buy four containers of *melinjau*[4] chips per month. Up to now, and in spite of a strong political will, Jambi has not been able to fulfil the request. The Batam market alone could absorb the total output of Jambi's animal farming. Since the outburst of the monetary crisis, the Kuala Tungkal harbor facilities experience a drop in imports but a sharp increase in exports. The new currency exchange rates act as a strong incentive for exports of locally produced commodities.

According to the provincial authorities, the main agricultural problem in Jambi is not to produce but to control pests. In that concern, farmers always lack cash and knowledge. They need to be organized, trained and motivated. The local and outside market could still take up huge amounts of agricultural products. Unfortunately, their quality is generally too low, sometimes unsuitable to industrial standards and always produced in too small amounts to be efficiently commercialized.

To overcome all these problems in a period of crisis and of budget scarcity, the local government intends to put all his forces together, to coordinate its efforts and to synchronize its action in order to motivate the people.

2. Provincial Dinas level:

2.1. Food crops and horticulture

To the Dinas at the provincial level, rice, as a strategic commodity is still the first priority. Intensification programs are implemented in the Kerinci and Tanjung Jabung districts. In between (Bungo-Tebo, Sarko, Batang Hari), the stress is put on the intensification of *payo* rice via small scale irrigation works at the village level and double cropping of rice.

Second priority goes to soybean and maize. The two commodities are still imported in huge amounts at the national level and are also insufficient at the provincial level. To the Dinas, the prospects for soybean are good, especially if one considers the high price of the product on the market, the insufficient local production and the needs expressed by local agro-industries. The main constraints to soybean production are the numerous pests; the absolute necessity of liming and conservation works in the mainly

[4] *Melinjau* chips are obtained by crushing the pericarp of fruits from the *Gnetum gnemon* tree.

red-yellow podzolic soils[5]. To the Dinas, more than cash, the farmers lack manpower and knowledge to cultivate successfully the crop. Moreover, due to the recent drought, soybean seeds are no longer available in sufficient quantities in Jambi. Available land for soybean cultivation is also lacking as many farmers converted their food crop plots into tree crop plots.

Maize experiences the same problems but to a lesser extent as the crop can be cultivated under tree crops during the first three years of plantation establishment (*tumpang sari*). The promotion of hybrid and composite varieties is presently the main intensification option. Marketing is still a problem because of the absence of feed industries in Jambi and the low amounts produced.

Because of the shortage of funds, the Dinas acts mainly by demonstration schemes and motivation campaigns. As for the development of alternative sources of food, like wild yam or sago palm, the Dinas is convinced of their importance... but considering the difficulties to develop easily marketable commodities like soybean and maize, it is reluctant to start a program for a crop not yet present on the market.

Concerning horticulture, *melinjau* is the first priority, according to the strong political will expressed by the governor of Jambi. Other fruit trees like *duku*, durian and mangosteen have good potential. Potatoes are to be developed in the Jangkat and Kerinci mountainous areas. *Jengkol* (*Pithecellobium jiringa*), *buah pidada*, pineapple and bananas are also cited as being potential, especially for home-industries development. Presently, the action of the Dinas is limited to demonstration plots, to grafting tries of local strains of *duku* and mangosteen and to tissue culture of orchids, bananas and potatoes.

2.2. Aquaculture and inland fisheries

With its many large rivers and wetlands, Jambi has a high potential for fish farming and fisheries. Unfortunately, because of the use of aggressive fishing techniques (electric fishing and tuba poisoning) fish stocks have been depleted and many species are facing extinction. Fish farming in cages and in ponds has been booming for the five last years. Its development is only hampered by the lack of good quality broodstock and fry.

With the monetary crisis, the price of feed increased threefold but the price of fish also increased, though to a lesser extent. As one needs two kilograms of feed to get one kilogram of fish, the production cost is very closely linked

[5] Or ultisols according to USDA soil taxonomy.

to the price of feed. But if the price of farmed fish exceeds 6,000 rupiah per kilogram, it faces competition with more favored sea fish.

Prospects are still very good for *nila* (tilapias), *patin* (*Pangasius spp.*) and *ikan mas* (common carp). Research is ongoing in order to diversify production by the breeding of local species. The main problems still to be solved are to find good quality broodstock and to master fry production techniques. It is hoped that the production of local feed could reduce the costs and render fish farming even more profitable than it already is.

2.3. Animal husbandry

Animal farming as a whole experienced much progress during the last ten years. Jambi's production now meets average local needs but imports from neighboring provinces are still needed during the peak demand periods of Ramadan and *lebaran haji*. Considering the huge marketing opportunities of Batam and Singapore, there is still much room for the development of animal farming (poultry, cattle, goat, and sheep) in Jambi.

Though future prospects are good, the poultry sector has been totally ruined by the monetary crisis and most farmers are bankrupt. The Dinas insists on the necessity to produce locally the feed and the chicks, up to now imported from Lampung or North-Sumatra. Local egg producers face harsh competition with larger producing units from Medan in North-Sumatra, especially during peak demand periods. The broiler market is also very competitive among all Sumatran provinces.

Local consumption of animal products from large and small ruminants is still very low and clearly limited by the purchasing power of local people. There is no milk-producing unit in the Province but the prospects for the development of cattle fattening are excellent. Calves for fattening purposes are in huge demand. As for goats, the prices in Batam are so high that most of the goats are sold long before they reach maturity. Sheep farming under rubber and oil palm plantations is presently tested in some locations.

The action of the Dinas is limited to some trials, to the follow up of stocks and to the promotion of artificial insemination. To the Dinas, Jambi has the same potential for animal farming as any other Sumatran province. But it is also clear that there is still room for much improvement.

2.4. Handicrafts and home industries

Though handicrafts and home industries are not traditional in Jambi, the Dinas tries to develop a large range of home industries. The most favored industries are those processing local products like wood, rattan and bamboo (furniture), food crops and fruits (pineapple *dodol* and jam, banana,

melinjau and *tempe* chips). Jambi batik and embroidery have also been promoted but face harsh competition from similar higher quality products from Java or West-Sumatra.

3. District level

At the district level, the official discourse remains more or less the same as at the provincial level. The reports of the Bupatis of Batang Hari, Sarolangun-Bangko and Bungo-Tebo to the local assembly (DPRD) differ very little. As at the higher level, all sectors are to be developed. The prima donnas (rubber, oil palm and cinnamon) are generally mentioned but a special stress is always put on the other commodities. The political will at district level is rigorously in line with the political will at the provincial level. No new commodity or conflicting choices emerge from the bupati's reports. Nevertheless the shopping list shrinks in and is limited to the major commodities (Cf. table 1).

Table 1. Agricultural development priorities per district

District Sector	Batang Hari	Sarolangun-Bangko	Bungo-Tebo
Tree crops	Rubber, oil palm	Rubber, oil palm	Rubber, oil palm
Food crops & horticulture	Rice, soybean, maize, groundnut Fruits	Rice (lowland and upland), maize, soybean Vegetables	Rice, soybean, maize
Animal husbandry	Cattle, buffaloes Goat, sheep Chicken	Cattle, buffaloes Chicken	Cattle, buffaloes Goat Chicken
Fisheries	Open waters Cages Ponds	Ponds Open waters	Ponds Cages
Industry and commerce	Home industries and handicrafts Timber industry and crumb rubber	Home industries Timber products	Home industries and food processing Rubber and sawn timber

Sources: Laporan para Bupati dalam Sidang Pleno Khusus DPRD Tingkat II, 1997.

3.1. Batang Hari District

To the Bappeda of the Batang Hari district, too much attention has been paid to rubber and oil palm, and too little to all other agricultural commodities. The Batam market is ready to absorb 1,000 head of goat or sheep per month. *Melinjau* chips, free-range chicken and cattle are all in high demand. Cage farming presents a high potential along the Batang Hari.

As for food crops, upland rice and maize have higher potential than soybean.

To the Dinas for food crops and horticulture, the development of *payo* rice could be profitable if small-scale irrigation works (dikes for flood control) were realized at the village level. Upland rice and maize intercropped with rubber or oil palm (*tumpang sari*) would pay for the maintenance cost during the first years of plantation establishment. Farmers do not favor soybean and groundnuts, vegetables have no local market and tubers of any kind are not priced. Horticulture at a large scale has little potential. But restricted to the home plots of transmigrants, *melinjau* and jackfruit could provide additional income for little work.

To the Dinas for fisheries, cage fish farming proved very successful. The sector's quick self-development is only hampered by the lack of fry. Ponds would also be an interesting alternative, but their development needs more capital and faces water control problems during the dry season.

To the Dinas for animal farming, PO Brahman and PE goat breeds are in high demand for fattening purposes. The finishers are generally rather wealthy transmigrant farmers ready to buy the calves cash. There is a harsh lack of calf and kid producers. Sheep rearing under tree crops is still tested by the Dinas. Most farmers consider chicken raising too risky.

To the Dinas for industry and commerce, priority should go to the supply of machinery for *melinjau* processing and to wood drying units. Other products like *Pandanus* and oil palm by-products certainly have potential but still need to be further studied.

3.2. Sarolangun-Bangko District

To the Bappeda of the Sarolangun-Bangko district, the main priorities in matters of agricultural development are cattle fattening, rice self-sufficiency, promotion of local fruit strains and potato cultivation in Jangkat. Of course, rubber, oil palm and cinnamon[6] should not be forgotten. Cage aquaculture develops by itself and PE goats are in high demand while the poultry sector is ailing. In the home industry sector, banana chips and *dodol* have good prospects.

To the Dinas for food crops and horticulture, the district's rice self-sufficiency could be achieved by the adoption of double cropping. Farmers are still reluctant to adopt double cropping for lack of cash and manpower.

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6 As all the cinnamon produced in the district is commercialized via the neighboring province of West-Sumatra, Jambi officials are a bit reluctant to develop a crop with no retribution to the Province.

To the officials, the problem could easily be solved by the supply of hand-tractors and hydro-tillers. But the real problem is probably more cultural than technical. The generalization of the *tumpang sari* practice (with Way Rarem and Sintani upland rice varieties) in plantation projects could also help to reach rice self-sufficiency. Local *duku* strains from Kumpeh and Muara Rancau are very appreciated and deserve to be promoted, as breadfruit, *melinjau* and avocado. In the mountainous area of Jangkat, Atlantic potato, currently developed in cooperation with Indofood looks promising. But the main constraint to the development of food crops in the district remains the farmers' preference for tree crops.

To the Dinas for fisheries, the quick development of fish farming in the district is only hampered by the lack of broodstock in hatcheries and consequently of good quality fry for the fish farmers. In spite of the increase of the price of feed, fish farming is still attractive and there is no marketing problem.

To the Dinas for animal farming, there is a high demand for cattle and PE goat fattening by transmigrant farmers. Because of the permanent lack of calves in Jambi, this demand has never been met. The poultry sector is totally out of business.

To the Dinas for industry and commerce, tiles and bricks manufacturing seem to survive the crisis. Home industries like *dodol ketan*, banana and *melinjau* chips should be supported as they provide additional income to house wives and women on their own.

3.3. Bungo-Tebo District

To the Bappeda of the Bungo-Tebo district, the main priorities in matters of agricultural development are: (1) food self-sufficiency in rice, soybean, maize and sago; (2) horticulture with durian, duku, *melinjau* and *salak* grown in house plots; (3) animal farming.

To the Dinas for food crops and horticulture, lowland rice intensification can be achieved by the adoption of *payo* double cropping. But farmers are still reluctant to adopt double cropping because the absence of water control highly increases the risks of total crop failure. Farmers favor maize and groundnuts as *tumpang sari* crops. Unfortunately good quality seeds of the latter are seldom available in Jambi. In spite of the many efforts deployed by the Dinas, farmers consider soybean cultivation as too risky is local conditions. Most plots formerly devoted to upland food crops have already been converted into tree crop plantations. Rambutan, *duku*, jackfruit and mangosteen grown in house plots have good potential, as high quality seedlings are already locally available.

