



Technical Note

Public Private Partnerships for Agriculture in Eastern Indonesia: A Comparative Study of the Beef Cattle and Cocoa Industries

November 2005



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CURRENCY EQUIVALENT

(Exchange Rate Effective)

Currency Unit = Indonesian Rupiah (IDR)

IDR 9700 = US\$1.00

ABBREVIATIONS AND ACRONYMS

| | |
|---------|---------------------------------------------------------------------------------------------------|
| ACIAR | Australian Center for International Agricultural Research |
| ADB | Asian Development Bank |
| AIAT | Agricultural Institute for Adaptation of Technology |
| APFINDO | Association of Indonesian Feedlotter |
| APRINDO | Association of Indonesian Commercial Retailers |
| ASEAN | Association of South East Asian Nations |
| ASKINDO | Asosiasi Kakao Indonesia -Association of Indonesian Cocoa Traders |
| BPSMB | (Badan Peremeriksaan Sertificat Mutu Barang) Board for inspection of quality certificate of goods |
| CABI | Commonwealth Agricultural Bureau Institute |
| CFC | Common Fund for Commodities |
| COPAL | Cocoa Producers Alliance |
| CPB | Cocoa Pod Borer |
| DAFEP | District Agriculture and Forestry Extension Project |
| DGLS | Directorate General of Livestock Services |
| DFID | Department for International Development (United Kingdom) |
| EASRD | East Asia Social and Rural Development unit (World Bank) |
| FAQ | Fair Average Quality |
| FEATI | Farmer Empowerment Through Agricultural Technology and Information |
| FMD | Foot and Mouth Disease |
| FOB | Free on Board |
| GOI | Government of Indonesia |
| ICCO | International Cocoa Conference Organization |
| IFAD | International Fund for Agricultural Development |
| MoA | Ministry of Agriculture |
| NTB | Nusa Tenggara Barat |
| NTT | Nusa Tenggara Timur |
| OECD | (Japanese) Overseas Economic Cooperation Fund |
| PENSA | Program for Eastern Indonesia Small-Medium Enterprise Assistance |
| PIF | Productivity Improvement Fund |
| PPH | (Pajak Penghasilan)- revenue tax |
| PPN | (Pajak Penambahan Nilai) - value-added tax |
| PNG | Papua New Guinea |
| SUCCESS | Sustainable Cocoa Extension Services for Smallholders |
| UN | United Nations |
| USAID | United States Agency for International Development |

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EXECUTIVE SUMMARY

Background- Agriculture in Eastern Indonesia

1. The work described here originated as a more general study of the potential for improvement of the productivity of dryland (as distinct from rainfed paddy) agriculture in Eastern Indonesia under the Advisory and Analytical studies of the Indonesia Country Program. Although GOI estimates that about 24 million hectares of land remain to be developed in the region, the major challenge is to improve the productivity of existing arable area. Compared to its Asian neighbors, Indonesia's agricultural output shows a greater dependence on labor and land and a reduced application of capital and fertilizers for development.
2. Dryland agricultural development in the region has progressed rapidly over the past 20 years on the basis of development of high value tree crop and livestock enterprises exploiting the available natural resources. In contrast to the situation for food crops in the rainfed and irrigated paddy areas (where GOI has focused its past investments), the private sector is the major driver of dryland investment, technical assistance and progress in yield and quality improvement, particularly at farm level in the provision of extension services and guidance through traders and trader based finance. Indonesia's public agricultural research and extension systems have been neglected in terms of budget for many years, particularly since the financial crisis of 1997 and subsequent decentralization of Government after 2001. Major investment in restoring the technical capacity of public research and extension is now required and will commence with the planned World Bank funded FEATI (Farmer Empowerment through Agricultural Technology and Information) project. The private sector, in contrast, has made major investments in areas with strong commercial benefit such as hybrid maize (yields are now 5t/ha for hybrids compared to 3.5t/ha for open pollinated varieties) and the related poultry industries. Future improvement in service delivery supporting farmer incomes was thus seen as linked to a partnership between public investment (particularly where significant public goods are involved), private sector technical expertise and farmer investments in labor and time for training.
3. The foundations for growth based on intensification rather than exploitation of resources in agriculture have weakened in Eastern Indonesia particularly in terms of service delivery, but also in terms of access to capital and fertilizer, onset of various diseases in cash crops (particularly Cocoa Pod Borer), poor linkages to markets and poor perception of price signals from markets. Total factor productivity has declined markedly since 1992 after growing strongly as smallholders exploited the resources base of Indonesia in the 1980s to establish new livestock and plantation crop industries. In dryland cash crop areas, there is incentive to improve service delivery based on private sector involvement in research and extension to increase profitability for producers and buyers alike, whilst complementing existing public sector services to livestock, food crops and estate crops. The two example industries chosen, beef cattle and cocoa, provide contrasts in the potential for use of the partnership model.

4. Cocoa currently involves about 500,000 farmers nationwide (400,000 farmers in Eastern Indonesia), mainly in South Sulawesi but also in Papua, NTT and NTB, Java and Sumatra. The industry has earned up to \$700 million in exports annually but is losing substantial profits (perhaps \$300 million per annum) because of low yields and increasing discounts on the world market for poor quality production as a result of Cocoa Pod Borer (CPB) infestation.
5. Ruminant livestock (mainly Bali (*Bos sondaicus*) breed cattle) have traditionally been bred on smallholder farms in Eastern Indonesia for sale to either “wet market” traders (after grass fattening) who slaughter in backyard style operations or to smallholder fattening operations commonly subsidized by directed credits from the Central Government. Breeding activities have shown very low returns to producers because of the long period to turnoff and the high labor cost of dry season feeding (ACIAR, 2002). Since the early 1990s a private sector trade has developed in live cattle from Australia based on importing Brahman (*Bos Indicus***Bos Taurus*) cross steers from Darwin and Rockhampton for fattening over about 90 days in feedlots in Lampung and Surabaya. In the period since the economic crisis of 1997 the generally unfavorable exchange rate has reduced profits, particularly since 2003. Prices for Australian feeder steers are at a historic high in 2005 (around \$1.80 US/kg) relative to past prices because of drought in Australia and exchange rate differences between Australia and Indonesia. The study reviewed the potential for partnership between smallholder breeders and large private sector feedlot fatteners, which was emerging in the 1990s but collapsed after the economic recession of 1997.

Objectives

6. The study objective was to compare and contrast the potential for use of a public private partnership approach in solving the problems of low productivity and inadequate smallholder income in the beef cattle and cocoa industries in Eastern Indonesia
7. The study also sought to suggest better methods of service delivery to facilitate these aims by cooperating with the private sector, which might be incorporated into the proposed FEATI project. The study was not intended as a design document but rather as a background paper on which design would be based. The study was carried out in collaboration with the Directorate of Planning of the Ministry of Agriculture of the Government of Indonesia. It also involved government at Provincial and District level. The impacts were expected to be:
 - A better understanding of the factors to be considered in developing investment options for the dryland farming sub sector which builds on past Government, private sector and Bank experience in implementation methodology, credit provision, service provision and infrastructure to provide guidance for more sustainable investments.
 - A better dialogue with the private sector in crop and livestock agriculture, with a view to increasing their role in future service provision.
 - Greater trust by the private sector in the potential for successful cooperation with public institutions
 - A range of options for extension strategy covering cash crop and livestock industries as well as integrated and specialized institutional models.

8. The study outputs were guided by an MOA desire to see the work contribute to the development of the proposed FEATI (Farmer Empowerment through Agricultural Technology and Information) project. The study was carried out in collaboration with the Directorate of Planning of the Ministry of Agriculture of the Government of Indonesia. It also involved government at Provincial and District level.

The Role of Public Private Partnerships- Contrasts between the Beef and Cocoa Industries

9. The criteria for success in a public private partnership have been established and tested in field work on cocoa in Eastern Indonesia with the international private sector and in the beef cattle industry with both public sector extension staff and private sector feedlot investors. They may be summarized as:
 - *Degree of mutual benefit.* The ability of the private sector to capture benefits from investment is a key driver. For cocoa, the market is one of many small producers and many buyers and market capture is not possible for any single investor. However, a large international investor with a long term vision can generate longer term benefits in terms of the sustainability of the industry within a shrinking world production base, if private sector technical assistance is combined with large scale GOI funding for an industry wide approach. Recent developments show that private sector pressure can also result in improved application of established government policies on export quality, which will improve short term returns. Beef cattle, particularly Bali cattle breeding and fattening is also an industry of many sellers and many small buyers. Partnership in the beef cattle industry is difficult to develop because there are no investors large enough to tolerate less than complete capture of benefits from investment in improving smallholder productivity, particularly for small breeding households. There are better prospects for partnership in feedlot operations involving cattle intended for higher quality markets, rather than in Bali cattle improvement where most meat is sold in wet markets where market capture is impossible.
 - *Reliable public sector support.* For both cocoa and beef cattle, public sector leadership is currently lacking. The changes following decentralization have seriously weakened district level extension services for tree crops. The policies of central and district government for beef cattle have emphasized subsidy for cattle purchase rather than improvement of productivity of existing animals. Success in cocoa improvement is dependent on Central Government vision in large scale financing of farmer empowerment (through training and extension), applied research and the application of soundly based policy on taxation and export quality. These initiatives are possible through the FEATI project but are currently not possible owing to disruption of research and extension services following decentralization of government.
 - *A supportive business environment.* Unfortunately, most of Eastern Indonesia has poor facilities for support to private investors. Communications, credit, support from the public sector in organizing a production base of farmers and supporting central government policy are all absent or poorly developed. Farmer initiatives in developing marketing linkages with the private sector in the cocoa industry suggest better prospects for developing a supportive business environment through training in business principles

and technical aspects of production. In contrast, policy confusion in the beef industry will make productivity improvement difficult to achieve unless some form of nucleus estate smallholder model can be developed around feedlots.

- *Low risk.* Few industries in Eastern Indonesia provide a low risk environment, however, price prospects for both beef cattle and cocoa show potentially high returns. Cocoa has shown volatility in prices in the late 1990s, however, with declining production in Brazil and Africa, longer term prospects for Indonesia appear promising if current policies supporting high export quality standards can be maintained and supported by production improvements at farm level.
- *A fair return on investment.* Examination of trading margins for farmers, collectors, traders, exporters and grinders in the cocoa industry show that farmers currently have the greatest value added in the industry but still suffer low incomes because of low yields and poor quality. Poor quality of cocoa in terms of butter content and trash contamination affect margins of grinders heavily and cause a feedback effect, due to low prices, on the profitability of traders and collectors further up the marketing chain. In turn, operators at these levels commonly attempt to improve margins by excessive discounting of prices to farmers for moisture content and the addition of trash to clean samples to add weight. Government investment combined with private sector technical assistance could improve the investment climate for cocoa by improving smallholder yield and quality, which would in turn improve the margins of collectors, traders and grinders through higher prices in a rational manner. In the beef industry, farmers' returns for good quality are assured by competition among buyers in a supply scarcity driven market. However, for investors, the attraction of developing better quality feeder stock for feedlots must be balanced against the risk of having no guaranteed access to production from smallholders who have numerous opportunities to sell to a range of competing buyers.
- *Adequate high quality human resources.* Extension services have been depleted in all agricultural industries. Recent projects in the cocoa industry (SUCCESS Alliance funded by USAID and PRIMA cocoa funded by the Netherlands Government and Mars Inc.) have developed high quality business and technical trainers who would form the nucleus of a private consultancy industry. However, these personnel need more Government support to both strengthen their own skills and to support Government technical services, particularly at sub district level. High quality personnel are scarce in the beef industry and those available are focused on administration of production subsidy programs for activities such as small feedlots. Leadership has generally come from the private sector feedlot industry for markets in the larger cities. In Bali cattle production, leadership is dependent on the presence or absence of trained public sector staff. Once again, Central government investment in the training of Provincial, District and sub District staff is required to provide adequate public sector support for private investment.
- *Potential impact on volume and quality.* Cocoa Pod Borer (CPB) infestation and ageing cocoa plantations are important factors contributing to declining productivity and quality, and constitute major barriers to the sustainability of the cocoa industry in Indonesia, with severe consequences also for bean quality. CPB causes "flat" or unfilled beans and clumping of beans reflected in a high trash content. For cocoa, an industry in which yields have fallen by perhaps 50% since the mid 1990s but prices have improved, even a small gain in output and quality (i.e. Lower price discounts) can have a dramatic impact on profitability. A reduction of \$100 per ton in discounts and a 20% increase in yield, for example, would provide a net present value of \$139 million if achieved across 120,000 project households in an industry of over 500,000 cocoa farmers. Public

private partnerships in the beef industry, however, may not have a dramatic impact on national output, even if they are beneficial to the smallholders and investors concerned, because the majority of beef output in Indonesia comes from extensive grassland production of Bali breed cattle and feedlot investors are not interested in the breed for the high quality urban based market they serve. Investment in AI for the beef industry involves a larger task in both semen production and service delivery development, with no assurance that the investment in developing better genetics would flow substantially to the provider rather than to public goods. Cross breeding faces policy conflicts which also reduce investment potential.

- *Sustainable farming systems.* Long term sustainability of farmers in the cocoa industry is dependent on their ability to survive both production and marketing downturns which will occur periodically. Too few farms have given adequate consideration to the development of alternative sources of complementary income from crops other than cocoa and in most cases, farms are highly specialized. Government investment in research and private sector technical support for extension are needed. In the beef cattle industry, the long dry season combined with poor management practices, make productivity improvement difficult. Where good feed resources are available, a decision needs to be made on the balance between Bali breed conservation and the production gains available from cross breeding. However, the authority of the Central Government is not used to coordinate a national strategy, as evidenced by the abandonment of national breeding strategies such as P3Bali in all but one province. Instead it is devolved to the Provinces by the principle of de-concentration as necessary, giving them independence in managing farm animal genetic resources and determining the importance of specific animals in terms of income potential for farmers and the values for society. The Provinces drive their own agenda on conservation, however, which seeks to ban crossbreeding over much of the larger islands such as Sumbawa. An additional threat to sustainability is the development of illegal imports of beef from countries such as Brazil and India which are not Foot and Mouth Disease (FMD) free.

10. Overall, the potential for improvement of productivity in the beef industry, in order to reduce import dependence and meet market demand appears much lower than the potential for success in improving profitability and sustainability in the cocoa industry by improving yields and quality.

Supply Chain Opportunities from a Partnership approach to Cocoa Improvement

11. Several factors are considered to have primarily contributed to the current quality crisis in the Sulawesi cocoa industry, which a partnership approach could address.
 - Farmers' general lack of knowledge concerning good farming practices, including uncontrolled and haphazard application of fertilizers and pesticides, and improper post harvest treatment. Existing farm practices are unable to effectively control CPB, and long term research into appropriate strategies to overcome infestation is lacking. Government investment to re-establish extension systems down to sub district level combined with high quality international and local technical assistance for research and extension is required. Partnerships between public sector production oriented extension staff and private sector business and marketing trained staff at district and sub district levels would provide a coordinated agribusiness approach to cocoa industry improvement by training

farmers in the application of cash and labor efficient technology for yield and quality improvement.

- Despite operating relatively efficiently, current supply chain structures are not providing clear price signals to farmers to produce better quality cocoa. In general, no price differential between good and bad quality cocoa exists at the farmer level, either for trash content or butter content. As a result, all the incentives are for traders to purchase clean beans as well as trash and then add trash back into the beans prior to sale since the market is not distinguishing adequately between good and bad quality shipments. The operation of the secondary trash market for remixing is estimated to be worth some \$22 million but is a poor substitute for the loss of both \$300 million in revenues and the brand image of Indonesian cocoa. Involvement of traders and collectors representatives in a partnership approach is required so that they see the benefits of encouraging sustainable production and marketing practices at farm level rather than short term profit taking based on dishonest practices. Farmer training in business and marketing by business trainers developed under the SUCCESS and PRIMA projects and funded by Government and World Bank would also help farmers to gain maximum added value from better quality beans in their negotiations with traders.
- Government neglect of agricultural research and extension at all levels since the 1997 financial crisis and subsequent decentralization has limited the opportunity to develop and apply cost effective technology for cocoa pod borer control by plant breeding, strategic application of pesticides, biological controls and promising farmer identified technology. Private sector technical assistance would be of considerable general value to the industry in developing technologies already applied elsewhere and in training research and extension staff.
- The past inability of relevant agencies in Indonesia to enforce existing export standards has meant that very low quality cocoa has been routinely allowed to enter global markets, affecting the international reputation of Sulawesi cocoa. Private sector pressure and GOI resolve to maintain standards during 2005 has been shown to have a dramatic effect on export quality, but must be supported by real quality improvement at all steps in the value chain in order to improve farmers' and industry profitability. Similarly, calls for a tax on exports by grinders (to "encourage local processing") reflect the disparate and uncoordinated nature of the industry. Such a tax would be passed back to farmers, lowering their returns and ability to implement productivity and quality improvement technologies even further. The industry needs to work together in a common forum to understand and resolve problems rather than lobbying government on a self interest basis. A partnership approach to funding of common priorities and to policy formulation, executed through an industry coordinating body is essential to achieve these aims.
- Current price discounts for Indonesian cocoa of \$280-300/ton against New York commodities exchange prices will cost the industry some \$150 million a year in lost future revenue if applied over 500,000 tons of production. Price discounts will not be reduced without international advocacy for the industry. The International Cocoa Conference Organization (ICCO) was established in 1973 to administer the first International Cocoa Agreement, (1972) and its successor Agreements of 1975, 1980, 1986, 1993 and 2001. Indonesia is the only major cocoa producer not to be in ICCO and misses out on both advocacy and funding as a result. Partnerships with an international donor to allow trial membership (at a cost of some \$250,000 p.a.) would give the

Ministry of Finance a demonstration of the benefits of membership and would contribute to the revision of the current policy banning membership of international organizations which had its origins in the 1997 financial crisis. Industry advocacy can also be promoted by an international private sector partner acting on behalf of Indonesian cocoa producers.

12. Cocoa thus provides a good model for reform and productivity improvement in high value cropping by smallholders in partnership with Government and the private sector in Indonesia. However, the solutions to the multiple problems of production, product quality, trade and export, research and extension require an approach involving the whole supply chain. There have been several good examples of partnerships among Government, cocoa farmers and external assistance providers, although none have been at a scale to have industry wide impact. They include

- The Success Alliance project funded by USAID (approx. \$6.0 million over 5 years) but involving Mars Inc, Dinas Perkebunan and Hersheys Chocolate which has demonstrated integrated pest management and provided business and marketing training. The emphasis in pest management is on cultural controls (pruning, hygiene, complete harvest) but no pesticide and has only limited losses to about 20% of production in project areas. About 75,000 farmers were provided with one time training but little or no follow up. Some 800 village level farmer trainers and about 140 full time trainers were trained. The full time trainers now form a potential core of consultants to farmers. Widespread impact has nevertheless been limited by lack of resources to follow up farmer training with field demonstrations over a number of seasons and by the perceived high labor cost of the interventions for farmers.
- The PRIMA project at Noling Village, Luwu Regency, South Sulawesi funded by the Netherlands Government and Mars Inc (approx. 1.0 million over 5 years). The project has developed integrated pest management and farmer organization, including business training. Both research and extension are funded. It emphasizes the benefits of quality control in cocoa production and marketing and has also been successful in developing local leaders as part of an exit strategy. PRIMA incorporates optimal use of pesticides into the treatment package and has succeeded in limiting losses to about 10% of total production. The project has been successful on a local scale but impact industry wide is limited by the lack of finance for more training and demonstrations and for coordination of industry effort.
- The Cocoa village model developed by ASKINDO, which also emphasizes integrated pest management. This model is limited to several small villages in South Sulawesi.
- IFC funded Program for Eastern Indonesia Small-Medium Enterprise Assistance (PENSA), jointly funded by IFC and governments of Australia, Canada, Japan, the Netherlands and Switzerland. One of the PENSA programs is in agribusiness linkages focusing on improving market efficiency-warehouse receipts, up-country buying and attracting multilateral investment for cocoa productivity improvement on small farms. IFC has started its assistance to ASKINDO by developing a strategic plan for the organization. The establishment of a sustainable, quality-informed cocoa supply chain will require that a number of important, yet unresolved, issues be satisfactorily addressed. These include the efficient functioning of local warehousing arrangements, how

extension services can be embedded within the system, and what institutional form culturally appropriate farmer organizations might assume.

13. In summary, potential exists to develop a public private partnership approach to implementation of projects for productivity improvement in cocoa under particular circumstances. Success in developing a partnership will require:
 - a. The combined commitment of donors, GOI and the national and international private sector, to enable a long term vision to be applied to the problem. In particular the technical and managerial expertise of the private sector is required to add value to loan and donor funding. An institutional structure for the partnership will probably be based on the model of a Commission with supporting secretariat as already proven from experience in the oil palm industry.
 - Strong local and national political support for reform of financing and implementation of agricultural extension and research, with supporting policy.
 - GOI willingness to take a lead in encouraging the spread of ideas generated by past donor funded projects such as PRIMA and SUCCESS. To maintain the initiative, reform of the funds allocation mechanism from a subsidy orientation to one directed at productivity improvement by funding knowledge acquisition is also required. The experience of these prior projects suggests that both research and farmer empowerment activities are needed to develop an adequate integrated crop management program
 - Flexibility on the part of public institutions in allowing the involvement of both regular staff and short term contracted staff as appropriate for a particular location. Reform of extension and research conditions, training and mobility under a wider initiative would be needed to ensure public sector staff are available to undertake training for and implementation of the program
 - Ideally some promise of early benefit from a reasonably large scale program in the short term (1-5 years) to offset costs of the private sector partner.
 - Efficient utilization of existing producer levies toward solution of field problems
 - Continued commitment to tight regulatory standards and the development of a “Gold brand” image for Indonesian cocoa
 - Wider engagement with the international cocoa industry to leverage additional research and development funding and access to markets.
14. The final chapter of the report outlines a management structure for public private partnership involving an industry wide Commission and Secretariat composed of all stakeholders. The Commission and Secretariat would manage funding from Government and technical assistance from the private sector and donors to research, extension and feedback monitoring initiatives down to sub district level. Additional functions would include financial management and industry advocacy on both policy and marketing.

INDONESIA

Raising Rural Productivity

Public Private Partnerships for Agriculture in Eastern Indonesia

1.0 Context

1. There are significant constraints to agricultural and rural development in marginal dryland (as distinct from rainfed paddy) areas of Indonesia, particularly in the eastern half of the country where long dry seasons occur over large areas. Technology development for these areas has lagged far behind that of more well-endowed irrigated lowlands in the western half of Indonesia. GOI estimates about 24 million hectares of dryland area whose potential is yet to be developed. The IFC, USAID and the private sector are involved in support to export oriented sources of smallholder income such as cocoa, vegetables, horticultural crops and livestock. Asian Development Bank (ADB) is currently investigating the potential for improvement to smallholder tree crop systems in higher rainfall areas,

| | Average annual growth rate during period | | |
|--------------------------------|------------------------------------------|---------|-----------|
| | 1961-67 | 1968-92 | 1993-2000 |
| Crop and animal outputs, total | 1.2 | 4.8 | 1.0 |
| Food crops, all | 1.3 | 5.1 | -0.1 |
| Rice, paddy | 1.7 | 5.5 | 0.7 |
| Cassava | -0.5 | 1.9 | 0.2 |
| Maize | 11.3 | 7.8 | 1.6 |
| Horticultural crops, all | 2.7 | 3.3 | 3.9 |
| Fruits, all | 3.0 | 3.7 | 4.3 |
| Vegetables, all | 2.9 | 4.0 | 3.9 |
| Non-food crops, all | 0.8 | 5.3 | 2.9 |
| Cane sugar | 1.4 | 5.6 | -4.1 |
| Rubber | 0.4 | 2.8 | 0.8 |
| Animal products, all | 1.4 | 5.7 | 0.9 |
| Meat | 1.5 | 6.0 | 0.8 |
| Milk | -0.6 | 5.1 | 2.9 |
| Fish products, all | 4.6 | 4.4 | 4.3 |
| Forest products, all | -1.5 | 0.7 | -3.5 |
| TOTAL FACTOR PRODUCTIVITY | 0.7 | 2.6 | -0.1 |

Source: Fuglie and Piggott (2003) cited in ADB/IFPRI 2004¹.

whilst ACIAR is planning a ruminant livestock improvement program in the province of Nusa Tenggara Barat.

2. The Government of Indonesia has an ongoing interest in increasing food output in poor areas to meet the needs of an expanding population, particularly in drier eastern provinces where the high input rice strategy is risky. The foundations for growth in agriculture have

weakened in these areas particularly in terms of service delivery, but also in terms of access to capital and fertilizer, onset of various diseases in cash crops (particularly Cocoa Pod Borer), poor linkages to markets and poor perception of price signals from markets. As a consequence, the growth rates of food oriented crops such as rice, maize and cassava have been very slow, particularly in the 1990s, compared to those of vegetables, horticulture and livestock (Table 1.1). Total factor productivity has declined markedly since 1992 after growing strongly as smallholders exploited the resources base of Indonesia in the 1980s to establish new livestock and plantation crop industries in Eastern Indonesia.

Table 1.1 Level and composition of agricultural output in Indonesia

| Average annual growth rate during period | 1961-67 | | 1968-92 | | 1993-2000 | |
|------------------------------------------|---------|--|---------|-----|-----------|------|
| Crop and animal outputs, total | | | 1.2 | 4.8 | | 1.0 |
| Food crops, all | | | 1.3 | 5.1 | | -0.1 |
| Rice, paddy | | | 1.7 | 5.5 | | 0.7 |
| Cassava | | | -0.5 | 1.9 | | 0.2 |
| Maize | | | 11.3 | 7.8 | | 1.6 |
| Horticultural crops, all | | | 2.7 | 3.3 | | 3.9 |
| Fruits, all | | | 3.0 | 3.7 | | 4.3 |
| Vegetables, all | | | 2.9 | 4.0 | | 3.9 |
| Non-food crops, all | | | 0.8 | 5.3 | | 2.9 |
| Cane sugar | | | 1.4 | 5.6 | | -4.1 |
| Rubber | | | 0.4 | 2.8 | | 0.8 |
| Animal products, all | | | 1.4 | 5.7 | | 0.9 |
| Meat | | | 1.5 | 6.0 | | 0.8 |
| Milk | -0.6 | | 5.1 | | 2.9 | |
| Fish products, all | | | 4.6 | 4.4 | | 4.3 |
| Forest products, all | | | -1.5 | 0.7 | | -3.5 |
| TOTAL FACTOR PRODUCTIVITY | | | 0.7 | 2.6 | | -0.1 |

Source: Euglie and Piggott (2003) cited in ADB/IFPRI 2004¹.

3. A particular concern is the ten poorest regions of the country with a focus in Eastern Indonesia. They include East and Central Java, East and West Nusa Tenggara, Lampung, West Kalimantan, Papua, Maluku, South East Sulawesi, and Yogyakarta. These areas accounted for some 26.1 million rural poor in 2000, some 50% of the total poor in the nation. The poverty rate in these poorest areas was 93% of the population, compared to only 6.9% in the half of the country with fewest poor.

4. The Government of Indonesia (GOI) has specifically requested assistance in analyzing problems associated with the production, processing and marketing of livestock products but has also expressed interest in the potential for comprehensive community driven development in Eastern Indonesia and in addressing the diversification and improvement of farming systems such as those for cocoa.

5. The overall thrust of World Bank planning for assistance to Indonesia, as expressed in the current Country Assistance Strategy, emphasizes the negative effects of low investment and poor service delivery which are in turn a product of poor governance. To facilitate growth,

therefore, existing or planned projects will use a platform delivery approach providing comprehensive assistance to governance and service delivery. In agriculture, the package will include microfinance, extension, research, land certification and watershed protection. Projects will also address restoration of irrigation and its maintenance in the crucial food bowl areas of Java. The package for dryland areas needs to emphasize agricultural extension and support for it from adaptive research in order to build on the initiatives of smallholders by improving productivity.

6. The Decentralized Agriculture and Forestry Extension Project (DAFEP) (1999-2005) has provided an excellent model for food crop and general agriculture areas with supportive local government and an integrated extension system as occurs in some 167 of 416 Kabupatens. Additional models are needed, however, for specialized products such as livestock with a specialized (single Dinas) extension service (a majority of Kabupatens). Such an approach has been pioneered by the the Department for International Development (DFID) (UK) funded DELIVERI project in South Sulawesi, where a Total Quality Management Approach was used to change attitudes of extension staff to productivity improvement. In cash crop areas, there is incentive to develop a third type of model based on private sector financing of extension to increase profitability for producers and buyers alike. The development of such models is logically a part of the activities of the successor to DAFEP, the Farmer Empowerment through Agricultural Technology and information (FEATI) project which will be prepared and appraised in FY 2006. This study is therefore a complimentary activity to preparation of FEATI in bringing together an assessment of dryland agricultural issues and a model for their resolution in future through partnership with other donors, the private sector, producers, traders and commodity markets.