To the Dinas for fisheries, there is a high potential for ponds and *mina padi* (fish and rice) development in the district. But farmers definitely prefer cage culture because the initial investment is much lower and because there is no need for water control. Fish production is still insufficient in the district and local producers face competition with fish from West-Sumatra.

To the Dinas for animal farming, cattle fattening, free-range chicken and PE goat are the best bets in the district. Calves for fattening are in high demand in all Transmigration areas. Though the poultry sector is bankrupt for the time being, the prospects for free range broilers (*ayam buras*) are excellent, especially in Transmigration areas.

To the Dinas for industry and commerce, most home industries in the district face bankruptcy. Because of bad management and lack of skill, they generally prove unable to compete with producers from other provinces, especially West-Sumatra.

From the top to the bottom of the pyramid, the strong political will is fading out... as it is progressively confronted to reality. Reality has many faces: available budget, manpower, skill, marketing, opportunity costs, competition, climate, soil fertility, pests, risk, farmer's wishes. When, by chance, the political will meets with the farmers' needs and wishes, success is at stake. When not, development projects, year after year, stay confined to rhetoric.

Photo 2. Upland food crop plots converted into oil palm plantations

Photo 3. Pak Samiin, nurseryman in Rimbobujang (Bungo-Tebo)

Chapter II

Potentials and constraints

1. Jambi and its "intermediate" districts

1.1. Population

Though its population doubled during the last 20 years, Jambi only counts a little bit more than two million inhabitants for a total surface area of 53,436 km², which gives an average population density of 38 inhabitants per square kilometer. The so-called "intermediate" districts[7] of Bungo-Tebo, Sarolangun-Bangko and Batang Hari are the less populated with densities ranging from 25 to 29 inhab./km². Urbanization is still very low in the intermediate districts where 91 to 96 % of the population is rural.

Table 2. Jambi: Population data in 1990

District	Population (inhabitants)	Surface area (km)	Density (inh./km²)	Urbanization (%)
Kerinci	280,017	4,200	67	10.9%
Bungo-Tebo	360,402	13,500	27	9.2%
Sarolangun-Bangko	350,095	14,200	25	4.2%
Batang Hari	325,783	11,130	29	7.8%
Tanjung Jabung	362,380	10,200	36	7.6%
Kotamadya Jambi	339,786	206	1,650	88.7%
Jambi	**2,018,463**	**53,436**	**38**	**21.4%**

Source: Hasil sensus penduduk Jambi 1990, BPS.

The population increase since the 1960's has been closely linked to the Transmigration program and to spontaneous migration. The Tanjung Jabung district presents the strongest increase during the 1960's, as the district became the target of both spontaneous Bugis and Banjar colonization and of *pasang surut* projects by Transmigration. In the 1970's, Transmigration is still active in Tanjung Jabung and opens new upland food crop projects in

[7] So called because of their intermediate topographic position between the mountainous district of Kerinci and the coastal district of Tanjung Jabung.

the intermediate districts. In the 1980's, the intermediate districts show the highest increase in population because of the numerous plantation projects related to Transmigration.

Figure 1. Evolution of the population in Jambi (1961-1990)

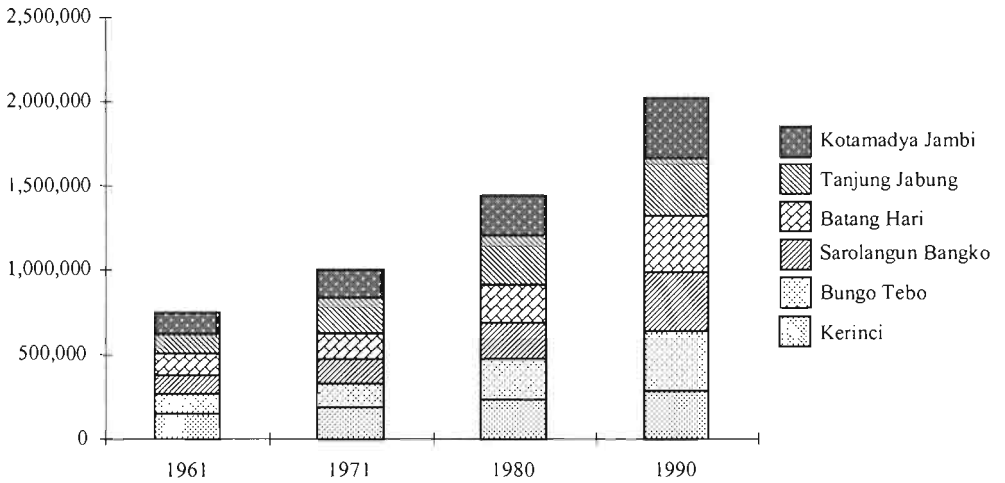


Table 3. Average population increase between censuses

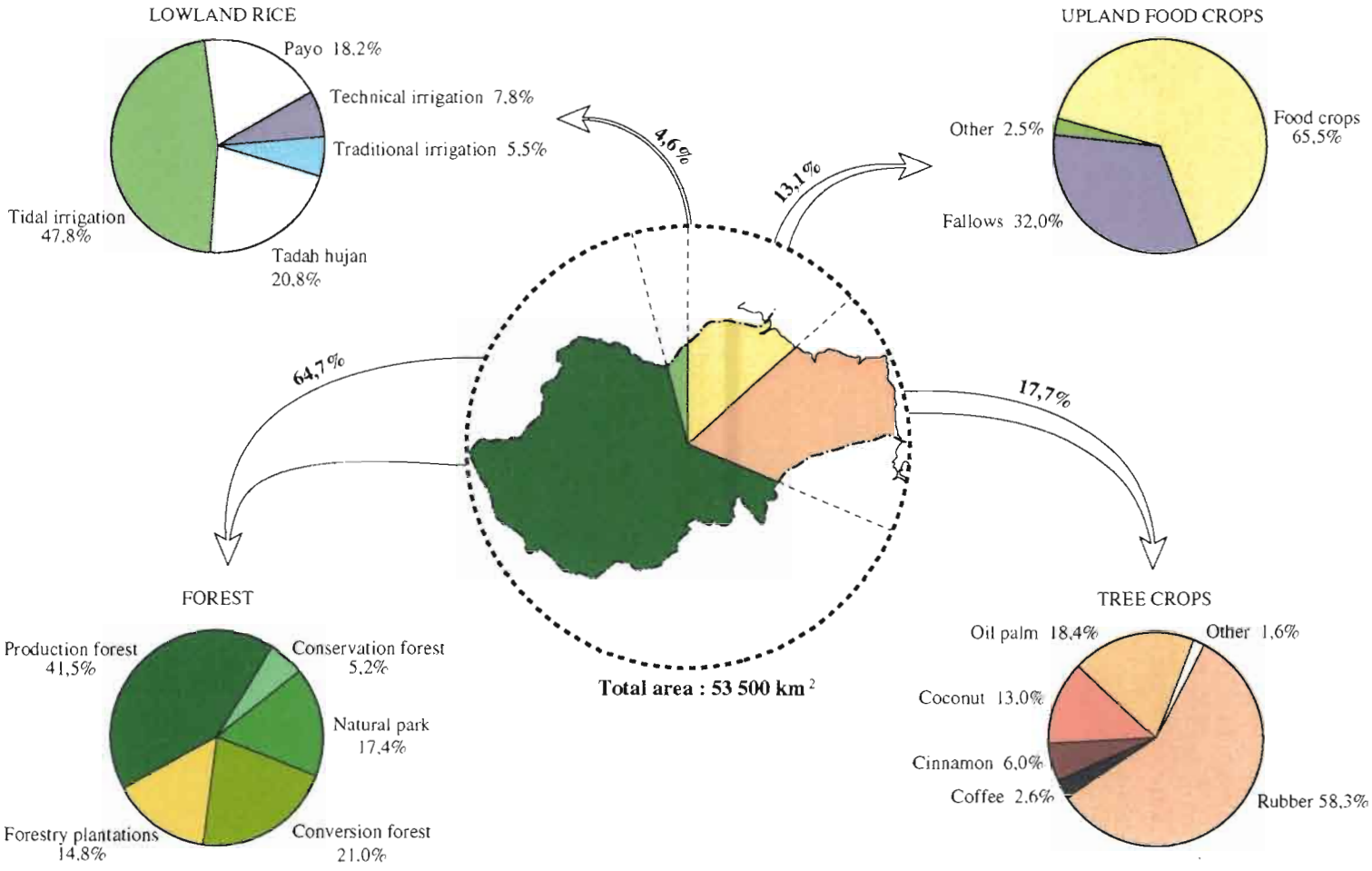
District	1961-71	1971-80	1980-90
Kerinci	1.82	2.88	1.59
Bungo Tebo	2.27	5.88	4.27
Sarolangun Bangko	2.53	4.73	4.88
Batang Hari	1.79	3.42	4.16
Tanjung Jabung	6.27	3.84	1.84
Kotamadya Jambi	3.44	4.24	3.98
Jambi	**3.04**	**4.11**	**3.40**

Source: Penduduk Propinsi Jambi, BPS, 1990.

1.2. Land use

According to official figures, 65 % of the land area of the Province is still under forest, or more exactly under forest status. Plantations come second with 18 %, upland food crops third with 13 % and lowland rice count for less than 5 % of the total surface area. More details are given in figure 2.

Fig. 2. Land use in Jambi (1996)



Source : Jambi dalam angka 1996; Statistik pertanian tahun 1995.

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These figures are rough estimates and should be taken with much caution[8]. They give more an idea of the overall potential of the Province than a record of the actual land use. Only a very little part of the area registered as lowland rice is cultivated on an intensive or regular basis. As for plantations, the only rather accurate data concerns private and government estates. For smallholder plantations, which are far exceeding estates, some sources differentiate productive from abandoned plantations... while others don't. The area under upland food crops is probably the less reliable as nobody has a clear idea of the actual use (and frequency of use) made of lands officially devoted to food crops. As to forestry, it is well known that the official figures relate only to the status of the land and do not consider the forest coverage.

1.3. Gross regional domestic product

The part from agriculture in the gross regional domestic product decreased considerably in Jambi from 37 % in 1985 to 28 % in 1995. During the same ten years, the part from processing industries increased by around 6 % while other sectors remained more or less unchanged. Detailed figures are given in table 4.

Though the relative contribution of the agricultural sector to the GRDP decreased at the provincial level, it remains decisive at the district levels of Batang Hari and Sarolangun-Bangko. The figures for Bungo-Tebo are not yet available but are probably in the same range. Often considered as secondary, the contribution of the food crops sub-sector is far from being negligible and even exceeds that of the tree crops sub-sector in the province of Jambi[9]. In Batang Hari the contribution of the food crops sub-sector is similar to that of the tree crops, and in Sarko it is more than twice. Though smaller, the contributions from animal and fish farming are not negligible. Unfortunately, available figures are not enough detailed to assess the part of home industries in the broader sector of processing industries.

[8] In the *Statistik pertanian Jambi* of 1995, the total of lowlands and uplands fairly exceeds the surface area of the Province.

[9] If we assume that the figures used for the calculation of the GRDP are reliable.