7. Past assistance from the World Bank has been in the form of area or integrated agriculture development projects such as those in Nusa Tenggara (CPL 39840) and South Sulawesi (CPL 40070), or more specific interventions such as the Treecrops Smallholder Project (CPL 34640). The completion reports for these projects have a common feature in lack of commitment by government during implementation and by communities after completion, poor credit arrangements and poor service and input delivery. Better targeting of industries for support and an approach based on facilitating and value adding to the market driven initiatives of smallholders may provide a more sustainable approach to dryland areas development. In particular, a holistic supply chain management approach from producer to end user is needed.

1.1 Background and Challenges

High Value Cash Crops Displace Food Crops and Livestock

8. Expansion of dryland cultivated area has occurred mainly for cash crops. In part this trend is due to the increasing demand for diversity in daily diets of urban dwellers, supported by increasing incomes which has led to increasing area expansion of cash crops, although at the cost of low productivity. Thus per capita expenditure on garlic and oranges is rising rapidly in Indonesia whereas expenditure on rice has reached a plateau (Ruf and Lancon, 2002 p 275). The same authors cite the trend to tree crops in irrigated lowlands of Sulawesi in place of food crops such as soybean and paddy. Tree crops such as cocoa are also replacing extensive livestock

grazing in uplands. High value industries currently account for some 55% of agricultural production but will probably account for 80% of the increase in output if constraints are addressed (USAID data).

9. Until prices for food crops improve, it is likely that substitutions will occur based on relative profitability, availability of planting material, information services and credit supply. In this situation, future food security may well rest on a concerted effort to take rice yields to the next plateau, integrating food and tree crops and using additional tree crop and livestock income from the uplands to purchase a range of cereals internationally.

Improving Productivity and Value Added for Smallholders

10. Marginal productivity of irrigated land (1993 dollars) in Indonesia increased steadily from \$1200 /ha in 1961 to \$3000 at the end of the 1990s, however although marginal productivity of dryland tripled in the same period, it has remained at about 6-7% of irrigated land in absolute terms. (World Bank 2001) Future gains in dryland areas will come from high value commodities (smallholder estate crops, horticulture, livestock and fisheries) engendered by partnerships between producers, traders, processors and a public sector more focused on regulation and research.

11. Productivity is low in most cash crop industries with the possible exception of vegetable horticulture which receives technical assistance from supermarket chains and is usually located on the best available soils. In the cocoa industry, yields have declined drastically after the onset of cocoa pod borer infestation in the mid 1990s from around 1.5m.t./ha before pod borer to 0.84 m.t./ha in 2002. Across the industry, the decline can be valued at around \$400 million at a price of \$1340/m.t.

12. Over the past decade, total cattle numbers have fallen from a peak of almost 12 million head in the mid-nineties to less than 11 million estimated by the Directorate General for Livestock Services (DGLS) for 2004. Similarly, cattle numbers in the eastern islands fell from almost 4 million in the mid-nineties to below 3 million in 2003. The main reason for the decline in cattle numbers has been the slaughter of breeding females as rupiah prices rose steeply following the devaluation. Low productivity of Bali (*Bos Sondaicus*) cattle due to inbreeding, a very inefficient government administered artificial insemination structure and poor quality grazing feed supplies being overrun by weeds such as *Chromolaena odorata*, are all additional causes of decline.

13. Potential does exist to drastically improve productivity. Mundlak et.al (2002) have compared the percentage contribution to output growth of various agricultural inputs in Indonesia and Thailand (Table1). Their data demonstrates that Thailand has made impressive growth through the use of fertilizers and capital. In Indonesia, growth has also occurred and to a greater extent in dryland areas, however, it has occurred in a situation of greater capital and input scarcity and has been more reliant on natural resources. Nevertheless, these authors maintain that there is still considerable potential for growth using more conventional inputs, since unlike Thailand and the Philippines where most (70-90%) of output growth can be

attributed to factor accumulation, in Indonesia total *factor productivity* still comprises some 49% of growth in output.

14. Past reliance on natural resources is also underscored in the work of Ruf and Lancon (2002) who emphasise that a spontaneous “Green Revolution” has also occurred in upland areas but has originated with farmers and traders themselves in response to perceived profits and on the basis of the fertility and other factors conferred by former forest rather than as a result of government policy or interventions.

Table 1.2 Contributors to Agricultural Output in Indonesia and Thailand

| | <i>Indonesia 1981-98</i> | <i>Thailand 1981-95</i> |
|----------------------------------------------------|--------------------------|-------------------------|
| <i>Annual Output growth rate %</i> | <i>3.045</i> | <i>3.22</i> |
| <i>Percentage contribution of Inputs to growth</i> | | |
| <i>Irrigated land</i> | <i>10.4</i> | <i>10.7</i> |
| <i>Dry Land</i> | <i>5.2</i> | <i>0.7</i> |
| <i>Fertilizers</i> | <i>10.2</i> | <i>19.0</i> |
| <i>Capital</i> | <i>12.8</i> | <i>40.6</i> |
| <i>Labor</i> | <i>12.7</i> | <i>1.9</i> |
| <i>Contribution to Output %</i> | | |
| <i>Factor accumulation</i> | <i>51.2</i> | <i>72.9</i> |
| <i>Factor Productivity</i> | <i>48.8</i> | <i>27.1</i> |

Source: Mundlak (2002)

They also note the mutual dependence of upland and lowland farmers including the reliance of upland smallholders on lowland agriculture for subsistence food production and the reliance of lowland farms on upland seasonal labor.

15. Improved productivity needs to be matched to marketing. In the Malino District of South Sulawesi, leeks are the main vegetable crop produced, with potatoes and cabbages as secondary crops in the rotation. Husbandry standards are excellent and yields are very high (up to 120 tons/ha with 5/6 harvests/ year) on fertile volcanic uplands with reliable rainfall. Market demand is high in Makassar at Rp700/kg. and in Jakarta at Rp1,500/kg. The District can supply the Jakarta market three months earlier than other suppliers. However, the growers do not have refrigerated storage or transport, resulting in product deterioration during delivery. While this is a credit-worthy business, no bank finance is available. Collateral requirements and risk perception by the banks and the perception of an unfriendly loan processing environment by growers and traders are constraining the development of a profitable business. The answer may be a partnership between producers and the Association of Retail Marketers (APRINDO) whose members have expressed strong preference for local produce if quality can be improved.

Poor Quality and Weak Market Linkages

16. Market awareness has been slow to develop in dryland areas because increasing output for undersupplied markets has been an adequate strategy for most commodities so far. As a result, the requirements of particular markets for particular quality have largely been ignored. With increasing market competition from other members of the Association of South East Asian Nations (ASEAN) countries, notably Thailand, however, this situation will change. In the horticulture sector, for example, poor keeping quality of local compared to imported fruit and vegetables results in a routine 40% wastage of all purchases by supermarkets (APRINDO pers. comm.). Private sector extension and development is assisting the improvement of this situation, notably around Jakarta and Bandoeng. The Royal Netherlands Government is developing a project to improve awareness of supermarket requirements and training of horticultural producers in crop husbandry and product handling for quality improvement.

17. Cocoa currently involves some 400,000 farmers in Eastern Indonesia, mainly in South Sulawesi but also in Papua, NTT and NTB. The industry earns some \$700 million in exports annually but is losing substantial profits (perhaps \$200 million per annum) because of low yields and increasing discounts on the world market for poor quality production as a result of Cocoa Pod Borer (CPB) infestation. Sulawesi cocoa faces a \$180/ ton discount before compared to the ruling New York Commodity Exchange prices for Ivory Coast cocoa because of its waste content (minimum 2%), resultant more difficult processing and different flavor. The discount increases with waste content, which is typically 5-6% on deliveries and as high as 10%, at which no US buyer was interested in Indonesian cocoa. Fortunately increased attention to standards has recently reduced waste content to 3.5% on export but the weight of responsibility is still being borne by the regulator rather than the industry as a whole. US imports decreased 50% in 2003 over quality concerns. Although growth in area planted to cocoa in Sulawesi has been important in maintaining world output in the face of disease problems in Brazil and instability in main production areas in Africa, Indonesia cannot maintain its presence in the world market as a reliable source unless quality problems are addressed. At a waste content of 5%, the loss to the industry is a minimum \$30 million and at 10% it is \$70 million plus the possible loss of export markets altogether.

18. Low quality is a function of several factors. Export standards are inadequately defined and inappropriate for non fermented cocoa. They are voluntary, not compulsory and poorly supervised, with certificates of compliance issued by private certification agencies on product which does not meet or attempt to meet the agreed standards. The traders therefore have no incentive to provide quality cocoa. Rather, their profits are derived from providing cocoa with maximum waste content by mixing clean product with waste derived from a secondary waste market valued at around Rp2000/kg. At the farmer/trader interface, many traders compete for scarce product and thus moisture and waste content risk is passed forward to grinders and exporters rather than sending clear price signals back to farmers, who still enjoy 70% of the New York Exchange price and have few incentives other than yield improvement to change practices.

19. Although the vanilla market worldwide is small (some 8000 tons of international trade), Indonesian vanilla is already heavily discounted or rejected by the international trade because of

mixing of good quality Sulawesi vanilla beans with poor quality product from Papua. Similarly good quality coffee from northern Sulawesi is mixed with poor quality southern lines. The major influence in improving coffee quality has come from the involvement of Japanese private sector investment around Rantepao.

20. The cattle marketing structure is rudimentary, especially in outer islands and farmers are forced to sell to intermediaries, reducing margins. Decentralization has brought with it a range of transit taxes varying between provinces. Other long standing restrictions to trade between provinces remain, sometimes as supposed barriers to spread of disease and in other cases as trade constraints imposed by provincial governments on inter island trade in cattle. Improved inter island shipping conditions are required to reduce cattle weight loss and the cost of shipping, which is mostly done as backloads at present.

21. Similarly, investments in meat processing have been made without apparent consideration of the marketing chain from breeder to consumer. Thus of 10 new small capacity (50 head/day) beef abattoirs constructed during 1998-2001 under financing by the Japanese Overseas Economic Cooperation Fund (OECF), only 3 have a throughput of more than 5 head per day. The facilities concerned do not have adequate food safety standards or cold storage/transportation to be acceptable in the high value markets of Jakarta and Bali. At the same time the facilities cannot compete in timeliness or cost of slaughter with backyard slaughterhouses aimed at the wet market and fresh meat for consumption within 3-4 hours of slaughter.

22. The organization of egg production also exemplifies weakness in market linkage, even though a rudimentary private sector coordination of production occurs. In Sulawesi, the industry is typically led by large producer/traders, selling eggs from both large self owned flocks (typically 100,000 birds or more) and from perhaps 500,000 birds owned by surrounding smallholders. The birds are purchased as day-old chicks and are replaced at 20 months. Eggs are sold to the trader and the old birds to the wet markets with supplementary income from manure. The trader supplies chicks, feed, and other inputs to outgrowers on credit at 5% per month with the expected production as collateral. Despite the shortage of eggs caused by Asian bird flu, however, prices for local producers have not risen above Rp430/egg because of poor linkages to international markets in, for example, Singapore. Feed costs have nevertheless risen from Rp290 per egg to Rp400 per egg leaving little margin for growers, many of whom have ceased operation.

An Important Role for the Private Sector

23. In contrast to the situation for food crops in the rainfed and irrigated paddy areas, the private sector is the major driver of dryland investment, technical assistance and progress in yield and quality improvement, particularly at farm level in the provision of extension services and guidance through traders and trader based finance.

24. Constraints to improving cocoa production and overcoming pest infestation in smallholder cocoa farming systems are usually linked to low level of agricultural knowledge, low level of technology adoption, and poor farming practices. In response to this problem, the United States Agency for International Development (USAID) has joined with ACDI /VOCA consultants as

implementation consultants, Mars Inc. and the World Cocoa Foundation to form a private/public sector partnership called the Sustainable Cocoa Extension Services for Smallholders (SUCCESS) Alliance project, which promotes an integrated approach to farmer training (based on Farmer Field School methodology), information exchange and applied research to control cocoa pests in Indonesia and should increase productivity of smallholder farmers. The partnership stops short of a full supply chain management approach, however, and has not had the impact on productivity and farmer attitudes and incentives expected from a \$6 million investment. To date about 35,000 farmers have been trained in integrated pest management. Based on comparisons between demonstration plot data and assessments of farmers' garden, crop losses have decreased by about 30%, and incomes have increased by an average of about US\$400 per year.

25. The private sector has taken the lead in improving maize yields under the incentive provided by the broiler chicken industry in Sulawesi. Yields of hybrids under competent but routine management are commonly 7-8 t/ha under irrigation (4.5t/ha for open pollinated varieties) or 5t/ha using residual moisture from paddy plus rainfall (3t/ha for open pollinated). Nevertheless, investment in research and development of open pollinated maize varieties, suited to more remote locations where commercial hybrid seed supplies are not available, is another option.

26. Increasing population and incomes in Indonesia are fueling a rapid rise in demand for poultry and feed grain, particularly in Sulawesi where land suitable for maize production as palawija crop exists. Domestic production of maize is insufficient to meet requirements and imports are above 1 million tons annually, half of which is used for animal feed. Intensive broiler production is based on smallholders contracting with large firms (such as CP). This model is successful since the firm provides technical assistance to growers, credit for input purchase, and a market at an agreed price. An unusual feature of the contracting is the sale price adjustment agreement to compensate for rises in feed price.

27. Within the national herd numbers are included imports of live cattle for fattening in South Sulawesi or Surabaya of between 438,571 head in 1997 and 171,122 in 2002, depending on import prices and the exchange rate. The main provinces for commercial feedlot development with foreign investment are Lampung, West Java, Middle Java, East Java and Yogyakarta. The GOL is also interested in increasing the use of local cattle in feedlots, however, there are several constraints including limited and scattered supply, low daily weight gain, parasite infestation, lack of objective measurement (weighing) to determine sale prices of store stock and thus a very wide range of initial bodyweights and meat quality. All of these factors are the antithesis of the characteristics of imported livestock and boxed beef, which comprise some 30% of total national beef production but are becoming very expensive owing to increasingly unfavorable exchange rate differentials with Australia and New Zealand.

Participation by Smallholders

28. Just as the participation of the private sector is key to improving productivity and quality, participatory approaches to extension and industry management are vital to address problems which have arisen under decentralization, particularly in the livestock sector, where the

participatory approach to extension developed under DAFEP needs to be adapted to the needs of a specialized rather than generalist extension service under Dinas Perternakan.

29. Forage production is a key element of the costs of smallholder livestock producers because of its competition for cash crop land. Feeding constituted more than 60% of smallholder costs found by Hadi et.al., (2002).Improvements in matching feed supply to individual smallholder situations, through participatory approaches, are being developed by CIAT in Asia and need to be considered for Indonesia. The potential for crop alternatives such as cocoa and their integration with livestock also needs to be understood.

30. Genetic improvement of the livestock herd to improve birth rate, weight and daily gain using Shahiwal females and Braham cross bulls commenced with IFAD and ADB financed programs in 1983. These two import programs had dramatic effects on total cattle numbers increasing the national cattle herd from 6.1 million in 1981 to 8.5 million in 1985 (Hadi et.al., 2002). Since then artificial insemination has developed as an alternative, although most government funded services display unacceptably low conception rates (25-30%) owing to duplication in staffing, poor record management, poor bull procurement and management and inadequate training of staff. Privatization of these services will be increasingly important (see also Brandenburg and Sukobagyo, 2003). Similarly in Sumbawa the two main government-run centers for extensive livestock breeding in Dombu and Sgrading Districts are in decline because of either community conflicts or because of inadequate budget after decentralization. Strategies for community based participatory management or complete privatization are needed.

31. The situation in feedlot operations in Sumatra is more promising. Smallholder farmer groups have formed during 1990-99 and are the basis of wholesaling loans from Bank Niaga and BNI to producers the combination of group national land certificates plus contracted output provides adequate security to the banks, who also enjoy low costs of (group loan) disbursement, since finance and collective risk is managed within the group. The result is a low cost loan (13% p.a. from Bank Niaga and 18% from BNI).

Credit- an ongoing concern

32. Similar attitudes and perceptions in regard to credit occur in all the industries reviewed. Both producers and village traders/millers identified credit supply as their major constraint to expansion and to uptake of improved technology. According to growers interviewed, the main constraint on output expansion in maize, for example, is credit for mechanized (faster) land preparation, pumps, fertilizers and other inputs. No growers interviewed have used institutional (bank) credit and none ever expected to even if it were available, though most had savings accounts in the banks. Poor understanding of business planning and a perceived unfriendly loan processing environment are key concerns. Individual farmers in Sulawesi obtain credit from traders at 5%/month, in comparison to 2%/month from banks but not available to them. Small traders buying directly in the village also expressed need for credit but were willing to accept bank credit, if available. Their main reason for not accessing bank finance was the higher collateral requirements of the banks for agricultural-related activities in comparison with requirements for other sectors. They were unable to meet more than 20% of the demand for credit from their farmer customers. Clearly, credit rationing is constraining growth in output of

maize and is driving up feed costs in the poultry and related industries. The proposed bank guarantee mechanism (line of credit to banks) being investigated by the International Finance Corporation (IFC) may offer one solution to the problem of managing risk by banks. Others include development of financial leasing, warehouse receipting and financial intermediary development for wholesaling loans, also by IFC

1.2 Objective

33. Given these background developments and challenges, a study of the situation facing smallholders and their private and public sector partners in dryland areas of Eastern Indonesia was seen as an opportunity to build on the initiatives in crop area expansion during the 1990s.

34. The study objective was to compare and contrast the potential for use of a public private partnership approach to solving the problems of low productivity and smallholder income in the beef cattle and cocoa industries in Eastern Indonesia

35. The study also sought to suggest better methods of service delivery to facilitate these aims by cooperating with the private sector, which might be incorporated into the proposed FEATI project. The study was not intended as a design document but rather as a background paper on which design would be based. The study was carried out in collaboration with the Directorate of Planning of the Ministry of Agriculture of the Government of Indonesia. It also involved government at Provincial and District level. The impacts were expected to be:

- A better understanding of the factors to be considered in developing investment options for the dryland farming sub sector which builds on past Government, private sector and Bank experience in implementation methodology, credit provision, service provision and infrastructure to provide guidance for more sustainable investments.
- A better dialogue with the private sector in crop and livestock agriculture, with a view to increasing their role in future service provision.
- Greater trust by the private sector in the potential for successful cooperation with public institutions
- A range of options for extension strategy covering cash crop and livestock industries as well as integrated and specialized institutional models.

2.0 The Potential for Partnerships in Ruminant Livestock Industries of Indonesia

2.1 Background

36. Ruminant livestock have traditionally been bred on smallholder farms in Eastern Indonesia for sale to either “wet market” traders (after grass fattening) who slaughter in backyard style operations or to smallholder fattening operations commonly subsidized by directed credits from the Central Government. Breeding activities have shown very low returns to producers because of the long period to turnoff and the high labor cost of dry season feeding (ACIAR, 2002). Since the early 1990s a trade has developed in live cattle from Australia based on importing Brahman (*Bos Indicus** *Bos Taurus*) cross steers from Darwin and Rockhampton for fattening over about 90 days in feedlots in Lampung and Surabaya. Imports peaked at about 424,000 head in 1997, declined to 41,000 in 1998 and slowly recovered to about 300,000 head in 2003-4.

37. The trading profit has always been sensitive to the exchange rate between the Rupiah and the US\$ (Australian cattle traded on US\$ terms). In the period since the economic crisis of 1997 the generally unfavorable exchange rate has reduced profits, particularly since 2003. Prices for Australian feeder steers are at a historic high in 2005 (around \$1.80 US/kg) relative to past prices because of drought in Australia and exchange rate differences between Australia and Indonesia (see table 1),

Table 2.1 Import price of live cattle 1995-2000

| | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|-------------------------------|-------|-------|--------|--------|--------|-------|
| Cattle (max 350kg liveweight) | 1.454 | 1.545 | 1.362 | 1.139 | 0.951 | 0.987 |
| Other cows and buffaloes | - | 1.649 | 1.481 | - | 1 | - |
| Growth% | | 5.76 | -11.89 | -16.68 | -16.60 | 3.66 |

Source ACIAR 2002

38. Australian feeder steers are currently purchased by Indonesian importers at a trading loss which they hope to recover with a profit on feeding owing to the availability of low cost feeds such as palm oil meal, copra meal, waste pineapple, cassava and locally available roughage. In the last 18 months importers have experienced small profits to significant losses. The situation has virtually stopped exports to the Philippines but in Indonesia the large feedlots have sustained losses to keep their wet market clientele supplied. They have cut costs and have started feeding local cattle. Imports to Indonesia from Australia in 2004 showed a 7% drop on 2003 levels compared to decreases of 46% and 51% to Malaysia and the Philippines respectively (Meat and Livestock Authority, Australia data 2005). In addition, for the longer term there are risks to live export on boats, from western animal liberation groups that are starting to make an impact on Australian livestock practices.

39. For the short-medium term the trading and feeding margin situation suggests a further drop in imports of feeder steers from Australia, rationalization of the Indonesian feedlot industry and increasing interest in local feeder bulls. Smallholders, particularly breeders, may benefit

Table 2.2 Beef supply by source (kilotons) 1995-2000

| Year | Native Cattle | Imported Cattle | Imported Beef | Total Supply |
|-------------|----------------------|------------------------|----------------------|---------------------|
| 1995 | 261.5 | 50.5 | 7.3 | 319.3 |
| 1996 | 268.0 | 79.2 | 15.8 | 363.0 |
| 1997 | 266.5 | 87.2 | 23.3 | 377.0 |
| 1998 | 320.8 | 21.8 | 8.8 | 351.4 |
| 1999 | 280.9 | 27.9 | 10.5 | 319.3 |
| 2000 | 276.9 | 63.0 | 26.9 | 366.8 |

Source ACIAR 2002

from this situation if they can produce animals of the correct breed at a weight and quality suited to feedlot fattening. However, at present, smallholders in much of the Eastern Islands produce either Bali (*Bos sondaicus*; *Bos javanicus*; *Bibos/Bos banteng*) or Ongole (*Bos Indicus*) cattle under extensive conditions in NTT or under a combination of extensive breeding and semi intensive fattening in NTB. The animals commonly take up to three years to achieve a weight of 280-300kg suited for use as feeder bulls in feedlots. To some extent, the price premium (10-30% compared to other breeds) received for Bali cattle compensates for the high cost of rearing the animal. Introduction of husbandry improvements and in some areas a cross breeding program, combined with a program to conserve and improve the Bali cattle genotype, could potentially double productivity in terms of returns to producers.

40. Two forms of partnership between feedlots and smallholders based on the Nucleus Estate Smallholder model is described by Hadi et.al. (2002). The first was a simple allocation of imported store stock to smallholder fatteners surrounding feedlots, with the implicit obligation that the animals would be sold to the feedlot after a fattening period of 90-100 days. The system operated prior to the 1997 financial crisis but broke down because of fraudulent behavior of smallholders in not selling to the feedlot in return for access to high quality animals or selling the imported stock to traders and replacing them with low quality local stock. In another form of partnership, some feedlots provide credit for livestock purchase to smallholders with no obligation to purchase the fattened animal but with an obligation by smallholders to return the loan amount plus 45% of all profit.

41. There appear to be few gains to be made in the processing and value adding chain. Most beef is sold through wet markets where the main concern is for fresh, preferably warm meat, slaughtered within four hours of sale rather than for a quality product with known hygiene standards. Intermediate technology abattoirs located in S. Sulawesi, Lampung and Lombok under Japanese loan financing have either collapsed or have failed to attract private sector management interest. The situation is not likely to change until rising incomes and demand for better hygiene force changes in hygiene standards related to slaughterhouses.

2.2 The challenge- improved productivity not greater numbers

42. The opportunities available to Indonesian smallholders could be assisted through a program aimed at productivity improvement rather than initial livestock ownership. A key limitation to feedlots and smallholder' profits is the very low average daily weight gain of animals owing to a range of genetic and management factors described below (sections 2.3, 2.4). Those opportunities are likely to be divided between farmers on Java and Sumatra (where 70% of local beef production is located and is based on low productivity Ongole (*Bos Indicus*) cattle and Eastern Indonesia, where Bali (*Bos Sondaicus*) predominate. In Java there is potential to improve productivity by both management improvement and cross breeding if numerous problems with the artificial insemination system can be overcome. In eastern Indonesia, Bali cattle productivity can be improved (section 2.4) but the market will be local and any improvement will not contribute to reduction of import dependence of high value urban markets. Feedlot operators are not interested in using Bali cattle for the reasons described by Hadi et.al (2002) because of limited and scattered supply, low shipping capacity and risk, low average daily gain and the established practice of purchase without weighing .

43. Current GOI funded and Kabupaten government implemented programs provide credit toward livestock ownership through cow bank type schemes. Typically such schemes aim to provide a breeding cow initially in return for a pregnant cow in three years time or two cows over five years. Recipients are organized into farmer groups of about 20 farmers. Even this type of credit is regarded by smallholders as inadequate and there are continual requests for zero interest schemes, debt forgiveness on death of cattle etc. Smallholders nevertheless perceive livestock as a good investment and a secure savings, although theft is a problem and off farm employment is becoming increasingly attractive as an alternative.

44. The credit schemes inspected in the study area of Dompu and Sumbawa Besar Kabupatens in Sumbawa, NTB all aimed to improve herd numbers. In retrospect however, current credit schemes have a quite small impact on herd numbers. In NTB, less than 10,000 of the total herd increase of approx. 50,000 can be attributed to subsidized credit schemes. Much of the concern regarding decline in numbers expressed at the ACIAR workshop- "Strategies to improve Bali Cattle in Eastern Indonesia"(February 2002) reflected declines in numbers as a result of the financial crisis of 1997 and the subsequent need for household income. An analysis of population dynamics during 1998-2002 showed that population declines had occurred in NTT and Lampung (-22 to -25%), and significant declines (around -9%) in NTB and South Sulawesi. However, since 2002 (Table 2.3) a steady increase in numbers of both cattle and goats has occurred as economic stability has returned.

Table 2.3. Trends in Livestock Population 2000-05- NTB

| No. | Type | Year | | | | |
|-----|---------|---------|---------|---------|---------|---------|
| | | 2000 | 2001 | 2002 | 2003 | 2004 |
| 1. | Cattle | 376,526 | 395,751 | 406,938 | 419,569 | 426,033 |
| 2. | Buffalo | 160,634 | 157,834 | 157,199 | 161,359 | 156,792 |
| 3 | Horses | 74,728 | 71,232 | 74,529 | 73,623 | 76,006 |
| 4. | Goats | 240,877 | 254,625 | 254,625 | 282,500 | 300,280 |

Source: Indonesian Research Institute for Animal Production

45. Data for Bali Cattle from the 2000 season demonstrate that even the well adapted Bali breed has difficulty surviving both the climate and the husbandry problems of eastern Indonesia. (Table 2.4). The data demonstrate that mortality in the herd is a real problem in NTT and that overall calving rates (calves as % standing cows) are low at about 61% .

46. Even in Sumbawa, where long term investments in live fences of *Gliricidia sepium* have made a huge impact on availability of early to mid dry season feed supply, average daily rates of gain of Bali bulls are commonly 300 grams compared to a Provincial Dinas Peternakan goal of 500 grams or feedlot performance of 800 grams . By comparison, imported Australian Brahman steer cattle on feedlots usually gain at 1.5kg/day

Table 2.4 Provincial herd numbers by sex, slaughter and mortality for Bali Cattle in Eastern Indonesia (2000)

| Province | Bulls | Cows | Slaughter/Export | Mortality | Estimated calving |
|--------------|---------------|----------------|------------------|---------------|-------------------|
| NTT | 11077 | 224025 | 78283 | 71567 | 149089 |
| NTB | 39050 | 153197 | 72550 | 11878 | 79183 |
| Bali | 71940 | 184572 | 66475 | 10347 | 122322 |
| S. Sulawesi | 39789 | 337051 | 99459 | 16294 | 203680 |
| Lampung | 19554 | 165084 | 40152 | 5163 | 73740 |
| Total | 253342 | 1032079 | 356919 | 115294 | 628014 |

Source: Indonesian Research Institute for Animal Production

47. Data on the reproductive performance of Bali cattle (Table 2.5) further demonstrate that in the difficult environment of Eastern Indonesia, the Bali breed has evolved for survival not productivity. Cows reach puberty later, have their first calf later, have longer calving intervals, lower calving percentages and lower milk production than is common on Bali or for *Bos Taurus* herd or *Bos Indicus* herds in better environmental conditions with better management.