Table 4. Jambi gross regional domestic product (in % at current prices)

Sector of activity	Jambi 1985	Jambi 1995	Batang Hari 1995	Sarko 1995
1. Agriculture	36.9%	27.8%	30.1%	47.8%
a. Food crops	17.0%	11.8%	8.8%	22.9%
b. Tree crops	8.2%	7.4%	9.3%	10.1%
c. Animal farming	5.8%	2.8%	3.9%	3.1%
d. Forestry	3.1%	5.0%	7.0%	10.9%
e. Fisheries	2.7%	0.7%	1.2%	0.8%
2. Mining and quarrying	9.9%	3.8%	11.0%	2.7%
3. Processing industries	11.1%	17.5%	21.7%	3.8%
4. Electricity and water	0.6%	0.7%	0.1%	0.2%
5. Construction	2.2%	6.2%	4.5%	8.6%
6. Commerce, hotels and restaurants	17.0%	18.7%	16.4%	14.5%
7. Transportation and communication	6.7%	10.2%	4.5%	7.2%
8. Financial and business services	4.5%	4.5%	3.2%	4.4%
9. General services	11.2%	10.6%	8.4%	10.8%
Relative total	100.0%	100.0%	100.0%	100.0%
Absolute total (million rupiah)	**712,465**	**3,457,573**	**524,734**	**483,614**

Sources: Jambi dalam angka, 1987 dan 1996; Batang Hari dalam angka, 1996; Sarko dalam angka, 1996; Bungo-Tebo not available.

2. Food crops and horticulture

2.1. Food crops

2.1.1. Lowland rice

The total lowland rice surface area of Jambi in 1995 varies greatly according to different sources from the same origin:

- 144,164 ha; Wilayah komoditas tanaman pangan Jambi, 1996.
- 165,234 ha; Statistik pertanian tanaman pangan, BPS, 1995.
- 246,481 ha; *Jambi dalam angka, 1996* (after correcting the total of the column).
- None of these figures is more reliable than the other. Nevertheless they give a broad idea of the distribution of rice paddies in the Province according to the level of water control.

Table 5. Distribution of lowland rice (hectare) in Jambi in 1995

District	Irrigated			Rainfed	Tidal	Payo	Total
	Full	Half	Village				
Kerinci	1,477	6,366	1,517	5,260		2,309	16,929
Bungo Tebo	2,015	1,737	2,248	7,571		6,492	20,063
Sarko	30	307	1,741	9,010		2,378	13,466
Batang Hari		264	650	3,299	183	17,022	21,418
Tanjung Jabung		685	2,939	9,155	78,730	147	91,656
Kodya Jambi				20		1,682	1,702
Jambi	**3,522**	**9,359**	**9,095**	**34,315**	**78,913**	**30,030**	**165,234**

Source: Statistik pertanian tanaman pangan 1995, BPS.

The figures of table 5 clearly show that irrigated rice cultivation (even at very unsophisticated technical levels) is underrepresented in the three intermediate districts concerned by the JRDP. Rainfed (*tadah hujan*) and *payo* rice fields represent the bulk of the figures in Bungo-Tebo, Sarko and Batang Hari. In *tadah hujan* (literally "rainwater receptacle") rice fields, the crop is exclusively inundated by rainwater... which renders a second cropping season hazardous. The *payo* are the depressions behind the levees of the main rivers and their tributaries. Inundated by the big river floods, the *payo* are generally cultivated when the water level falls[10] at the end of the rainy season. There too, a second cropping season would be hazardous. The percentage of double cropping in the Province remains low (18.5 %), especially in the district of Batang Hari which is dominated by rainfed and *payo* rice fields (table 6).

Table 6. Number of lowland rice crops per year in Jambi (1995)

District	One crop ha	Two crops ha	Total ha	Two crops % of total
Kerinci	5,901	11,028	16,929	65.1%
Bungo Tebo	14,243	5,820	20,063	29.0%
Sarolangun Bangko	11,125	2,341	13,466	17.4%
Batang Hari	21,218	200	21,418	0.9%
Tanjung Jabung	80,447	11,209	91,656	12.2%
Kodya Jambi	1,702		1,702	0.0%
Jambi	**134,636**	**30,598**	**165,234**	**18.5%**

Source: Statistik pertanian tanaman pangan 1995, BPS.

[10] After the big floods of March or April.

Thus it is not surprising that the Dinas for food crops insists on rice intensification programs. As a matter of fact, there is much room for improvement, especially for rainfed and *payo* lowland rice. Up to now, only 15 % of rainfed lowlands are double cropped. Increase double cropping would require the implementation of rather costly regional irrigation networks. Small-scale works at the village level are less costly but also less efficient as we could see in Sungai Manau (Sarko district). Inlets proved undersized to ensure a regular water inflow during the dry season and most of the irrigation works – of low quality – were no longer in working order after only a year. Today, none of the area is double cropped and part of it has even been left fallow.

In already irrigated areas there is still room for improvement by intensification, at least from a technical point of view. Pak Baharudin of Sungai Manau (Sarko) is one of these famous *sawah kincir* (paddle wheel rice field) farmers close to the Kerinci district. He owns a hectare of rice field irrigated by a paddle wheel with water from the river. Every year, after a double crop of rice, he builds a new *kincir*. The average yield ranges from 2 to 3.3 tons of paddy per hectare. He once used fertilizers and pesticides, but stopped a year or two ago. He could be called a "traditional" farmer were it not his labor organization. In fact, he resembles more a gentleman farmer as most of the work is done by paid labor. Plowing and harrowing is done by a small entrepreneur with a hand tractor (200,000 Rp/ha), pulling out the rice and weeding is given to daily laborers. Irrigation maintenance and harvesting are the only operations entrusted to family labor. Pak Baharudin could still improve his yields. He knows it, but is not interested in it. His present yields cover the cost of cultivation and ensure him more than self-sufficiency in rice. To earn cash, he has other opportunities:

- his rubber trees are a source of regular cash used for every day's needs and to pay day-laborers;
- his cinnamon trees may provide extra cash for bigger expenses like tuition fees or medical expenses;
- in case he needs more cash, he takes some friends to the forest to look for valued timber.

To Pak Baharudin and his neighbors, rice farming is only meant to achieve rice self-sufficiency. The return to labor from rice cultivation is too low compared to other opportunities (tree crops, forest resources) to justify any kind of costly or risky intensification in rice cultivation.

2.1.2. Upland food crops

Considering the doubtful reliability of data concerning lowland rice, data about upland crops is even more questionable. The bad accuracy of data comes first from the fact that land is not permanently allocated to the same crop (as is the case with lowland rice or tree crops). Secondly, in Jambi, upland crops are rarely grown as single crops but are generally intercropped with tree crops during the first years of plantation establishment (*tumpang sari*) or with other food crops (intercropped or relay planted) or both. No mention of intercropping is made in the statistics available. Third, there are always great discrepancies between areas planted and areas harvested due to the large amount of crop failure because of pests or drought or both.

Table 7. Harvested area (ha) of upland food crops in Jambi in 1995

District	Rice	Maize	Cassava	Groundnut	Soybean
Kerinci	533	1,390	225	524	158
Bungo Tebo	19,844	2,215	7,268	775	3,638
Sarolangun Bangko	21,543	3,458	9,017	1,118	4,015
Batang Hari	4,075	940	1,578	503	1,438
Tanjung Jabung	4,827	1,424	939	623	2,968
Kodya Jambi		72	202	130	
Jambi	**50,822**	**9,499**	**19,229**	**3,673**	**12,217**

Source: Statistik pertanian tanaman pangan 1995, BPS.

Upland rice in swidden cultivation nearly disappeared in Jambi. Swidden cultivation as a farming system is only surviving in the remotest areas upstream the main rivers. But upland rice is often associated with maize and groundnuts in clearings intended for tree crop development (generally rubber). During the two or three first years before the canopy closes, food crops pay for the clearing and the maintenance work of the plantation. Regeneration of old unproductive rubber plantations can follow the same pattern.

Transmigration centers are generally the only areas where one can find permanent upland food crop plots. As long as the center remains under control of the Department of Transmigration, reallocation of food crop plots to alternative uses is prohibited. As usually cultivation is no longer profitable after a few years, transmigrants generally leave the land unattended. The plot quickly turns into *Imperata* wasteland but is still officially registered as food crop plot. After the center is handed over to the regional government[11], the transmigrants may convert the land to whatever

[11] Five to ten years after the opening of the center.

they wish, depending on available opportunities. Lately, rubber and oil palm were the favored crops.

Since the beginning of the 1980's, the authorities try to develop soybean cultivation in Jambi. With the support of the EEC a big soybean development center was established near Muara Bungo. On 400 ha, the center was first conceived to become the major seed producer for whole Indonesia. Ambitions were later reduced to accommodate Sumatra only. Today the center (Balai Benih Palawija) struggles to satisfy the Province's needs[12]. Of the 90 ha soybean and 33 ha maize targeted for 1997/98, only 50 and 16 ha could respectively be implemented and the seed production is far too short to satisfy demand. Moreover, when seeds are made available to farmers, the main cropping season is already over and farmers are no longer interested in soybean seeds. To meet local needs, the seed farm should be able to produce off-season.

But even though, farmers show little interest in soybean cultivation. Pak Wardiono of Pamenang (Sarko), former soybean cultivator, summarizes the problem. Good quality soybean seeds are difficult to find on the market, they are often too old, of uncontrolled provenance and always expensive. In order to achieve a correct yield, soybean needs high fertilization on a routine basis. Liming at a rate of 2 tons/ha should be implemented at least every five years. Soybean being very sensitive to pests, efficient plant protection implies the use of high cost pesticides. Labor requirements are high for soil preparation, weeding and harvest. Risk of total crop failure is very high because of uncontrollable pests (wild boars), drought or excessive rainfall at harvesting stage. Last but not least, the official price of soybean set by the government is too low in comparison to the cultivation cost and the risks incurred. In short: soybean cultivation doesn't pay.

Pak Wardiono solved the problem his way. He stopped growing soybeans for a few years and converted his food crop plots into oil palm. All his neighbors did the same in this former Transmigration center. There and in many other places in Jambi, every year thousands of hectares of food crop plots are converted into plantation crops.

2.2. Horticulture

Data about horticulture is available from many sources and in various formats but no one is reliable. The most problematic is data about areas

[12] The local administration did not have the means to upkeep the buildings and the material handed over after the end of the EEC project. The generator set and most of the tractors are out of order and cannot be repaired for lack of spareparts. The allocated budget is insufficient to ensure the maintenance of the numerous buildings.

under fruit trees and production per hectare... as fruit trees are generally associated and not planted in pure stands. The table 8 lists the number of trees of the major horticulture crops in Jambi. These figures are not much more reliable but they give a rough idea of the relative importance of the different species. Though considered of prime importance in the Province, data about the number of *melinjau* trees (*Gnetum gnemon*) is not available.

Fruit trees are grown in three kinds of orchards. Transmigrants use to mix a great number of trees on their home plots (*pekarangan*). Individual production is generally low but the concentration of many *pekarangan* in Transmigration centers makes commercialization easier. Local people possess orchards on the river levees around the villages or isolated amidst rubber plantations. Often called *pulau duku* (duku island), these orchards coincide with former temporary dwelling places in relation with the shifting cultivation cycle.

Table 8. Number of trees, production and average yields of horticulture crops

Type of crop	Number of trees	Production (tons)	Yield (kg/tree)
Avocado	87,452	3,104	35.5
Mango	186,808	4,548	24.4
Rambutan	262,780	6,667	25.4
Duku/Langsat (*Lansium domesticum*)	129,758	10,830	83.5
Citrus	269,118	5,184	19.3
Durian	344,640	11,504	33.4
Jambu (guava, rose apple...)	149,272	3,192	21.4
Sapodilla	31,680	893	28.2
Papaya	273,924	3,107	11.3
Banana	1,292,768	14,524	11.2
Pineapple	2,086,469	1,139	0.6
Salak (*Salacca zalacca*)	13,245	79	6.0

Source: Indikator pertanian tahun 1995, BPS Jambi.