Table 2.5 Reproductive Performance and Milk Production Data by Province (2000)

| Province | Age at Puberty (months) | Calving Age (months) | Calving Interval (months) | Calving Rate (%) | Calf Mortality (%) | Milk Production (kg/lactation) |
|------------------------------------|-------------------------|----------------------|---------------------------|------------------|--------------------|--------------------------------|
| NTT | 30 | 41 | 15.4 | 66.6 | 48 | 164.7 |
| NTB | 24 | 36 | 16 | 51.7 | 15 | |
| Bali | 24 | 32 | 14 | 66.3 | 8.5 | 274.5 |
| S. Sulawesi | 30 | 36 | 15.7 | 60.4 | 8 | 164 |
| Australian Rangelands ¹ | 15-27 | 27-39 | 15 | 86-90 | 3 | n.a. |

¹ Data of long term trials at Grafton Research Center, NSW Dept of Agriculture Australia for *Bos Indicus*/*Bos Taurus* cross animals. Ranges indicate variation between worst and best forage supply

48. Field study in NTB found that selection is almost random in most herds and that 'breeding' is based on the ability of a young bull to produce a few calves before it enters the fattening phase, rather than any selection policy or attempt to improve genetics. Discussion with farmers using 'any bull' gave the distinct impression that they had little appreciation of the role of genetics to improve performance, nor gave it any priority compared to animal health and/or nutrition.

49. Similarly, the only breeding program established successfully with international assistance (and now defunct except in Bali), the P3B program, was based on initial phenotype selection followed by 2 years of performance testing. However, only one set of performance records were kept in two locations (Dompu in Sumbawa and Bone in Sulawesi) and these were lost in 1998 riots and fires in both locations. The 5 surviving bulls, located at Dompu, could, however, become a genetic resource if moved to either the AI center at Singosari in Java or the NTB provincial station at Mataram, for semen collection. Top-down' breeding programs are not going to achieve positive outcomes on Sumbawa as has been attempted in the last 20 years. Any future breeding projects must include farmers in discussions on breeding objectives and selection of all key animals e.g. sires, from the outset. The benefits will have to be demonstrated continuously and farmer group methodology adopted so that a competitions between groups can be used to maintain interest in genetic improvement, even if the method of selection is subjective. A full breed improvement program would take at least two generations (10+ years) to prove superiority of a pedigree. Semen from NTB proven bulls could be used in a progeny test on Bali, in head-on comparison to the best bulls on Bali. Under present regulations this would require special permission from DGLS and probably all progeny of NTB bulls would have to be slaughtered. Bali island cannot export semen because of Jembrana disease nor can it import semen. Nevertheless a benchmark of productivity for NTB bulls compared to Bali bulls would be established.

2.3 Opportunities in Cross Breeding

50. Given the existing low productivity of Bali cattle and the probable slow progress in improvement of productivity in the breed through breeding programs, an alternative strategy for smallholder income improvement from part of the herd is crossbreeding in areas where preservation of the pure Bali breed is not a priority.

51. Crossbreeding exploits the phenomenon of heterosis. Hybrid vigour (heterosis) is the additional performance of the crossbred calf over the average performance of both parents. The greatest level of heterosis occurs when animals of diverse genetic backgrounds are mated by e.g. *Bos indicus* x *Bos taurus*. Hybrid vigor is very attractive to farmers in developing countries because they can clearly see the increased growth, often accompanied by a color change that makes the crossbred calf 'stand out' from the crowd.

52. Nevertheless, while F1 Euro x Brahman animals may perform well in all but the harshest environments in northern Australia, it remains to be seen if a F1 Euro x Bali female in NTB could have adequate adaptation in village systems. To date, few Brahman cross animals have been produced in the study area in Sumbawa, but the experience at village level with them

indicates that turnoff age could be cut by at least a year to about 2 years for a 280 kg animal if all other management factors were improved

2.4 Opportunities in Better Husbandry Practices

53. Sumbawa, the study area, is an island with <1500 mm annual rainfall with the main rainfall period from January to March and a dry season from June to September. Humidity during the year ranges from 40-100%. Maximum temperatures range from 30.4⁰ to 32.7⁰C and minimums from 20.1⁰C to 24.7⁰C. In a forage-based cattle system with this type of rainfall pattern, it is necessary to synchronize cattle husbandry and management procedures with the growth of pastures to in order optimize the nutritional conditions for the cow and calf. Several strategies could form part of a management package for existing farmer groups formed by Kabupaten Dinas Peternakan staff under the directed credit programs.

Time of Calving

54. The Bali breed has relatively high fertility and the female will tend to come on heat on a year-round basis. The average farmer would be happy with that situation. It means that to re-breed a female after calving does not require a lift in nutritional conditions from the break of the rainy season to promote oestrus as do other tropically adapted zebu cows e.g. Ongole or Brahman.

55. The problem, however, is that if Bali females exhibit heat (oestrus) year round, calving will occur year-round at about 285 days after conception. If the calf is born in the dry season when protein levels are low and feed scarce then the calf's pre-weaning average daily gain (ADG) will be low. If the cow's condition is low then the cow's fertility will be lowered and calving percentage will drop and inter-calving intervals will increase. All the above lower cow-calf productivity.

56. If the mating season is restricted to a determined period it follows that the calving period will also be restricted. If mating occurs so that the calves are born in the season when there is good quality and quantity of feed available to the suckling cow, then both cow and calf will gain from the superior nutrition available at that time of the year. Integral to improvement of genetics would be control over which bull mated a particular cow. Any move to seasonal, controlled mating needs to be done gradually to minimize impact on cows with out of season calves.

Strategic weaning

57. The Bali breed has a superior ability to maintain body condition in spite of lactation demand, dry season, poor nutrition, poor common grazing etc. It appears that it does not suffer the lactation anoestrus problems of the zebu or zebu-based cows in the tropics, where the suckling effect of a calf combined with low nutrition affects oestrus. Bali cows, however, have relatively poor milking ability causing poor pre-weaning average daily gain in calves (see table 6), and high mortalities in young calves. Poor cow-calf bonding in the breed compared to other tropically adapted breeds has been reported (Kirby 1984) from work in the Northern Territory of Australia. The Bali cow may 'switch off' milk production from its calf if nutritional conditions

are poor as a survival mechanism. Strategic weaning of a young Bali calf is therefore recommended as a key tool to improved production.

Nutrition

58. Poor nutrition, particularly in the dry season is a major factor in low productivity in Eastern Indonesia, particularly in NTT, where lack of dry season drinking water compounds the problem. It is notable on Sumbawa in NTB here has been a long history of planting the leguminous fodder tree Gamal (*Gliricidia sepium*) in ‘coppiced’ hedgerows and as the main structure in ‘living fences’. This not only allows for protection of fodder crops from the grazing herd but also most importantly provides a key dry-season forage source for cattle.

59. Lamtaro (*Leucaena leuccephala*), another important tree legume, is less in evidence on Sumbawa and there are many places on the island where Lamtaro could be planted in conjunction with Gamal or separately. A 1995 outbreak of psyllid disease badly affected Lamtaro trees in the islands. Psyllid resistant varieties are now available and of course plants that had inherent resistance to the disease have also multiplied locally since that time. For the common grazing areas of Sumbawa it is clear that stylosanthes species are much better suited than species such as Siratro (*Macroptilium atropurpureum*) with the crown above ground. Stylos are not commonly grazed in the wet season when they provide nitrogen to the soil because of reduced palatability. They are grazed in the dry season and the viable seeds are transported by the cattle to new areas, providing a low-cost method of common-grazing pasture development.

60. Fodder availability is not the only problem in the dry season but also the labor required to collect it. Fodder collection is the most time-consuming task involved in keeping cattle (Ruf and Lançom 2004). The island of Sumbawa, in common with most of NTT and NTB does not have coconut or palm oil plantations so the by-pass protein supplements they provide in many South-East Asian environments are absent. Other than Gamal, Lamtaro, rice straw, rice bran and crop residues, there is little that could be used as supplement to grass. Given the smaller size of Bali cattle, a supplement of 30 grams of urea per day per cow with a sulfur source and an attractant e.g. salt, could provide a low-cost non-protein nitrogen supplement to stalled animals eating low quality roughages. A dry mix could be provided to grazing animals in some situations.

61. Australian Center for International Agricultural Research (ACIAR) funded projects conducted previously in NTB have shown positive responses to dry-season supplementation, even with only rice bran as the supplement. Urea supplementation of both weaners and cows should therefore be a dry-season option in any integrated plan to improve husbandry.

2.5 Potential financial impact of improved management-

62. The absence of good data on the benefits of management improvement is a real constraint to adoption by smallholders and to interest in partnership by the private sector. Although the ACIAR is conducting work in this area with the Agricultural Institute for Adaption of Technology (AIAT) in Lombok, their work is incomplete and unpublished. Two further research projects investigating social and institutional constraints are in planning. The lack of productivity data and particularly data on financial benefits indicates that some of the current expenditure on

subsidy for livestock purchase needs to be redirected to research on productivity improvement. The predicted outcome of trials on husbandry improvement, funded by ACIAR, are presented in Table 2.6. Data from actual trial results is unpublished but has substantiated these predictions. The data are based on the market value of additional live weight at sale from improvement in calf growth rates in response to management improvement from 0.24 kg/day (current practices) to 0.36 kg/day (best practice).

Table 2.6. Estimated Financial impact – (Cash flow/cow/year) on Lombok and Sumbawa in Response to Management Improvement

Rp Million

| | |
|---------------------------------------------------------------------------------------------------------|------|
| Current system , no weaning, dry season calving, no supplements Surviving calves sold at 3 years | 1.35 |
| New village management system with various options | |
| Wean and sell calves | 1.50 |
| Wean, keep calves 12 months, sell | 2.12 |
| Wean, keep calves 12 mths, increase LWG modestly to best village level | 2.91 |

Source: Unpublished data of ACIAR

2.6 Policy Constraints to Implementation

Breed Conservation

63. A major barrier to implementation of any program for national productivity improvement in ruminant livestock in Indonesia is the policy dislocation on Bali cattle conservation and improvement arising from decentralization. Conservation programs have been independently implemented by several provinces, notably NTB, which is an important supplier of animals for fattening and would benefit from a crossbreeding program to increase turnoff rates by lowering turnoff age. The provincial policy in NTB clearly has a conservation objective as expressed in vision and mission statements provided by the Kabupaten Government at Dompu and reinforced as a ban on crossbreeding in all but two Kecamatens in Sumbawa Besar Kabupaten.

Vision: Through breeding and animal health services to strengthen the role of NTB province as the center of Bali cattle (calves and beef cattle) and buffalo production.

- Mission:*
1. To improve the quality of Bali cattle in NTB
 2. To implement the development of national standard of Bali cattle.
 3. To implement the regulation of population structure by controlled replacement, culling and export to stabilize Bali cattle population.
 4. Cattle selection to increase productivity i.e. to increase the weight gain.
 5. To empower the human resources so that Bali cattle can produce competitive livestock product for the open market era.
 6. Preservation and utilization of natural resources.

Objectives

1. To achieve population structure by controlled replacement, culling and export to stabilize Bali cattle population,
2. To achieve increased productivity by increased daily weight gain from 300 gram/day to 500 gram/day.
3. To meet demand for beef and calves for export/inter-island trades without affecting the Bali cattle germ plasm.

64. By contrast, national policy as expressed by the DGLS Directorate of Livestock Breeding, through the Law on Animal Husbandry and Veterinary Act No.6/1967, Article 13 is simply to seek genetic improvement through both purebreeding and crossbreeding as well as the creation of new breeds. The policy on conservation and utilization of farm genetic resources resulting from the Law No 6/1967 is as follows:

- The conservation program has to be conducted in well managed areas such as on smaller islands, in certain Village breeding Centers, private sector and Government farms
- Ecologically safe, socially acceptable and competitive breeds should be developed
- High quality and competitive breeds should be developed
- Breeding techniques such as Breeding Programs, Selection and Culling, Biotechnology Engineering (AI and restricted use of Embryo transfer) should be used.

65. Implementation is, however, effectively devolved to the Provinces since decentralization. The Central Government still has a role in the management of animal health and breeding development *guidelines*. However, the authority of the central government is not used to coordinate a national strategy, as evidenced by the abandonment of national strategies such as P3Bali in all but one province. Instead it is devolved to the Provinces by the principle of deconcentration as necessary, giving them independence in managing farm animal genetic resources and determining the importance of specific animals in terms of income potential for farmers and the values for society. The only clear agreement appears to be in relation to a ban on cattle breeds other than *Bos sondaicus* on outlying islands of Bali as a conservation measure and on Madura island for breeds other than Madura cattle. It is generally recognized by Central Government that crossbreeding will be necessary elsewhere to meet demand for meat. The Provinces drive their own agenda on conservation, however, which seeks to ban crossbreeding over much of the larger islands such as Sumbawa.

Disease Control

66. The policy on export of Bali cattle semen from Bali is not clear. The island is a declared Jembrana disease area but whilst a policy of containment appears to exist, in practice semen is apparently being exported not only to other provinces but also to Malaysia (source: Indonesian Research Institute for Animal Production, Bogor). At the same time, imports of semen or cattle are banned so that breed improvement is made difficult.

Credit Supply

67. Experience during the study in NTB and Lampung with directed credit schemes suggests that they are simply increasing numbers of livestock which could easily be lost in drought or

economic recession but not serving the real need for improved beef productivity. A change in the policy of directed credit, however, may only occur from the initiatives of work such as the WB funded Sustaining Microfinance project now under preparation, which aims to promote finance institutions as credit providers using commercially realistic terms.

2.7 Threats to Beef Production

68. There are two main threats to Indonesian and regional beef production which arise from illegal imports. The first is from Brazilian beef imported into the Philippines and illegally imported into the Eastern Islands. Brazil and the Philippines are not Foot and Mouth Disease (FMD) free producers whereas Indonesia is a provisionally free producer and bans imports from such countries. The second and more pressing threat is from India, where beef output has risen dramatically over the last five years. Indian beef is supplied legally to Malaysia via Singapore from abattoirs in Mumbai but is repackaged in Singapore into Australian and New Zealand branded cartons and shipped in containers to Jakarta in the hope of sale at drastically reduced prices compared to local norms. As of April 2005 several containers of intercepted beef were waiting disposal at Tanjung Priok port. Increased regulatory vigilance is needed to preserve Indonesia's reputation as an FMD free producer and LiveCorp of Australia (the national meat marketing organization) has already funded investigations in Jakarta into illegal imports.

2.8 Conditions for Success in Public Private Partnership for Livestock Improvement

Market Access and Capture

69. The problem foreseen by feedlot companies with entering into partnerships for improvement of beef output in Eastern Indonesia are mainly related to market access and capture. As small and medium sized enterprises, most feedlot companies recognize the need to improve the position of smallholder beef breeders in remote areas of the country as an alternative to Australian feeder cattle. However, they must balance long term vision in supplying technical assistance with benefits from trading in the relatively short term. Until they can be assured of a clear separation of public and private benefit, little progress will be made.

70. Islands such as Timor Barat also present problems with transport because there are no purpose built cattle transport ships of adequate size to make longer distance sea transport viable. In Sumbawa the absence of cattle markets combined with strong competition from the wet market buyers make market capture from assistance to particular areas unlikely. Further, feedlotters are unsure of the suitability of Bali breed cattle for feedlot fattening because of their slow growth rate. Balancing such concerns, however, is the fact that Bali cattle command a premium price and have better temperament which may reduce the initial conditioning period in the feedlot compared to Onggole cattle.

71. The first priority of feedlotters is to assist the smallholder breeders of *Bos Indicus* type cattle surrounding feedlots at Surabaya and Lampung . Poorly bred cattle, often affected by liver fluke and suffering from inadequate feeding prior to sale are a costly problem for feedlots. However, any improvement in husbandry would be reflected in improved profits because smallholders are linked by loyalty to the feedlot

72. The concept of a privately driven AI system linked to particular feedlots is not new in the dairy industry at Malang, East Java and is already conducted in (government subsidized) private sector, breeding enterprises (Appendix 2) but poses problems in the extensive beef industry because of market capture and the relatively small profit available from fee for service structures. Nevertheless, the Indonesian Association of Feedlotter (APFINDO) and the private sector participants recognize that good quality AI services will be essential to beef industry improvement and they are prepared to work with World Bank to determine the viability of such private sector supplied services.

73. In the interests of both their feedlot division and meat division, PT Santosa Agrindo (Feedlot Division) plan to conduct a trial of the performance of Bali cattle in terms of average daily gain on appropriately modified rations, carcass yield and overall cost of gain during 2005. . Subject to that trial giving positive results the company is prepared to go forward up the supply chain and determine possible linkages.

Trust in the Public Sector

74. In any future project, funding by public and private sources would use the principle of parallel financing. Feedlotter are emphatic that any partnership must not involve cash inputs to projects as would be the case in co-financing. In addition, several conditions of management need to apply

- in any future project involving public private partnerships, representation would be sought for the private sector on the project steering committee
- Considerable care should be taken in future to ensure that project objectives were soundly based in commercial terms and reflected a recognition of the need for improved oversight of expenditure to ensure that Indonesia did not increase its debt burden

2.9 Applying Productivity Improvement to Livestock Enterprises.

75. The approach to any project involving village level livestock production should be based on productivity improvements identified by both farmers and by technical assistance from the private and public sectors. Such an approach should first identify a target audience of importance to the private sector partner, particularly focusing on capture of the benefits of productivity improvement by the relevant private sector partner. Thus a PIF fund would apply to initiatives such as handling facilities, chemicals/vaccinations for parasite or disease control, improved feeds or supplements, better weaning management, improved AI services etc within a group of farmers supplying a feedlot or other commercial enterprise. The enterprise would supply quality technical services for farmer or technician training. PIF funds could be applied to larger projects such as upgrading facilities and genetics at AI centers or to subsidizing the costs of privatizing the centers in order to make them into viable business enterprises.

76. A key to this partnership approach is that public extension services are focused in an area where spin off private benefits are likely This different to the usual focusing of public services on areas of public benefit, however, it does ensure the supply of adequate high quality technical support services for farmer and technician training which would otherwise be unavailable or

prohibitively expensive. If success is measured in both capacity and financial terms then a longer term public benefit will result as better trained extension technicians utilize new skills elsewhere.

77. Given the performance of crossbred cattle, *it appears inevitable that smallholders will introduce crossbreeding, but that it must be a managed process* to avoid pitfalls such as the introduction of non Bali bulls by producers which could result in drastic changes to the genetic base.

78. Further dialogue with provincial and central governments on the strategy for implementation of crossbreeding would need to articulate the key elements required in a combined cross breeding and conservation strategy, namely,

- Privatized and strictly controlled AI services, ideally operated by feedlot companies with an interest in developing a secure client base.
- A ban on use of crossbreeding in Bali cows before their second calf, considering the relatively late age at first calving, the need to avoid dystokia and the need to secure adequate numbers of purebred Bali calves.
- Farmer group extension to encourage sale of crossbred animals for slaughter and retention of the best Bali cows for breeding.
- Extension on complementary husbandry practices to crossbreeding.
- A ban on field use of non Bali bulls
- A Bali cattle breed improvement program commencing with efforts to save superior bulls collected by P3B and compare their performance and their progeny performance with bulls in Bali.
- Community based breeding programs operated through farmer groups with initial phenotype selection and subsequent efforts to develop pure AI or selected bull mating under common environmental conditions so that a breeding value can be estimated for any sire used to demonstrate genetic compared to phenotypic progress.

2.10 Summary

79. There are many opportunities to improve the productivity of smallholder ruminant livestock in Indonesia through simple interventions in husbandry and by introduction of cross breeding using better quality *Bos Indicus* semen in particular areas linked to the feedlots around Surabaya and Lampung. However, most feedlot companies are still too focused on short term profit in the wake of recovery from the financial crisis of the late 1990s to be interested in longer term investment of technical resources outside their well known feeder cattle source areas. Whilst private investments have been made in AI services for the dairy industry, they have been linked to suppliers of a particular dairy factory. Investment in AI for the beef industry involves a larger task in both semen production and service delivery development, with no assurance that the investment in developing better genetics would flow substantially to the provider rather than to public goods.

80. The Government of Indonesia also needs to re-examine the allocation and monitoring of impact of expenditure on subsidy for livestock purchase and fattening in backyard feedlots. Smallholder feedlots can be relatively inefficient technically and pose environmental hazards in waste disposal when managed with inadequate technical assistance. The subsidy program is

contributing relatively small numbers of cattle to the overall herd. Much more emphasis is needed on productivity improvement.

81. The Ministry of Agriculture also needs to develop a leadership role in policy development for the livestock industry to assist and protect the implementation and local policy roles of the provinces and districts. Better and clearer national policy on livestock quarantine and export , breed improvement and protection and a stronger effort on protection of the industry from illegal imports are all required before a partnership approach has prospects of sustainability.

3.0 Public Private Partnerships in Cocoa production

3.1 Background

82. Cocoa is produced by about 500,000 smallholders in Indonesia, principally in Sulawesi (400,000 smallholders, 350,000 tons) but also in Papua, NTT, Maluku, Kalimantan, Java and Sumatra. Rapid development of the sector has occurred since the 1980s and has been aided by unabated demand for cocoa, particularly as political strife in West Africa has limited output there. Approximately 60% of all Indonesian cocoa exports occur through Sulawesi ports, and more than half of these through Makassar (BPS, 2004a). In Sulawesi, yields are down from 1,500kg/ha in 1999 to 840kg/ha in 2004 (Table 3.1). In Sumatra a general search for alternatives has commenced and oil palm area is expected to increase. In Java, with heavy population pressures, different land use is also being sought. Many farms in Kalimantan are abandoned, whereas production in 1998 was 27,000 tons. In Maluku, with little technical help, growers are abandoning the crop. Only in Irian Jaya and NTT has Cocoa Pod Borer (CPB) either not taken a major hold or is it under control through spraying treatments for other pests.

Table 3.1 2004 Ha vs Production, Yield and relative importance per Province, Indonesia

| Province | Cocoa Area | | Ha Non Prod. | | Ha Prod | | Production | | Yield mt/ha |
|------------------------|----------------|-------------|----------------|------------|----------------|------------|----------------|-------------|-------------|
| | Ha | % | Ha | % | Ha | % | mt | % | |
| Sulawesi | 520,000 | 59% | 104,000 | 20% | 416,000 | 80% | 350,000 | 0.79 | 0.84 |
| Sumatra | 140,000 | 16% | 14,000 | 10% | 126,000 | 90% | 40,000 | 0.09 | 0.32 |
| Java | 60,000 | 7% | 12,000 | 20% | 48,000 | 80% | 16,000 | 0.04 | 0.33 |
| Kalimantan | 40,000 | 5% | 0 | 0% | 40,000 | 100% | 5,000 | 0.01 | 0.13 |
| NT | 50,000 | 6% | 5,000 | 10% | 45,000 | 90% | 16,000 | 0.04 | 0.36 |
| Maluku | 35,000 | 4% | 3,500 | 10% | 31,500 | 90% | 8,000 | 0.02 | 0.25 |
| Irian Jaya | 35,000 | 4% | 3,500 | 10% | 31,500 | 90% | 9,000 | 0.02 | 0.29 |
| Total Indonesia | 880,000 | 100% | 142,000 | 16% | 738,000 | 84% | 444,000 | 1.00 | 0.60 |

Source: Mars Inc. data

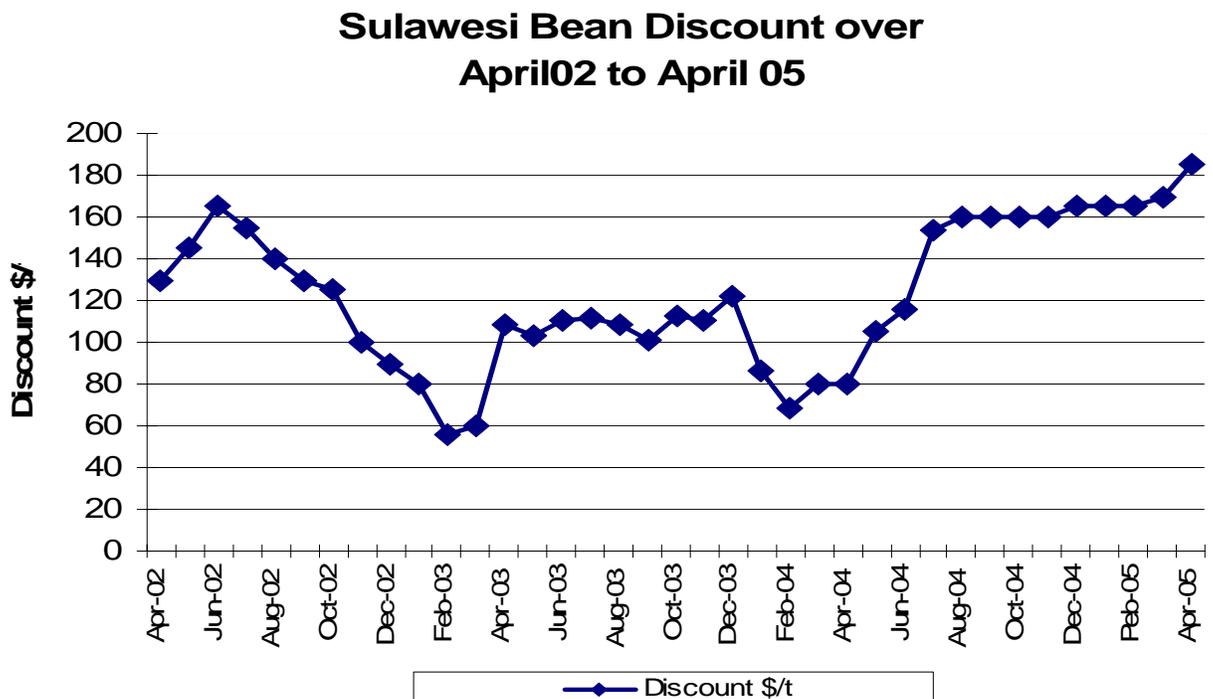
83. According to Akiyama and Nishio, (1996), Indonesia's cocoa boom was substantially assisted by a 'hands-off' policy from GOI which facilitated the development of a highly competitive marketing system. That growth was also the result of local migration patterns and the relatively unrestricted expansion of smallholders into new growing areas across Sulawesi and other islands. (Ruf and Lancon 2002) Expansion in total production area continues to occur despite stagnating production and a gradual decline in productivity at the individual farm level. The unlimited expansion of cocoa growing areas is ultimately unsustainable. In order to develop a sustainable industry based on long term stable yields and quality, a partnership between producers, private sector traders and government is now needed to organize the funding for investment in research and extension which will be the basis of sustainable yield.

84. CPB infestation and ageing cocoa plantations are important factors contributing to declining productivity and quality, and constitute major barriers to the sustainability of the cocoa industry

in Indonesia, with severe consequences also for bean quality. CPB causes “flat” or unfilled beans and clumping of beans reflected as high trash content.

85. The poor quality of beans due to a high trash and low butter content in samples have meant that Sulawesi cocoa (and Indonesian cocoa in general) is routinely subjected to a price discount in the global market. In 2004, average Free on Board (FOB) export prices were commonly US\$180 per ton lower in Indonesia compared with competing exporter countries such as the Ivory Coast and Ghana. The discount rose to \$220 by May 2005 in reaction to high (10-12%) levels of trash in shipments received in the United States, which is the major buyer. It has since risen further to around \$300/ton and is expected to remain at that level unless quality improves. Trash levels in exports to Malaysia are lower (4-5%) because the shipments are tested before acceptance at destination. In the United States, however, the cost of testing is regarded as prohibitive and buyers have in the past relied on the accuracy of Government issued quality certificates, which are accurate in countries such as Ghana and Ivory coast but have proven completely inaccurate as a description of Indonesian cocoa quality. Instead of testing, the U.S. cocoa industry has progressively increased discounts and is now rejecting cargoes from Indonesia.

Fig 3.1 Discounts against New York Price



86. For smallholder cocoa farmers, many of whom directly depend on cocoa production as their main source of income; declining productivity is seriously affecting the profitability of cocoa farming. Commonwealth Agricultural Bureau Institute (CABI) (2003) estimates that CPB infestation alone causes around 25%-40% yield loss in Sulawesi, and resulted in industry losses worth US\$200 million in 2002. Recent estimates based production losses (240,000 tons dry bean equivalent valued at \$250 million) and on the actual value of discounts (\$50 million) in response

to trash (assuming only 5% trash content), reduced cocoa powder yield and reduced butter yield in Sulawesi beans place the losses in 2005 at \$300 million.(Mars Inc data).