Availability of selected material is no longer a problem in Jambi. A few efficient nurserymen are already able to provide seedlings in large numbers. Pak Samiin, for example, is established in Rimbobujang (Bungo-Tebo) since 1992. He produces any kind of fruit tree, ornamental, rubber and oil palm. He accepts big orders, delivers to any place of the archipelago and guaranties his products for a month's period. He recently shipped 40,000 grafted Sikotong durian to Kalimantan. The main problem to solve remains the distribution of small amounts of seedlings to a great number of smallholders.

The efforts of the Dinas to promote horticulture have been limited so far to demonstration activities. In 1992/93, the Dinas decided to turn 1,000 ha at Bajubang (Muara Bulian) into a fruit production center (*Sentra produksi buah-buahan*). After a few years only 700 ha remained and funds run short. In 1997/98, the Dinas selected 50 ha out of the total area as *inkubator*. The idea was to push the farmers to secure the whole area by promoting adequate techniques on a limited plot: the *inkubator*. There, the most modern techniques of fertilization, pruning, drop irrigation, etc. are taught to the farmers. The basic assumption at the origin of the project is that the farmers don't know the adequate techniques... and that they would adopt them if they knew. A short discussion with Pak Sukardi, head of the farmer's group, leaves no doubt about the falseness of this assumption. To him, farmers are not ignorant of most of the techniques taught. They perfectly know that fertilization, irrigation, weed and pest control have beneficial effects on the crop. But they also know that inputs have a high cost and that labor gets a better return from rubber, oil palm or off-farm jobs. According to Pak Sukardi, unless heavily subsidized, the farmers will not adopt the promoted techniques. The *inkubator* will probably bear no fruit.

3. Aquaculture and inland fisheries

The stress put on fish farming (and consequently the little interest in fishing activities) by the Dinas is surprising if one considers the figures in table 9. According to official data, even if it concerns 52 % of the households involved in fishery activities, fish farming only represents 7 % of the total annual fish production of Jambi. As usual, these figures, though precise down to the unit, are not more than very rough estimates. Marine and inland fisheries figures are generally based on estimations of yearly increase from figures estimated the year before. Production of fish farming is obtained by multiplying an average yield by the surface of ponds or by the number of cage farmers. According to the figures in tables 9 and 10, this gives an average of 250 kg of fish produced per year per cage farmer. As most fish farmers own more than one cage and manage to get two to three harvests per year... 250 kg per year is probably a very underestimated figure.

The evolution of production estimates is probably more reliable than absolute figures because it is related to the increase in numbers of pond and cage farmers. From 1992 to 1996, the production of ponds increased by 79 % (from 814 t to 1458 t) while cage production increased by 435 % (from 172 t to 920 t). Cage fish farming has been booming in the

intermediate districts since 1994. The activity shows an interesting complementarity between local people, migrants and government agencies.

Table 9. Fishery production (tons) in Jambi in 1995

Type of activity	Kodya Jambi	Batang Hari	Bungo Tebo	Sarko	Kerinci	Tanjung Jabung	Jambi
Marine fishery						19,976	19,976
Fresh water f.	355	2,083	498	1,424	494	752	5,606
Pond farming	80	260	74	561	297	28	1,300
Cage farming	82	461	16	25	8	0	592
Tambak						6	6
Fish and rice			5	18			23
Total	**517**	**2,804**	**593**	**2,028**	**799**	**20,762**	**27,503**

Source: Kantor Dinas Perikanan (1996); Jambi Dalam Angka 1996.

Table 10. Households involved in fishery activities in Jambi (1995)

Type of activity	Kodya Jambi	Batang Hari	Bungo Tebo	Sarko	Kerinci	Tanjung Jabung	Jambi
Marine fishery						2,391	2,391
Fresh water f.	930	4,500	615	1,686	545	527	8,803
Pond farming	990	3,450	915	2,145	1,862	270	9,632
Cage farming	268	835	378	610	299	0	2,390
Tambak						60	60
Fish and rice			62	52			114
Total	**2,188**	**8,785**	**1,970**	**4,493**	**2,706**	**3,248**	**23,390**

Source: Kantor Dinas Perikanan (1996); Jambi Dalam Angka 1996.

As the best locations for cage fish farming are along the main rivers, local Jambi people compose the bulk of the growers. Sundanese or Javanese migrants take advantage of their know-how to manage the hatcheries. The Dinas helps to provide the broodstock, trains hatchery owners and growers, promotes modern cultivation techniques and studies the farming potential of not yet cultivated local fish species.

The fish farmers:

Pak Saib lives in Senaning, a small village along the Batang Hari. Cage culture was first introduced in the village in 1996 via the IDT[13] program. Pak Saib took one out of the 11 cages proposed by the program. He was able to pay back the credit (560,000 rupiah) with his first harvest six months later. For a total cost of 900,000 rupiah (cage, fry and feed) he got a total

[13] *Instruksi Desa Tertinggal*, national poverty alleviation program.

Photo 4. Cage culture, a booming activity in Jambi

Photo 5. Fishponds, an activity still to be developed in Jambi

harvest worth 1,850,000 rupiah. Today he owns 6 cages and the total number of cages in the village increased from 11 to more than 300 in only 2 years. Pak Saib prefers growing catfish rather than tilapia. The growing period is longer (6 months compared to 4 months for tilapia) but the fish is more resistant and can partly be fed with kitchen waste, which considerably reduces the cost of feed. The initial cost of a cage is around 300,000 rupiah (170,000 for the wooden cage, 30,000 for the net and 100,000 for the four floaters) and the maintenance cost is considered negligible. Input-output analysis is summarized in table 11.

Table 11. Input output analysis for a six-month catfish cage culture

Items:	**Amount**	**Unit cost**	**Total**
Catfish fry: (size 1.5 cm)	500 unit	175 Rp	87,500
Feed: shrimp pellets (first month)	3 kg	10,000 Rp	30,000
Feed: pellet 88 (2nd and 3rd month)	50 kg	1,800 Rp	90,000
Feed: pellet TL9 (4th to 6th month)	600 kg	1,600 Rp	960,000
Total proportional cost:			**1,167,500**
Harvest (6,000 Rp/kg)	450 unit	4,500 Rp	**2,025,000**
Return to labor			**857,500**

Source: Field survey, March 1998.

Even with the sharp increase in price of feed, cage farming remains a quick and high yielding activity with low risk and little labor requirement (two hours a day for 6 cages). Up to now, the only problem fish farmers are facing is the lack of fry. Today, in Senaning, cage culture represents the first source of income for the families who were unable to rehabilitate their old rubber plantations. The new activity also provided work to local craftsmen (cage building) and fishmongers. Early every morning, 9 motorcyclists leave the village to commercialize the fish as far as Mersam (100 km).

In Tanjung Agung (Rantau Pandan) cage farming experienced a quick start in 1995 with 187 units, but dropped to 60 units in 1998. What could be misinterpreted as a lack of interest by farmers is only the result of competing activities. In 1996, most families from Tanjung Agung participated in the opening of a 2,000 ha area of rubber plantation at quite a distance of the village, which obliged them to reduce fish farming activities. Pak Agus Salim did not join the group and still manages a 10-unit cage farm. He grows common carp in bamboo cages[14] harvested every 4 months.

[14] A bamboo cage costs 100,000 Rp and lasts 2 to 3 years.

Table 12. Input output analysis for a four-month common carp cage culture

Items:	Amount	Unit cost	Total
Common carp fry: (size 8-12 cm)	400 unit	275 Rp	110,000
Feed: concentrate	600 kg	2,300 Rp	1,380,000
Feed: self-produced			100,000
Total cost:			**1,590,000**
Harvest	300 kg	8,000 Rp	**2,400,000**
Return to labor			**810,000**

Source: Field survey, March 1998.

Since the monetary crisis, fish farming can only compete with rubber tapping[15] if farmers manage at least 8 to 10 cages. With 10 cages in rotation, Pak Agus Salim harvests a cage at least every two weeks. This enables him to buy the fry and the feed for the next rotation and leaves him with a 1,6 million rupiah monthly income. The main problem for fish farmers remains the lack of good quality fry. Local hatcheries often prove unable to satisfy an increasing demand.

The hatcheries:

The quick development of cage farming in Jambi induced a high demand for fry. As fry is difficult and expensive to ship from the traditional producing areas (West-Java), anybody with the adequate know-how could make a fortune in Jambi. Three years ago, Pak Catur (27 years old) decided to make use of the experience gained as student at private and public hatcheries in Java. He borrowed money from his father to buy 0.3 ha of land close to a good source of water and started with two small hatchery ponds. He soon added four more ponds and now produces 15,000 catfish fry and 10,000 tilapia fry a month. He earns 1,650,000 gross income and nearly 1,500,000 net income per month (or return to labor for two family workers, considering operational costs only). As unsatisfied demand is still high in Jambi, he is willing to invest in selected broodstock, new ponds and better equipment to increase his output.

Pak Taskam was born in Ciamis (West Java) and grew up amidst fishponds. With the booming fish farming in Jambi of the early 1990's he started his own hatchery in a village close to Jambi. His 14 ponds cover 0.25 ha altogether. On the average, he produces 15,000 tilapias and 10,000 carps a month, to say a gross output of 2,125,000 Rp and a net return to labor of around 1,500,000 Rp per month.

[15] In Tanjung Agung, since the price of rubber reached 2,500 Rp/kg a rubber tapper can earn up to 75,000 Rp per day.

Pak Sabidi runs the Mina Sejahtera hatchery in Bajubang (Muara Bulian). Born in West-Java, he migrated to Jambi in 1955 to work as daily laborer on rubber plantations. In 1993, he borrowed land from the head of village and started a small hatchery. He now manages 9 ponds totaling 0.5 ha and producing 40,000 tilapias, 10,000 carps and 15,000 catfish a month. His monthly gross income averages 10 million rupiah (with a 30 % production cost). Because of the booming demand for fry, hatcheries benefit from sustained economic returns and their owners are willing to develop their business.

The development of hatcheries faces two main problems:

- in spite of their good results, local banks still hesitate to lend money to hatcheries[16];
- good quality broodstock is presently unavailable in sufficient quantity in the Province.

The Dinas:

The Dinas Perikanan played an important role in the fish-farming boom in Jambi. It first provided comprehensive packages to fish farmers, including fry, feed, technical information and training sessions for growers and hatchery owners. As private hatcheries progressively take the lead in fry production, the Dinas activities shift (or should shift) to more upstream activities like fundamental and applied research and training courses.

The main bottleneck preventing the development of hatcheries in Jambi remains the unavailability of good quality broodstock. Therefore the first priority for the Dinas should be to provide certified broodstock to hatcheries rather than competing with them for fry production. The second priority should be to diversify fish farming by the domestication of new species with high potential. The research work started at the Loka-BAT[17] of Sungei Gelam is most promising. The domestication of local fish species (*patin sungai, botia, belida, labi-labi, papuyu, and petutu*) is economically interesting as most local species are palatable and reach high prices on the market. From an ecological point of view, it would also avoid the extinction of many species by excessive fishing. The difficulties experienced by the Loka-BAT to collect broodstock from Jambi rivers prove that time has come to tackle this matter seriously. High level technical assistance is needed to overcome the major breeding problems and to organize training sessions for hatchery owners.

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[16] Most hatcheries own little assets and have no collateral.

[17] Loka-Budidaya Air Tawar, aquaculture research center built on the same model as the BPPAT of Sukabumi.

The Dinas should also look for ways to reduce the dependence of fish farmers on imported feed in order to reduce production costs. Alternative sources of feed are available in Jambi. Though there is no room for large feed producing units, small units (home industries) could take advantage of the high demand in cheap feed. The Dinas could help these small units to control the quality of their product.