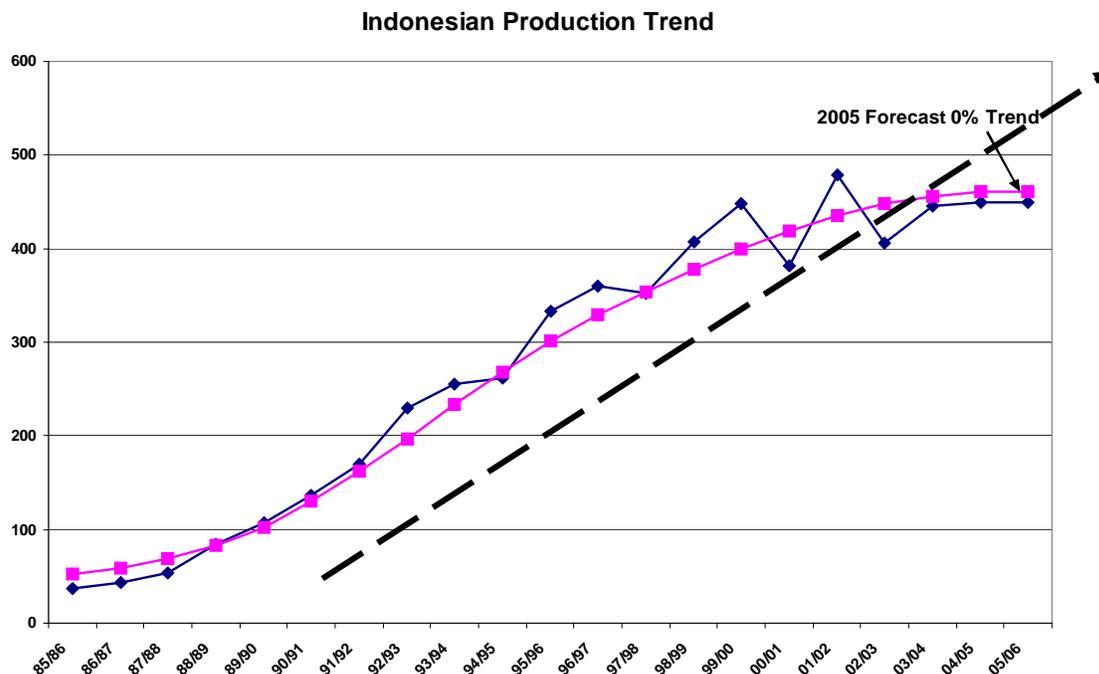
87. If the value of beans from Indonesia is compared to that of Ivory Coast based on the reduced fat content (35% for Indonesia, 54-58% for Ivory Coast), lower powder yield, higher waste content (5% Indonesia, 2-3% Ivory Coast), higher waste disposal cost, higher freight cost, poorer inherent flavor, lack of fermentation and higher processing costs, the true value of Indonesian cocoa beans would be about \$279/ton less than those from Ivory Coast. Discounts in late 2005 were in fact close to \$300/ton.

- Several factors are considered to have primarily contributed to the current quality crisis in the Sulawesi cocoa industry, which a partnership approach could address.
- Farmers' general lack of knowledge concerning good farming practices, including uncontrolled and haphazard application of fertilizers and pesticides, and improper post harvest treatment. Existing farm practices are unable to effectively control CPB, and long term research into appropriate strategies to overcome infestation is lacking. Government investment to re-establish extension systems down to sub district level combined with high quality international and local technical assistance for research and extension is required. Partnerships between public sector production oriented extension staff and private sector business and marketing trained staff at district and sub district levels would provide a coordinated agribusiness approach to cocoa industry improvement by training farmers in the application of cash and labor efficient technology for yield and quality improvement.
- Despite operating relatively efficiently, current supply chain structures are not providing clear price signals to farmers to produce better quality cocoa. In general, no price differential between good and bad quality cocoa exists at the farmer level, either for trash content or butter content. As a result, all the incentives are for traders to purchase clean beans as well as trash and then add trash back into the beans prior to sale since the market is not distinguishing adequately between good and bad quality shipments. The operation of the secondary trash market for remixing is estimated to be worth some \$22 million but is a poor substitute for the loss of both \$300 million in revenues and the brand image of Indonesian cocoa. Involvement of traders and collectors representatives in a partnership approach is required so that they see the benefits of encouraging sustainable production and marketing practices at farm level rather than short term profit taking based on dishonest practices. Farmer training in business and marketing by business trainers developed under the SUCCESS and PRIMA projects and funded by Government and World Bank would also help farmers to gain maximum added value from better quality beans in their negotiations with traders.
- Government neglect of agricultural research and extension at all levels since the 1997 financial crisis and subsequent decentralization has limited the opportunity to develop and apply cost effective technology for cocoa pod borer control by plant breeding, strategic application of pesticides, biological controls and promising farmer identified technology. Private sector technical assistance would be of considerable general value to the industry in developing technologies already applied elsewhere and in training research and extension staff.
- The past inability of relevant agencies in Indonesia to enforce existing export standards has meant that very low quality cocoa has been routinely allowed to enter global markets,

affecting the international reputation of Sulawesi cocoa. Private sector pressure and GOI resolve to maintain standards during 2005 has been shown to have a dramatic effect on export quality, but must be supported by real quality improvement at all steps in the value chain in order to improve farmers' and industry profitability. Similarly, calls for a tax on exports by grinders (to "encourage local processing") reflect the disparate and uncoordinated nature of the industry. Such a tax would be passed back to farmers, lowering their returns and ability to implement productivity and quality improvement technologies even further. The industry needs to work together in a common forum to understand and resolve problems rather than lobbying government on a self interest basis. .A partnership approach to funding of common priorities and to policy formulation, executed through an industry coordinating body is essential to achieve these aims.

88. Current price discounts for Indonesian cocoa of \$280-300/ton against New York commodities exchange prices are costing the industry some \$150 million a year in lost revenue. Price discounts will not be reduced without international advocacy for the industry. The International Cocoa Conference Organization (ICCO) was established in 1973 to administer the first International Cocoa Agreement, (1972) and its successor Agreements of 1975, 1980, 1986, 1993 and 2001. Indonesia is the only major cocoa producer not to be in ICCO and misses out on both advocacy and funding as a result. Partnerships with an international donor to allow trial membership (at a cost of some \$250,000 p.a.) would give the Ministry of Finance a demonstration of the benefits of membership and would contribute to the revision of the current policy banning membership of international organizations which had its origins in the 1997 financial crisis. Industry advocacy can also be promoted by an international private sector partner acting on behalf of Indonesian cocoa producers.

Fig 3.2 Actual and Projected Cocoa Output in Indonesia 1985-2005



Source: Mars Inc data

89. In other growing areas such as Papua and Flores, the trading system has few buyers who act to discount heavily for poor quality. Thus farmers deliver clean product. Nevertheless, clean cargoes from outer islands are mixed with bad quality beans from Sulawesi to provide a sample thought to be acceptable at whatever discount regime is operating. Thus good practice is not rewarded and smallholders on outer islands are penalized for bad practice on Sulawesi.

3.2 Policy and Regulatory Constraints

Membership of International Cocoa Organisations

ICCO

90. The International Cocoa Conference Organization (ICCO) was established in 1973 to administer the first International Cocoa Agreement, that of 1972 and its successor Agreements of 1975, 1980, 1986, 1993 and 2001. The Agreements were concluded among the governments of cocoa-producing and cocoa-consuming countries, under the auspices of the United Nations (UN). The 2001 Agreement was negotiated at the UN Cocoa Conference in February 2001. This new 2001 Agreement has been open for signature and ratification since 1 May 2001 and entered into force on 1 October 2003.

91. The 2001 International Cocoa Agreement excludes economic clauses and places greater emphasis on a sustainable cocoa economy. Through the creation of a Private Sector Board, the

Agreement seeks the active involvement of the private sector in the achievement of its goals. It will also promote transparency in the world cocoa market through the collection, analysis and dissemination of relevant statistics and the undertaking of appropriate studies. Finally, the 2001 Agreement strengthens the national cocoa economies of member countries through the implementation of a range of projects.

92. Membership of the 2001 Agreement at March 2004 comprised 30 countries, representing around 80% of world cocoa production and around 60% of world cocoa consumption. Countries that are not members of the Agreement often participate in meetings as observers. The ICCO is the main world forum for the gathering and dissemination of information on cocoa, for the promotion of cocoa research and studies of the economics of cocoa production, consumption and distribution and for the encouragement of development projects concerning cocoa. In this connection, the ICCO Advisory Group on the World Cocoa Economy has held several conferences on key issues.

- Indonesia is the only major cocoa producer not to be in ICCO. The private sector is pressing for Indonesia's membership for several reasons:
- Membership of ICCO allows access to Common Fund for Commodity money (currently Indonesia misses out from the \$25 million (approx.) portfolio of CFC cocoa projects)
- ICCO run programs on promotion of cocoa consumption,
- ICCO now have no economic clauses in their agreement, removing any barrier to industry support (especially from the USA).
- The new cocoa agreement actively promotes sustainable cocoa production,
- Having Indonesia as a member would help to counterbalance the powerful West African lobby in ICCO. There is a need for a strong Asian member in ICCO (in view of the decline of Malaysia and relative importance of PNG as producers).
- By not being a member, Indonesia misses out on the following:
- Indonesia is not represented at an inter-governmental level
- Indonesia is barred from benefiting from CFC (Common Fund for Commodities) projects. Currently there are several major cocoa development projects funded by CFC, such as development of markers for Witches Broom disease resistance (Brazil, Ecuador, Peru); development of cocoa by products (Ghana); differentiating between fine and bulk cocoa (Trinidad, Venezuela, Papua New Guinea, Ecuador), Cocoa germplasm utilization and conservation (10 cocoa producing countries); cocoa yield and quality improvement, a participatory approach (12 cocoa producing countries). The latter two cocoa breeding projects make up the largest international collaborative effort to improve cocoa varieties to happen in cocoa in 20 years and Indonesia is not involved. As the 3rd largest cocoa producer in the world, Indonesia is significantly disadvantaged by not being involved in these global initiatives.

- Indonesia is not allowed to benefit from Dutch Buffer Stock projects, a source of funding established in 2004. This fund is available to support sustainable cocoa production, training for the cocoa sector and improved cocoa quality schemes, and provides 13 million Euros of new cocoa money. The World Cocoa Foundation prepared a detailed proposal for the Dutch fund entitled “Program to Develop Cocoa Clones in Asia Resistant to Cocoa Pod Borer”. Most of the significant funding requested would have been for the development of a cocoa breeding and variety development centre in Sulawesi. The proposal was supported by The Provincial Government of South Sulawesi, Dinas Perkebunan Provinsi Sulawesi, and other cocoa stakeholders in the region. Unfortunately the proposal has been rejected by the Advisory Board of the Dutch Buffer Stock fund. because Indonesia is not a member of the ICCO. The Advisory Board liked the project and thought it was highly relevant, but they were not able to overcome this administrative issue. They cannot provide significant funding to non ICCO members.
- The fact that Indonesia is not a member of the ICCO also means that it is not eligible for funding of cocoa projects by the Common Fund for Commodities (CFC). Indonesia is not even a member of the Cocoa Producers Alliance (COPAL), a producing-country organization aimed at improving co-operation and information sharing amongst its members. COPAL membership would help Indonesia to establish itself as a leading producing country, able to have a meaningful dialogue with the cocoa and chocolate industry, donors, and consuming-country governments
- Indonesia does not share in the information flow on quality and safety issues, consumption data, supply and demand forecasts produced by ICCO

93. If Indonesia had been a member of ICCO for the 2003/04 cocoa year, it would have cost €20 000 (approximately \$276,000). There have been commitments to join ICCO by past Ministers of Agriculture but these have not been acted on. Government policy after the financial crisis of 1997 did not favor membership of such organizations on grounds of both absolute cost saving and perceived cost effectiveness. That policy has not yet changed and membership is still opposed by the Ministry of Finance. Donor funding would be needed to demonstrate the benefits of membership

ASEAN Cocoa Club

94. During the 2005 ASEAN meetings in Vientiane, Lao PDR, the National Focal Points working group for cocoa agreed on a strategic plan of action on ASEAN cooperation in the cocoa sector under the Vientiane Action Plan 2005-2010. The plan, apart from formation of an ASEAN cooperative group for cocoa, provides for some important initiatives which in many ways replicate the benefits of cooperation using ICCO but within an Asian context. The initiatives may explain some of the reluctance of Indonesia to become involved with ICCO. They include:

95. Formulation of quality standards and harmonisation of phytosanitary measures for cocoa beans and products; establishment of best practice standards for labor and

environmental management; formation of an ASEAN cocoa contract and arbitration panel. (Coordinators: Indonesia and Singapore)

- Joint cooperation on trade issues including access to EU and US markets; addressing high import tariffs on cocoa products by China, India and others. Strengthening the joint position on codex issues affecting cocoa (Coordinator: Indonesia)
- Strengthening research, extension and technology transfer including a project on CPB using biological control and host plant resistance; participatory R&D on cocoa, trials on selected genetic materials, seminars, workshops and information exchange including a cocoa database for ASEAN. (Coordinator: Malaysia)
- Enhancement of private sector involvement including identification of strategic alliances and participation of the private sector in all meetings of the ASEAN joint committee on the ASEAN Agriculture and Forest Products Promotion Scheme. (All member countries)

Taxation Issues

96. Several levels of taxation on cocoa exist in Sulawesi. All of these taxes are passed backward to prices received by producers, with little apparent impact on industry improvement:

1. Local taxes (retribusi) at the various districts, amounting to between 10-35 Rp/kg depending on how many districts the beans traverse between source and port at Makassar or Palu.
2. Export levies by the provincial governments and ASKINDO (traders organization) at the ports. At Makassar, the South Sulawesi provincial government collects 40 rup/kg (when this was introduced in 2001, it was meant to be collected on behalf of ASKINDO but the tax has instead gone to consolidated revenue of the provincial government). As a result, in South Sulawesi ASKINDO now collects an additional 10 Rp/kg. At Palu, the Central Sulawesi provincial government collects 7 Rp/kg. Palu city collects 5 Rp/kg, and Central Sulawesi ASKINDO collects 8 Rp/kg. The latter is further sub-divided into 60% for the ASKINDO branch, and 40% to Central ASKINDO in Jakarta
3. There is a PPH (Pajak Penghasilan - revenue tax) of 0.5%, which is supposed to be collected by the traders in Makassar (or Palu) when they buy the beans from the collectors. But if the traders buy from the farmers, no PPH is required. This rule is usually ignored because farmers suffer price reductions as compensation.
4. A PPN (Pajak Penambahan Nilai - value-added tax) of 10% levied when the traders sell the beans to the processors (or buyers) in Indonesia. The bean buyers pay the 10% to the traders who submit the money to the Tax department. If the buyers are processors, and the resultant products of cocoa butter and cocoa solid are subsequently exported, the processors can go the tax department to claim back the 10%. Normally, this is a long procedure and the amount of money reimbursed is usually reduced, after lengthy negotiations and harassment from tax officials. When the beans are exported, there is no 10% PPN imposed.