4. Animal farming

Figures about poultry (table 13) are no longer relevant[18] as the whole sub-sector faces bankruptcy since the outburst of the monetary crisis. The largest units are the most severely hit as their assets were generally acquired on a credit basis.

Pak Haji AM Armynal is one of the five owners of large layer units around Jambi. He also owns a small poultry shop where he sells eggs, day-old-chicks, feed, medicine and small equipment for farmers. Until September 1997 he managed a 50,000 laying hen unit and produced 35,000 eggs a day, sold at an average unit price of 150 rupiah. With the harsh increase of feed price following the devaluation of the rupiah, the break-even point (for proportional costs[19] only) was pushed up to 225 rupiah per unit. The new floor price of 250 rupiah per unit could not be achieved on the local market where the highest prices reached 200 to 225 rupiah. On one hand, consumers reduced their purchases and, on the other hand, large egg producers from Medan dumped prices at 175 rupiah. Since September, Pak Armynal loses 50 rupiah per egg sold on the local market. He is unable to renew his stock of layers and already reduced it to 30,000 hens. If selling prices don't increase he will be out of business in a three-month period.

Meanwhile, he puts his hope in broiler production. The sector is also ailing but because of an increasing demand from the outside, the price of chicken raised dramatically and covers again production costs. Pak Armynal currently manages a network of ten broiler producers in the village of Tangkit. All the farmers belong to the same ethnic group as Pak Armynal (Bugis) and most are related to him by family ties. Pak Sanusi, for instance, is raising 2,000 broilers for Pak Armynal. He provides the hen-house and all the labor, while his godfather provides the ten-day chicken, feed for 30 to 45 days, medicine and technical support. The proportional costs come to 5,000 rupiah per broiler, including 500,000 rupiah as wage for two months of work. If the average selling price remains over 6,000 rupiah per kilogram

[18] If they ever were...

[19] Feed counts for 75 % of the break-even point.

Photo 6. Broiler production is surviving the crisis

Photo 7. The laying hen sector is facing bankruptcy

of broiler[20], the operation leaves an interesting benefit. Some farmers are ready to share the risk with Pak Armynal and thus share equally the benefits (or the loss) if any. But most prefer the security of a monthly wage and leave the risk and the benefits to their godfather.

Table 13. Poultry population in Jambi (1993-1996)

District	Local hen	Layer	Broiler	Duck
Kodya Jambi	230,437	48,700	638,000	15,169
Batang Hari	873,027	172,010	737,800	52,596
Bungo-Tebo	611,124	2,276	192,450	24,444
Sarolangun-Bangko	799,946	7,130	279,513	50,732
Kerinci	860,309	43,725	10,450	278,313
Tanjung Jabung	712,103	19,639	123,817	59,766
Jambi 1996	**4,086,946**	**293,480**	**1,982,030**	**481,020**
Jambi 1995	3,916,854	261,997	2,089,950	424,162
Jambi 1994	3,734,536	249,017	1,343,944	439,181
Jambi 1993	3,456,223	213,424	1,108,350	409,887

Source: Kantor Dinas Peternakan Tk. I, 1997; Statistik Peternakan Propinsi Jambi, 1996.

Animal husbandry is one the favored sectors by national and regional governments as can be seen from the numerous aid programs: Banpres, APBD Tk.1, APBN Dati 2, APBN Demo unit, IBRD 2, PTDT, Crash program and IFAD[21]. The evolution of the stocks of cattle, buffaloes and goats from all government aid programs is summarized in table 14.

Table 14. Animal husbandry programs: evolution of stocks (1996)

Animal	Position in 1995	New drop	Born	Dead	Lost	Stored	Sold	Cleared	Position in 1996
Cattle	20,025	1,591	2,042	446	25	1,353	996	1,349	19,372
Buffalo	658	40	49	12	0	24	13	56	634
Goat	5,682	95	246	182	121	163	17	103	4,624

Source: Laporan Tahunan Dinas Peternakan, Propinsi Jambi 1996/1997.

[20] The broilers are sold after 30 to 40 days of raising (1 to 1.5 kg average weight). The average price on the local market was 6,000 rupiah/kg in early March 1998 and reached 10,000 rupiah at the end of the same month.

[21] Banpres: Presidential Fund; APBD Tk.1: Provincial budget; APBN Dati 2: District budget; APBN Demo unit: Demonstration unit; IBRD 2; PTDT: Pengadaan Ternak Daerah Transmigrasi, cattle for Transmigration projects; Crash program; IFAD: International Fund for Agricultural Development.

According to official figures, since 1993 the ruminant population increases regularly in Jambi while the numbers of horses and pigs decrease (table 15). As usual, figures are only rough estimates. In order to avoid taxation and levies, neither local people nor transmigrants are very accurate when they report their stocks to local authorities. A rapid check at village level always shows important discrepancies. Local Jambi people generally raise buffaloes and cattle while transmigrants only rear cattle (PO Brahman and Balinese). Buffaloes and cattle mostly graze unattended in the *payo* and fallow areas in Jambi villages and are housed-animals in zero-grazing systems in Transmigration villages.

Table 15. Total animal population of Jambi (1993-1996)

District	Cattle	Buffalo	Horse	Goat	Sheep	Pig
Kodya Jambi	2,406	557	25	5,695	933	2,419
Batang Hari	14,131	17,840		31,569	13,833	4,284
Bungo-Tebo	33,407	25,781	3	32,237	12,992	196
Sarolangun-Bangko	32,708	33,766	23	21,427	17,865	
Kerinci	48,924	3,736	492	14,662	3,954	
Tanjung Jabung	7,596	1,846		12,896	653	1,107
Jambi 1996	139,172	83,526	543	118,486	50,230	8,006
Jambi 1995	132,864	81,300	1,159	115,429	37,894	9,881
Jambi 1994	123,409	77,167	1,109	111,852	42,211	11,829
Jambi 1993	112,915	74,334	1,115	106,328	42,416	10,578

Source: Kantor Dinas Peternakan Tk. I, 1997; Statistik Peternakan Propinsi Jambi, 1996.

In the village of Senaning (Batang Hari), 140 families share more than 300 heads of cattle while only a hundred are officially registered. The animals graze freely in the fallow areas around the village and are only tethered when the *payo* are cultivated. The 20 head of cattle introduced since 1993 through the Bandes program (revolving system) expanded into 80 head in 1998. On the average, only 15 head of cattle are sold a year. Animal husbandry is still not perceived as a regular productive activity. Jambi people rather consider cattle raising as a savings account and only sell cattle for specific needs: marriage, circumcision, medical expenses, and tuition fees...

Transmigrants consider cattle raising in a different way. As animals cannot be left wandering around as in a Jambi village, cattle must be kept in stalling and fed. These conditions restrict the number of head of cattle a single transmigrant may raise to a maximum of four. Pak Wardiono, a Javanese transmigrant from Bukit Bungkul (Pamenang), got his first cow in

Photo 8. Cattle fattening, a high return to family labor

1984 by the IFAD program. He gained full ownership over his cattle in 1987 after paying back two calves to the project. Since 1987 he sold a total of 9 head of cattle. The income from animal husbandry served to pay for his son's marriage, to pay tuition fees, to build a new house, to buy a motorcycle and a color television, and to pay five trips to Java to visit relatives. He still raises three heads of cattle on a regular basis.

As it only requires 2 to 3 hours of work a day, animal husbandry is considered as a secondary activity. For his daily needs, Pak Wardiono counts on his 3 hectares of rubber (TCSDP). For his pension, he awaits the income from the 2 hectares of oil palm developed in cooperation with PT. Krisna Duta. But animal husbandry is of utmost importance for big expenses as the sale of a two-year old cattle may provide a cash income of up to 1.8 million rupiah.

Pak Sumadi, transmigrant from Sukamaju (Rimbobujang), participated twice in a cattle fattening program organized by the Dinas. In 1993, he received two one-year old calves valued 375,000 and 400,000 rupiah. After 8 months of fattening, the animals were respectively sold 950,000 and 1,100,000 rupiah. The benefits were shared on a 40-60 % basis between the Dinas and the farmer, which left Pak Sumadi with a return to labor of 765,000 rupiah. In 1994, Pak Sumadi took two calves (total value 870,000 rupiah) for a twelve-month fattening period and sold them for 2,755,000 rupiah. Net return to labor reached 1,320,000 rupiah (30-70 % share basis), or 1,200 rupiah per hour of work (3 hours per day on average).

Rimbobujang farmers don't depend on animal farming to make a living. Pak Sumadi already owns a 4 hectare high-yielding rubber plantation, which procures him a regular and high income. Cattle raising is just meant to keep him busy in the afternoon and to provide an additional income on a yearly basis. Farmers now reject the traditional *gaduhan* 50-50 share ratio and ask for 60 to 70 % of the fattening benefits. Risks are reduced thanks to an intensive sanitary control by the Dinas[22]. Feeding the animals is not problematic and can even be coupled with weeding the rubber plantations. During the 1997 drought, Pak Sumadi and five friends chartered a small lorry to collect grass in the neighboring estates. As the fattening program proved successful, calves are in high demand in his neighborhood. Rather than asking for credit, farmers prefer buying calves cash. Unfortunately, demand considerably exceeds offer and too few calves are available.

[22] In 1994, only one out of 50 cattle died.

5. Handicrafts and home industries

The Dinas Perdagangan dan Perindustrian monitors a few home industries and craftsmen throughout the Province. It tries to promote local products at regional and national exhibitions, helps small entrepreneurs to find sponsors, organizes management courses and sometimes provides credit or small machinery. Because of budget limitations, all actions are undertaken at a very small scale and without any real follow-up.

In Pulau Betung close to Muara Bulian, Pak Sapar created an original model of chair carved out of one piece of *renggas* wood in 1991. His neighbors soon followed his example and today Sungei Betung counts more or less 200 woodcarvers and 50 shops along the main road. The average chair weighs around 50 kg and a whole set (four chairs and one table) is sold 1.5 million rupiah. With the crisis, business slowed down considerably. But local craftsmen are more concerned with the vanishing raw material. Big pieces are already difficult to find and in six years supply will come to an end. The woodcarvers are already looking forward to diversify their production.

Ibu Ponira manages Mekar Rotan, a small rattan processing industry, in Benit close to Muara Bungo. She buys rattan from collectors and sells mainly semi-processed material. Furniture making is not very developed as local manpower is too costly compared to Java. Since Asmindo's monopoly on rattan trade, most rattan processors are out of business[23]. Locally, rattan buyers are also facing an irregular supply of raw material as collectors mostly work during the dry season, from August to October. The volume of rattan collected is linked to the price of rubber. When the price of rubber is high, farmers are not very keen to spend 10 to 15 days deep in the forest to collect rattan.

In 1968, the village of Tangkit, close to Jambi, was founded by Bugis pioneers looking for new land to develop. The acid peat soil soon proved unable to sustain anything else but pineapple. Since the beginning of the 1990's, some farmers try to add value to their product by processing the pineapples. Pak Baso Intan, head of Tuli Mario, produces *dodol nenas* (pineapple fruit paste) since 1993-94. With the help of the Dinas, he obtained various credits from public companies. He employs 12 people on a regular basis and produces 100 kg of *dodol* per day. Because of the big smoke of 1997, pineapples stopped fruiting and he was out of business for three months. Since he ameliorated the packaging, Tuli Mario is a well-

[23] Bungo-Tebo counted 15 rattan processors in 1990. Only 2 survived.

known brand on the local market and is sold as far as Batam. Securing a market for his product is a matter of survival.

Pak Nurdin, manager of Cap Piala, produces *salai nenas* (roasted pineapple cuttings) in the same village. The Dinas helped him to obtain a credit from a public company to start his business and sent him to a managerial training course. He registered his own trademark and patent. To secure a market for his product, he recently signed a memorandum of understanding with Hero and Golden Truly supermarkets in Jakarta and Bandung.

Pak Suparjo, his wife and his daughter, transmigrants of Giriwinangun (Rimbobujang), produce *kripik tempe* (tempe chips) since 1982. Every day they buy 7 kg soybean, add ferment, wrap the whole in banana leaves, leave it to ferment for a day and a night, and roast the chips one by one next day. The return to labor (table 16) is around 30,000 Rp per day or 5,000 rupiah per hour (2 persons during 3 hours a day).

Table 16. Tempe chips home industry. Input-output analysis

Items	Amount	Unit Price (Rp)	Total price (Rp)
Soybean	7 kg	2,500	17,500
Tapioca	3 kg	3,000	9,000
Eggs	4 units	250	1,000
Rice flour	2 kg	2,000	4,000
Frying oil	3.5 kg	3,500	12,250
Fuel wood			1,000
Total inputs			**44,750**
Output	750 chips	100	**75,000**
Return to labor			**30,250**

Source: Field survey, March 1998.

Pak Suparjo is not interested in developing his home industry. Up to now his chips are easily sold on the local market. Increasing his production would oblige him to seek new markets. To him, tempe chips are only an additional source of income[24]. His 3 ha of rubber are his main source of income. At the present price of 2,500 Rp/kg rubber, he earns 1.5 million rupiah per month.

Since 1992 Ibu Kasihani manages Kopinkra Terpadu, a small cooperative producing banana chips in Bangko. Every day, except Friday, the cooperative provides work to 17 persons chosen among 55 members, all

[24] Or merely a way to keep his womenfolk busy, as he puts it.

women. Three persons (manager, quality controller and bookkeeper) are employed on a monthly basis.

Table 17. Banana chips production. Input-output analysis

Daily production	Amount	Unit Price (Rp)	Total price (Rp)
Banana	40 bunches	3,500	140,000
Frying oil	30 kg	4,000	120,000
Sugar	10 kg	2,000	20,000
Salt	1 kg	500	500
Vanilla	20 bundles	100	2,000
Fuel wood	18 bundles	500	9,000
Packaging	400 units	125	50,000
Inputs			**341,500**
Wages	20 workers	3,000-5,000	**85,000**
Total cost			**426,500**
Output	400 packs	1,300	**520,000**
Net daily benefit			**93,500**

Source: Field survey, March 1998.

Ibu Kasihani would like to develop the cooperative in order to provide more work for its members. The main problem remains to secure a market. Some supermarkets already contacted her, but they wanted to sell the chips under their own trademark. She now hopes that a higher quality packaging will enable the cooperative to sell its own brand in urban markets.

Photo 9. Dodol nenas Tuli Mario, a well-known brand in Jambi

Photo 10. Banana chips, a promising home industry

Chapter III

Major findings and discussion

1. Some opportunities and many constraints

Thanks to rubber, Jambi[25] is a rich province. Since the Dutch introduced the first rubber seedlings[26] in Mersam in the very first years of the XXth century, rubber has become the main source of cash income for Jambi people. Rubber is a blessing because it thrives on the poor acid soils of Jambi, because it survives in the forest re-growth without requiring much maintenance, because it is not very sensitive to pests and diseases... and because its latex provides the tapper with a high return for his labor. Rubber was most suited to Jambi's physical and human conditions: much land and little labor. But every rose has its thorn. Rubber fixed the opportunity cost of labor at a high level. Only very few activities could compete with such high returns to labor. Having important cash income, it was easier to buy manufactured products (or even food crops) rather than producing them. Consequently, many sectors of activity were entirely left out by local people.

Though to a lesser extent, these conditions still prevail today. With 2,500 Rp/kg of rubber at farm gate level, Jambi farmers[27] are rich. With only 3 to 4 hours of work early in the morning, a tapper can earn 50,000 Rp per day. With such an income, he can already make a comfortable living and is not really encouraged to start burdensome activities in the afternoon. Specialized in rubber tapping, local people do not develop many other skills. In spite of the numerous migrants who joined the Province, Jambi only counts 2 million inhabitants, which gives an average population density of 27 inhabitants per square kilometer in the intermediate districts and consequently a very restricted local market. For all these reasons, in Jambi, labor is expensive, rather unskilled and rare. Migrants from Java and Sulawesi possess more skills and are willing to work harder and for lower

[25] For greater convenience we use « Jambi » when we refer to the intermediate districts targeted by the JRDP.

[26] Merchants and pilgrims back from Mecca also smuggled in seeds from Malaysia.

[27] At least those owning rubber plantations.

wages than local people. At least for a start. As soon as they come to owning tree crop plantations, the same economic rules apply to them. But then, the migrants who possess specific skills are also be in a position to develop alternative activities even more rewarding than rubber tapping.

Jambi faces indomitable physical constraints, al least at smallholder's level: poor soils, high rainfall and aggressive pests. Jambi's red-yellow podzolic soils are leached by heavy rainfall, acid, poor in organic matter and deficient in most nutrients. Local people chose to adopt crops adapted to the physical conditions... while authorities often prefer to adapt conditions to adopted crops. The first choice limits opportunities to a few crops like rubber. The second has a cost farmers are generally not willing to pay. To increase soil fertility means high and recurrent liming and chemical manure. Combat pests costs in fences and pesticides, weeding costs in labor and/or herbicides. Food crops are the less favored by farmers because they incur all three expenses on a regular basis. Inputs are always high and so are the risks of total crop failure. With tree crops, high inputs and maintenance costs can be limited to the first years of growth till the canopy closes. Once the plantation is established, total crop failure seldom happens.

Jambi is no exception but rather the archetype of Sumatra's central East coast provinces. Thus it has the same opportunities and faces the same constraints. Till recently, there was a common belief in Jambi that the upgrading of road infrastructure in Sumatra would open new markets for local products and boost their development. In fact, the contrary happened and the local market was further opened to more competitive products from outer provinces. Jambi is not well armed to face the competition from the three Sumatran "tigers": North-Sumatra, West-Sumatra and Lampung. Benefiting from larger local markets and higher technologies, these three provinces developed bigger and more efficient industries. Eggs from Medan, day-old-chicken and feed from Lampung, embroideries from Padang... are sold cheaper in Jambi than local products.

As the Jambi market is too limited, no commodity can be developed without securing new markets. The proximity of Batam, Singapore and Malaysia may be a chance for Jambi. But up to now, this proximity is only visible on maps and has not yet been expressed in harbor infrastructure and means of transportation. Even then, the Province will still face competition from other Sumatran provinces.

2. Rich villages with some poor

According to Indonesian standards, Jambi's villages are rich. The IDT concept, elaborated according to Javanese perceptions and criteria, is not operating in the outer islands[28]. Thanks to rubber, oil palm, timber and other resources, the people of Jambi are rich. In Jambi, even transmigrants – since they abandoned food crops for tree crops – are rich. Manpower is rare and expensive. Daily wages in villages reach 5,000 to 8,000 Rp depending on the type of work. Sharecroppers usually get half of the harvest, which may be more than 25,000 Rp per day for rubber tapping at present prices. In all villages, there are more potential employers than people ready to work. Says a head of village: "If you own rubber or workforce you cannot be poor in Jambi".

The corollary of this statement is that there are poor people in Jambi: those who possess neither rubber nor workforce. The poorest of the poor are generally elderly people not or no longer owning productive rubber, disabled persons living on charity, and over all, women on their own: widows, divorced or repudiated. They own little or no land and have limited labor force. Daily wages for planting, weeding and harvesting food crops are their main source of income. Those who possess some skill may complement their income by making mats, baskets, hats, etc. Having no husband they are regularly overlooked in village development schemes and never in a position to tap IDT credits.

3. An inadequate political will

Though some efforts have been made recently in matters of decentralization, Indonesia's political organization remains strongly hierarchical and typically pyramidal. In line with the overall top-down approach adopted by the government, every level of the pyramid has little room to maneuver and considers merely his role as a relay between the immediate upper and lower levels.

Self-sufficiency, for instance, is typically a national goal. But why should it be a provincial or a district goal ? Curiously, every level of the pyramid is seeking self-sufficiency as if it were independent, a nation on its own. Regional advantages are still considered as important but only at the level underneath (districts for provincial level, sub-districts for district level...). The predominant basic assumption is that imports are costly and that

[28] The stress on road network, for instance, is not relevant when river transportation is fluent. The availability of a refuse dump in a Jambi village is not as primordial as in Javanese villages where densities reach 2,000 inhabitants per square kilometer.

producing locally must be cheaper. Efficiency, opportunity cost, economies of scale and market capacity are seldom taken into account. Asked about potential commodities in Jambi, an official answered: "If the price is high, there is a potential". Thus, every level wants to become self-sufficient in rice, in soybean, in maize, in fruit, in meat, in eggs, in fish... and wants to develop industries. Every level wants its feed factory, its breeding facilities, etc., at any cost. The corollary of this is that once self-subsistence is reached... the commodity is paid less attention. Jambi, for instance, is more or less subsistent in rice thanks to the Kerinci and Tanjung Jabung districts. Thus, rice is no longer a priority at the provincial level, but it still is in the intermediate districts were self-sufficiency is not yet achieved. Some officials even consider hampering rubber and oil palm development in order to boost other commodities like soybeans and groundnuts ! Forcing the political will may be counterproductive.

That the political will is imposed from the top to the bottom of the pyramid is actually not surprising. What is more surprising is that it never takes into account local conditions, be they physical, economical, social or cultural. That Jambi's environment may not be suitable for soybean cultivation has never been questioned. Problems and constraints are only tackled from a technical point of view. Chemical fertilizing will improve the soil's fertility, liming will increase the pH, pesticides will protect the crop! Extension workers will improve the farmers' skill and credit will help to cover the cost. Motivation meetings will decide the farmers to follow the scheme. That farmers may not be interested is entirely overlooked. The dominant perception among upper level civil servants is that peasants lack the basic knowledge of what is best for them. At the intermediate level, the civil servants are squeezed between their superior's will and the farmers' reluctance. They thus develop a double language for the only sake of their position as civil servants. At the lowest level, the farmers listen politely and carefully to the message delivered by the extension workers... and follow their own way.

The compilation of data follows the same administrative rules: "Better any figure than no figure at all". Thus, all government agencies provide a huge amount of unreliable data. Most figures are obtained by estimating the increase to be applied to the figure estimated the year before. Productions are never measured but calculated by multiplying estimated areas and assumed yields. Once published, figures become official and can no longer be corrected.

4. "Supporting" activities

4.1. Food crops and horticulture

4.1.1. Lowland rice

There is still much room for lowland rice development in Jambi. Many irrigated areas are underutilized and could bear more important harvests. Many *tadah hujan* rice fields could be irrigated and many fallow *payo* areas could be turned into productive rice fields. Up to now, the Dinas put to much stress on double cropping. In *payo* rice fields, double cropping is far too risky. Double cropping of *payo* is less a problem of irrigation than of flood control. In order to harvest the second crop before the big floods of the start of the rainy season, the first crop must be planted earlier than March-April, what the Dinas tries to promote. Though technically feasible this would put the first crop at a high risk of flooding and the second at a high risk of drought. No surprise that the farmers don't follow the extension service.

According to the farmers, rather than pushing for double cropping, there would be more to gain by ensuring the single cropping of the *payo*. In fact, many *payo* areas, formerly cropped have been abandoned because of the high risks of crop failure due to floods. In ancient times, the Pasirah[29] organized collective compulsory works in order to realize small dams and dykes to control the floods. Today, compulsory work is no longer possible but many villages along the Batang Hari would be interested by credit schemes intended to rehabilitate ancient dams and artificial levees. According to some village heads, the know-how is still available, the work could be done on a *padat karya*[30] basis by village laborers and the cost paid back by the *payo* owners after harvest. All levels of village society would be involved in the work.

Farmers generally consider rice farming only as a way to achieve food self-sufficiency and not as a source of income. Therefore they are often reluctant to intensify cultivation by increasing inputs or by double cropping. On the contrary, they are more interested in reducing the labor requirements of the crop by renting hand-tractors for land preparation and by using herbicides for weeding. From a strictly economic point of view, at present prices, rice cultivation does not really pay compared to rubber. But producing his own staple food is a matter of pride for a peasant. Prestige is also at stake when the farmer can show his ability to give work to numerous day-laborers.

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[29] Head of village during the Dutch colonization.

[30] Labor intensive.

4.1.2. Upland food crops

Local people never attempted permanent upland food cropping. It became the major focus of the food crop Transmigration projects in the 1970's and early 1980's. None of these projects was really successful. Under permanent food crop cultivation, land fertility decreased quickly. With heavy rainfall, the quick mineralization of the organic matter and the leaching of the nutrients further decreased the already low chemical fertility of the soils. In the open areas, season after season, the proliferation of quick growing weeds increased the burden of the farmers. Amongst forests and plantations, the cultivated plots attracted and concentrated all pests of the neighborhood putting cultivation at a high risk. After a few years only, most Transmigration centers turned into *Imperata* grasslands. Most food crop projects only started to develop after Transmigration authorities stopped enforcing the ban on tree crops. Today, nearly all food crop plots have been converted into rubber or oil palm plantations.

Technical solutions do exist. But they have a high cost and put smallholders at high risk. Furthermore, farmers have much more interesting opportunities providing higher returns for lower risks.

There is still room for upland food crops development in Jambi but not on a permanent basis. The development of new oil palm and rubber plantations and the rejuvenation of old "rubber jungle" could accommodate upland food crops like rice, maize and various leguminous crops during the three first years of plantation establishment. *Tumpang sari* has many advantages as it contributes to the farmer's subsistence, it pays for part of the plantation cost and proves beneficial to the tree crops by ensuring proper maintenance during the first years.

Nevertheless, the returns to labor provided by *tumpang sari* remain low compared to those from tree crops. Very often, farmers who already own productive plantations no longer care about self-subsistence and resort to the market for their staple.

4.1.3. Horticulture

Prospects for horticulture are not too bad in Jambi. The Province produces all kinds of fruit and the local market is unable to absorb the production during high yielding years. Local strains of *duku* and mangosteen are very palatable and renown as far as neighboring provinces. The main constraint to the development of horticulture in Jambi is less a matter of quality and quantity than of marketing. Even during high yielding years, the production is scattered over large areas and among a great number of smallholders, which implies high collection costs and impedes efficient marketing. The

specialization of small areas in a restricted number of horticulture crops would help to promote local brands, while intensification[31] would increase the output and thus facilitate the collection of the product. Another solution would be to intercrop some horticulture species with rubber as already tested in rubber agroforestry systems (RAS) by the SRAP project[32].

In any case, horticulture crops would only complement and not replace rubber or oil palm. While the latter produces regularly, the former often provides a high income at once every two or three years. This difference in timing and amount is much favored by farmers as the related incomes may serve different purposes.

4.2. Fishery and fish farming

Very little is known about fresh water fishery in Jambi, but it is widely accepted that aggressive fishing techniques led to stock depletion. In fact, nobody has the slightest idea neither about the former nor the present state of the stock. Nevertheless, the increasing difficulties to find broodstock confirm the bad state of Jambi rivers. But even if the prospects for fresh water fishery are limited, the sector should be paid more attention by the Dinas and by research institutes.

Since 1994, fish farming has been booming in the intermediate districts. Pond farming development is hampered by the high establishment cost of ponds and by the lack of locations with easy water control. Cage farming developed at a tremendous pace as many suitable locations were available in the Province. Every village along the Batang Hari has his success stories. Cage farming perfectly suits local people:

- it requires little capital;
- it requires little work;
- it is quick yielding;
- it provides a high income (and a high return to labor);
- it involves little risk.

The development of cage farming has also an interesting side effect on environment awareness by local people. Tuba poisoning almost came to an entire stop in all major rivers as fishers would have to compensate growers for eventual losses. Floating wood is pulled ashore to avoid damages to cages and villagers tend to be more careful when using detergents and when disposing of refuse.

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[31] Especially by increasing the density of the selected species.

[32] The Smallholder Rubber Agroforestry Project is testing various cropping patterns associating rubber with other tree crops in Jambi, South-Sumatra and West-Kalimantan. SRAP is a joint venture between Cirad, Icraf and Gapkindo.

The absence of technical knowledge (at the start) did not hamper the development of fish farming. Short training courses, extension workers' visits and learning from neighbors proved sufficient as the growers' motivation was very strong. Technical knowledge proved more important for fry production. Private hatcheries, managed by Sundanese and Javanese migrants, quickly took the relay of public hatcheries. As the global demand is still unsatisfied, hatcheries benefit from high prices. Though they are able to develop their activities with their own resources, credit would be welcome to increase the pace of development.

Even more than credit, hatcheries need good quality broodstock, technical assistance and little material. The Dinas can provide part of this in its already existing locations if there is no harsh shortage of funds following the monetary crisis. The efforts already made to domesticate local species and to diversify fish farming production should be sustained. International technical assistance is still required for solving fundamental research problems and for training of trainers.

4.3. Animal farming

Quick action must be taken to save the ailing poultry sector before its total collapse. Broilers will soon be lacking in Jambi, as (the remaining) local production will be channeled to Jakarta and other major cities. Small units of 2,000 broilers under the sponsorship of an entrepreneur providing day-old-chicken, feed, medicine and technical assistance already proved able to survive the crisis and should be further promoted.

Cattle fattening has excellent prospects as a secondary activity, especially in Transmigration areas. It presents more or less the same advantages as cage farming: low capital input, little work, quick yielding, high income, high return to labor and little risk. Contrary to fish farming, the feed is nearly free of charge but requires labor proportionally to the number of head of cattle. Three to four head of cattle are a maximum for a fattener, while a fish grower can easily manage ten cages. The main problem for developing cattle fattening in Jambi remains the lack of calves.

The price of cattle (but also of goats and sheep) is so high and marketing so easy that most animals are sold still young on the local, national and international market. Goats dropped by the Dinas in local villages were redirected to the Batam market long before they were able to multiply.

4.4. Handicrafts and home industries

Home industries processing local products like wood, rattan, pineapple or banana have a rather good potential. Jambi's home industries will probably

never be able to compete on a big market, but they should be promoted as they have an important multiplying effect. They create an outlet for local resources, provide work to villagers and are a source of added value. Local entrepreneurs[33] have the will and the technical knowledge necessary to succeed. They even prove able to manage with intricate administrative procedures. What they most lack is an easy access to credit and, over all, a secure market for their products. At the opposite end, wholesalers and supermarkets are ready to secure a market if local entrepreneurs prove able to secure a regular supply. This goal is far from being reached, unless a critical mass of producers creates a grouping. Unfortunately, up to now, no local resource[34] is produced in sufficient quantities to enable such a grouping.

[33] Mostly Bugis or Javanese spontaneous migrants.

[34] With the exception of timber, rubber and palm oil... all restricted to large industries.

Chapter IV

Recommendations

Recommendations to be made differ considerably according to the kind of development (or the targeted population), to the privileged sectors and to the mechanisms of action chosen. All three items are closely linked, as a social orientation may wish to target the poor in a cooperative home industry, while a more economic orientation may provide credit to efficient hatchery owners. It would be presumptuous for us to decide which part of the population or which sector deserves more attention than the other. Therefore we will limit ourselves to inform decision-makers about the chances of success of the different options at hand.

1. The general orientation: political, economic or social?

The political will puts to much stress on options that should be handled at the national level only. It should pay more attention to the potentials and the constraints of the Province's physical and human environment. It should also pay more attention to the farmers' will. Enforcing the political will at any cost may be counterproductive. The stress put on soybean is the best example. Since the early 1980's, a tremendous amount of money has been spent in the Province to develop soybean. Regional, national and international funds have been wasted in the venture. Jambi is certainly not the best place to produce soybean in Indonesia. Why not accept the fact, rather than insisting, year after year, and spending huge amounts of money without any result?

There is no shame in importing feed from a neighboring province. The basic products necessary to produce feed are not available locally and would have to be imported. The absence of efficient harbor facilities would considerably increase the transportation costs. The local market can only absorb small quantities of feed, thus preventing the factory from making economies of scale. There is no doubt that locally produced feed would be much more expensive than feed imported from Lampung. The same applies to day-old-chicken production.

A more economic development orientation would only focus on certain types of projects and of actors. The poorest of the poor are also the less able to tap credits from any development project. The IDT program, which was basically designed to alleviate poverty, is an archetype in this concern. In most villages, only prominent farmers received the manna. The first to benefit from rubber clones were also the first to receive cattle and the first to develop cage culture. Says one head of village: "the poor families would not have been able to repay the credit". He was.

Quite naturally, the most promising sectors are those currently developed by these prominent farmers. The latter are ready to invest in any lucrative activity even without access to credit. Most of them possess rubber plantations and are only looking for an additional source of income. Supporting their enterprises can only be crowned with success.

Many entrepreneurs would make the best use of cheap credit. Hatchery owners, nurserymen and some home industry managers are skilled artisans on boosting markets. They generally represent a good risk. Unfortunately, local banks are reluctant to make loans to developing businesses as long as they don't possess assets as collateral.

A more social orientation would try to target the poorest of the poor. But socially oriented projects do also need to be economically feasible if one wants them to last. In Jambi, the poorest level of village society is essentially composed of women on their own. They often have children to raise and thus cannot accept full time jobs far from home. Part time jobs in the village or – even better – at home are the most favored. To target this group, labor intensive home industries are probably the best choice.

2. The privileged activities

At present, the most promising sectors of activity in Jambi are fish farming and cattle fattening. Both are managed by well-off smallholders and small entrepreneurs. They represent the safest investments and the highest returns. At the growers' level, cage culture develops by itself as basic investment is relatively low. On the contrary, pond farming development is still hampered by the costlier works required for digging the ponds and for ensuring proper water control. These works can be organized at a neighborhood level as they generally concern more than one family. The know-how is available but the farmers need credit to buy the material and to pay the labor. Hatchery owners face the same problems as the fry is produced in ponds. Their high and secure income enables them to accept individual loans. Increasing the production capacity of existing hatcheries is primordial to the development

of the whole sector. Therefore highest priority should be given to hatcheries. More upstream, the availability of good quality broodstock is fundamental. This responsibility should be devolved to the Dinas Perikanan.

Cattle fattening also provides high returns to the farmers. Many fatteners no longer ask for credit or share systems but prefer buying the calves cash. The development of the activity is only restrained by the insufficient availability of calves. Any program aiming at introducing calves (on a cash, credit or share basis) would be welcomed by the farmers.

Broiler production seems promising again after the collapse of the poultry sector in Indonesia. Prices are up again, and broilers could represent an interesting additional income for smallholders. But farmers are still reluctant to take the risk and prefer joint ventures with sponsors where they can get a secure net income. These sponsors should be encouraged to involve smallholders in their activities.

Small home industries have rather good prospects. They are managed by clever entrepreneurs who should be supported by the local banking system. Unfortunately, most of them prove unable to secure a regular supply in quality and quantity. They are all prisoners of a vicious circle: their output being to small they are not in a position to conquer new markets; and if they try to increase their production they face harsh marketing problems. Thus, they are condemned to remain small. Investing in the sector may pay, but is rather risky. The safest way would be to organize joint ventures with wholesalers in big cities.

For more social oriented projects, we would recommend *payo* development and home industries on a cooperative basis. *Payo* development would concern whole villages, especially along the Batang Hari. The building of small dams and levees is meant to protect the *payo* from the big floods and to secure their use for rice cultivation. The investment is rather big and not very safe. First, the dams and levees need to be maintained and rebuilt regularly; second, they may not withhold excessive floods. But as most of the cost consists in labor, it may give work to many villagers, especially the poorest day-laborers. Once the *payo* converted into rice field, tilling, planting, weeding and harvesting will also give work to the poorest villagers.

Home industries on a cooperative basis like Kopinkra Terpadu in Bangko should be promoted. Without being very efficient, such an industry gives work to 55 women on a part time basis close to their home. They are free to organize their working time according to their needs and have the feeling to work for themselves. Cooperative work also develops a stronger sense of

solidarity. The key issue in such cooperatives is less to obtain credit than to find dedicated, efficient and honest managers.

We do not recommend specific projects concerning upland food crops or horticulture. This does not mean that these sectors should be paid no attention. Upland food crops should be considered as *tumpang sari* crops during the first years of rubber or oil palm establishment and thus integrated in the latter's packages. Horticulture crops could be introduced in rubber agroforestry systems or developed in house plots. Specific horticulture plantations are still premature in Jambi's present conditions.

3. Mechanisms for action

It is very encouraging to note that farmers and entrepreneurs no longer ask for grants, subsidies or gifts as they did 10 or 20 years ago. Instead, they are looking for loans to expand already existing activities, are interested in training programs to increase their skills, are concerned about the quality of their supplies and are willing to conquer new markets. Unfortunately, their enterprising spirit is hampered by intricate administrative procedures, by an embryonic banking system, by insufficient supplies and by the weakness of the local market.

Private loans should be made accessible to efficient entrepreneurs willing to develop their activity. Supporting hatcheries is the key to sustained development of fish farming in Jambi. Fry production needs to be increased in quantity, quality and diversity. Helping nurserymen to produce cheaper and better quality vegetal material is probably the most efficient way to develop horticulture in the province. Private home industries, especially the ones processing local products, need funds to invest in higher quality packaging in order to conquer bigger markets.

Collective loans should be made available to villages, hamlets or neighborhood groups, and cooperatives for more socially oriented projects. The way IDT funds have been managed by some village heads raised much criticism. Thus, local people would prefer loans to be directly made available to the real users rather than being channeled through village authorities (or higher administrative levels). Collective loans would be useful for pond culture development at hamlet level, for *payo* reclamation and for home industries working on a cooperative basis.

Sponsorship needs to be promoted in many sectors. Sponsorship with wholesalers and supermarkets is the best way to secure markets for local home industries. But sponsorship may also be needed to rehabilitate the

ailing poultry sector especially in broiler production. It may also be necessary to make calves available for fattening purposes in the Province.

Training is already organized by most Dinas. Training courses at the Dinas proved most useful in increasing the managerial skill of small-scale entrepreneurs, cooperative staff and hatchery owners. Farmers generally prefer *in situ* training and visits to successful farmers.

Technical support is most necessary in animal farming. It can be organized by the private sector as in the poultry business for instance or by the Dinas. Besides selling most supplies to the farmers, poultry shop owners play a major role in technical support. This role could even be emphasized by the development of sponsorships and joint ventures. The sanitary control and artificial insemination organized by the Dinas Peternakan had a considerable impact in securing animal husbandry and in increasing the quality of the breeds. There is still much room for development in hatcheries. Up to now, fry production only makes use of 1 % of the fecundity of the broodstock. With more sophisticated techniques (hormonal treatments, high quality feed) 50 to 80 % of survival may be achieved. Solutions for optimizing fry production at low cost are still explored at the Loka-BAT of Sungei Gelam[35].

Research is still needed in all sectors, especially farmer friendly research. Up to now, too much stress has been put on optimizing yields (of any kind) without paying attention to local farming conditions.

Upgrading of official services is an indispensable preliminary to any regional development project. In all Dinas, there is generally more good will than possibilities for action. All national and regional development schemes lack sustainability. As they must absolutely fit in the budgetary year, funds only become available at the end of the rainy season. Revised every year, they generally disappear before having reached any result. At all levels of the civil service, thinking is "project oriented". The way funds are disbursed always matters more than the results achieved. Much more could be achieved if civil servants were judged on results rather than on their ability to please their boss.

[35] International cooperation with the Catfish Asia project.

Photo 11. A wealthy transmigrant's house in Rimbobujang

Conclusion

The keys to success

Jambi is a rich province. Asked about the impact of the monetary crisis, a farmer answered: "The price of rice doubled, the price of rubber tripled... I don't call this a crisis". The high income provided by tree crops puts the opportunity cost of labor at a high level. As depending on a single crop may be hazardous – especially for a commodity exported on the world market – farmers are looking for additional income-generating activities.

In the present situation, the adoption of any additional activity is subordinated to four conditions:

- low initial capital requirement;
- low labor requirement;
- high and quick return;
- low risk.

Any activity responding to these conditions, like cage farming or cattle fattening, will be quickly adopted by the farmers without any outside intervention. Activities with high initial capital requirement may still interest farmers if cheap credit is made available. Risky activities could also be considered if returns are proportional to risk, or if a sponsor shares the risk. Activities with high labor requirements have little chance to be adopted, while those with a low return to labor have none. The worst combination is obtained with upland food crops: high input cost, much labor requirement, small return and high risk.

Things may change over time. The rubber and oil palm market may well not remain flourishing, or phytosanitary problems may destroy large areas of plantations. Then, Jambi's farmers will have to reconsider less interesting opportunities. But for the time being, any activity will have to develop in the shade of rubber.

Annex 1

Resource persons and contacts

Officials:

Bappeda:

Ramli Djalil (Ketua Bappeda Tk. I), Segonang, Syahdimal, Sariman Wibisono (Ketua Bappeda Batang Hari), Suparno (Ketua Bappeda Sarko), Anwar Harminto, Junaidi T. Noor (Ketua Bappeda Bungo Tebo).

Dinas Tanaman pangan dan Hortikultura:

Mohamad Arifin, Halel Ramli, Erman Rahim, Yuhelza Liza, Hardiono, Purwoyatno.

Dinas Perikanan:

Ali Supardan, Suwandi AS, Ibu Rosi (UPPPU), Indra, Zainul Arifin, Mulyadi, Akhyar.

Dinas Peternakan:

Muljonosaeran, Manalu, Ridalyan, Suparmin, Suharno, Yul Karmain.

Dinas Perindustrian dan Perdagangan:

Dasril, M. Yamin, M. Hanip, Lihayati, Zulkarnaini.

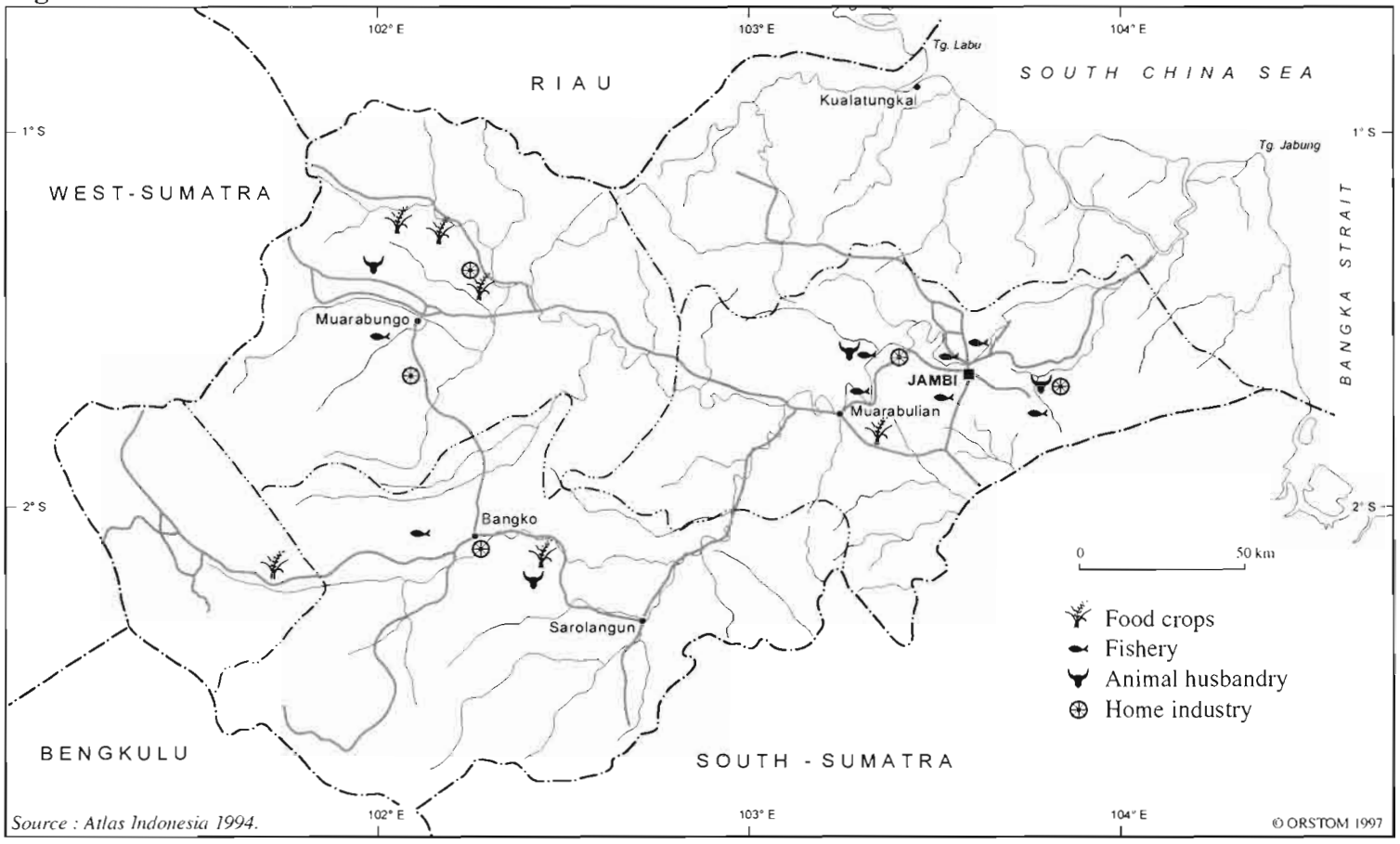
Other:

Firdaus (Warsi), Sutrisno, Sabniel Aulia, Helil Sujadi (BIPP), Damsir Alam (Balai Benih Palawija).

Farmers and entrepreneurs:

Baso Intan (pineapple), Nurdin (pineapple), Haji Armynal (laying hen), Sanusi (broiler), Sabidi (fish farming), Sukardi (*inkubator*), Saib (fish farming), Marzuki (cattle fattening), Hadin and Sapar (handicrafts), Ibu Ponira (rattan), Ibu Kasihani (banana chips), Rozali (fish farming), Baharudin (rice farming), Wardiono (cattle fattening and ex-soybean farmer), Agus Salim (fish farming), Sumadi and Murawi (cattle fattening), Samiin (nurseryman), Suparjo (tempe chips).

Fig. 3. Locations visited



Since the beginning of the XXth century the economy of Jambi has been dominated by rubber. To be adopted by Jambi's farmers, any alternative agricultural activity must be more lucrative than rubber cultivation. National and regional development programs often fail because they forget to take into consideration this absolute rule. The authors assess the development perspectives of various farming activities complementary to rubber and oil palm in Jambi's present conditions.

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