97. Local processors contend that the PPN 10% has discouraged grinding in Indonesia because of the higher cashflow required as a result of paying the value-added tax. APIKCI (the

Association of Indonesian Cacao and Chocolate Industry Players) is asking that the PPN be removed and replaced this with a 10% export tax to encourage more grinding in Indonesia.

98. The export tax (Pungutan Export) is under discussion. The Minister of Trade and Industry has approved the tax in principle to encourage local grinding but its introduction requires passage of new legislation in the National Parliament. Like many taxes the concept of an export tax to encourage grinding fails to recognize that grinder's profitability is dependent on high butter content and low trash content. In effect the export tax is as subsidy to grinding and fails to solve the basic problem of poor quality beans leading to poor profitability.

Export Inspection Procedures

99. Exporters of cocoa beans in Indonesia need to obtain two certificates:

1. Certificate of conformity from Sucofindo or Pan Asia (the 2 designated surveyor companies to issue the export certificates) the certificate states that the results of testing conform to analysis according to SNI (National Standard of Indonesia) sampling methods. The certificate also indicates the results of grading according to Indonesian Standard from IAA to IIS for non-fermented beans (III is for fermented beans). The key attributes are waste, bean count, mould and moisture). If the beans are rejected, resampling can be conducted or special approval obtained from BPSMB (Badan Peremeriksaan Sertificat Mutu Barang- Provincial Board for inspection of quality certificate of goods)

2. Recommendation certificate from BPSMB.

This certificate states that "the beans have been tested, the result conforms to SNI 01-2323-2000 reference for unfermented/fermented beans characteristic for grade: unfermented". BPSMB is the watchdog on the performance of Sucofindo and Pan Asia, a role which it is now assuming with vigor as evidence of the issue of false certificates becomes available (see Table 1 below). The quality certificate is submitted to Trade Department and Custom Department of Indonesia (an internal Indonesian requirement only) for export. The quality certificate is submitted to Trade department and Custom Department of Indonesia (an internal Indonesian requirement only) for export. . A certificate of quality is issued from SGS which states actual quality result and is sent to the buyer.

100. Where the quality of beans does not comply with the standard, Sucofindo in theory asks the exporter to contact and confirm his situation and buyer requirement with BPSMB. BPSMB can either request re-sampling or release the beans with the certificate of conformity and recommendation certificate for export with conditions. The exporters have to provide guarantee letters which declare that "the beans do not comply with SNI but it are acceptable to the buyer. The exporters accept full responsibility on the bean quality and release BPSMB and Sucofindo or Pan Asia from those responsibilities on the exported beans". However, when the practice of issuing false certificates became apparent in June 2005, BPSMB was forced to declare that no certificate could be issued unless beans complied with the standard. In practice, most samples had so much trash and mould content that compliance was impossible and all exports ceased. Further, BPSMB took over the role of the inspection companies and enforced more stringent standards.

101. Despite these set procedures, the past lack of validity and integrity of the Sucifindo certificate is shown in the example in Table 3.2 below, which is not exceptional. It is the quality results of a contract of 1,000mt of bean that P.T. Effem transacted with P.T. Olam, an international trader with a buying station in Makassar. The analysis done by P.T. Effem and P.T. Olam are compared to those of Sucofindo in their quality certificate.

Table 3.2 Results of Private Compared to Official Surveyor Quality Testing, Makassar, May 2005

| Attribute | P.T.Effem | P.T.Olam | Sucofindo | Standard |
|------------------|------------------|-----------------|------------------|-----------------|
| Waste | 4.21 | 4.9 | 2.44 | 2.5 % |
| Mouldy | 4.19 | 3.91 | 2.85 | 4.0% |
| Moisture | 6.71 | 6.36 | 7.45 | 7.5% |
| Bean | 112 | 115 | 109.25 | 100 beans/100g |

Source: P.T. Effem Makassar data

102. The results show a distinct disparity between independent and verifiable private testing and data of the regulator, especially on waste. Differences could be due to different interpretations of waste by Sucofindo/BPSMB (PT Effem tends to be more strict, but would not differ by more than 1-1.5%) or the certificate is just inaccurate, or both. Since BPSMB took over the inspection role, quality has improved somewhat, however, it is still relatively easy to obtain an export certification for beans with, for example, a 3-5 % waste content and a 110 bean count.

103. Overall the problem is seen by industry as one of having specifications but not enforcing them through an adequate regulatory structure. Malaysia, PNG, and Ghana have cocoa boards that enforce standards strictly to protect the country brand image (and may not easily 'bought'), including regulations on cocoa from nursery to export. The solution is not only a responsibility of Indonesia. By not inspecting at destination, US buyers are providing implicit acceptance whereas Malaysian buyers, with checks at destination, are not.

104. The effect of the tightening of standards by the Ministry of Trade since May 2005 has been that general quality of exports has improved from around 5-7% waste in 2004 to about 3.5% or less for the latest shipments. However, exporters still submit below standard samples and hope the regulatory system (now confined to PT Pan Asia and the BPSMB) will allow them to export as meeting the Indonesian standard. A worrying development is that organizations such as ASKINDO are now pressing for a relaxation of the Indonesian export standard from 2.5 % trash to 5% trash. The whole responsibility is falling on the regulator, whereas the industry as a whole needs to take a more responsible attitude when purchasing and shipping cocoa. The implication is that assistance will be urgently required to address CPB at farm level and raise yields so that the need for the waste market is removed.

105. Reform of cocoa export standards and certification is most welcome but must be maintained. If standards at export slip again, buyers will continue and extend discounting of Indonesian cocoa. One possibility is that US importers will continue rejecting cargoes. A first example has occurred recently with a cargo of some 8000 tons and the incident must send a clear

market signal to the Sulawesi cocoa industry. If poor practices continue, however, discounts will be applied to a point where it becomes unattractive to producers and large scale replanting to other crops occurs. Even more important is the impact of unreliable certificates on national brand image. Importers in the United States are increasingly turning to other sources given the past unreliability of Indonesian cocoa certification.

National and Provincial Importance of Cocoa

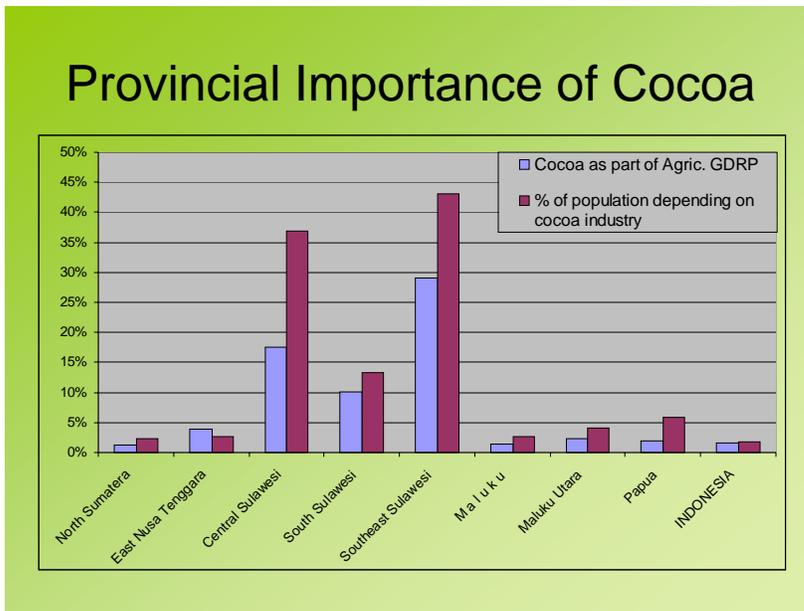
106. Even though cocoa only contributes 0.7% of national export earnings (Table 3.3) and about 2 % of national GDP, it is more important at provincial level (Fig 3. 3). The data also refer to exports rather than total value of output including domestic use which on a production

Table 3.3 Export Income Sources 2003 Indonesia

| Source | Income (\$Billion) | Source | Income (\$Billion) |
|---------------------|--------------------|----------|--------------------|
| Oil and Gas | 13 | Palm Oil | 2.2 |
| Wood Products | 4.5 | Rubber | 1.7 |
| Manufacturing | 4.2 | Seafood | 0.9 |
| Tourism | 4 | Cocoa | 0.36 |
| Mining | 3.6 | Pepper | 0.08 |
| Garment manufacture | 2.3 | Cashew | 0.035 |

Source: Mars Inc.data

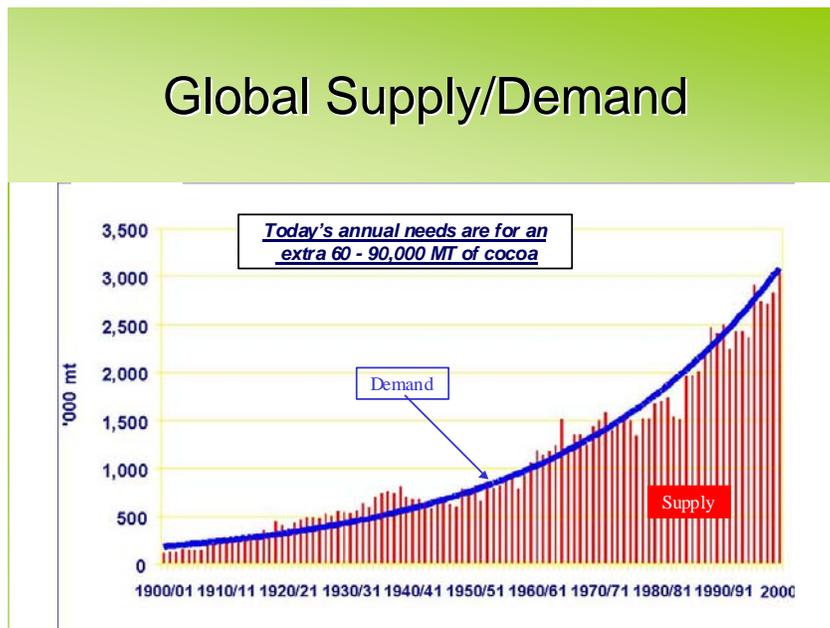
Fig 3 3Contribution of Cocoa to Provincial and National GDP and Household Livelihood



Source: Mars Inc data

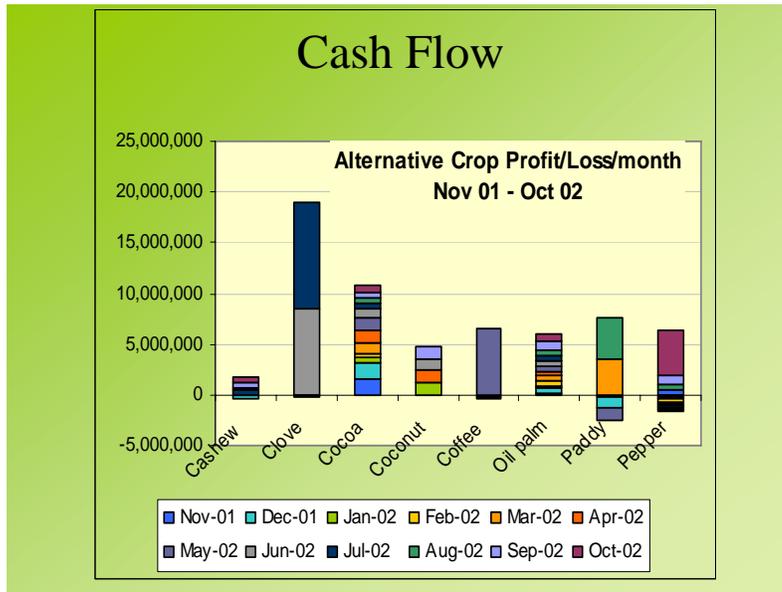
volume of over 700,000 tons at prices of around \$1200/ton would be higher.

Fig 3.4 Supply Demand relationships for cocoa 1900-2000



Source: Mars Inc data

Fig 3.5 Monthly Cash Flow Comparison- Alternative Crops



Source: Mars Inc data

107. There are many reasons why the cocoa industry is important to smallholders and should be revitalized for the benefit of smallholder producers rather than being allowed to decline through a misguided perception that the global industry will pay the same price for waste as good quality beans. A stable supply demand relationship. (Fig 3.4) and cash flow (Fig 3.5) are particularly important reasons.

108. Unlike vanilla, which experienced a decline in fresh product price from Rp300,000/kg to Rp20,000/kg over the last 12 months (as manufacturers switched to artificial alternatives and a supply shortage from Madagascar eased), cocoa shows a stable supply/demand relationship over a long period (Fig 3.4).

109. A most important factor is the contribution of cocoa to cash flow of smallholders (Fig.3.5). No other crop in Eastern Indonesia combines relatively high total income with regular monthly cash income. Paddy and pepper require inputs in the planting phase before harvest and thus show negative returns in some months.

3.3 Addressing the Problem with Public Private Partnership

110. Dutz (2004) has reviewed the application of public private partnerships (PPP) to both investment and service provision in areas such as power, water and sanitation, solid waste management, transport, as well as health and education services. . He notes several typologies:

- *Design, Build Finance and Operate (DBFO)* including familiar Build Operate Transfer (BOT) and Rehabilitate Operate Transfer (ROT) operations as applied to attracting private finance to infrastructure projects such as roads, bridges and, more recently, agricultural investments such as irrigation schemes.

- *Design ,Build and Operate (DBO)* contracts which attract private sector technical and management expertise but rely solely on public finance
- *Management and affermage* type contracts, so named after French *affermage* contracts involving mainly public investment combined with varying degrees of transfer of operation and maintenance responsibility and payment of a fee based on revenue collected by the operator.
- *Service contracts* where private involvement is limited to operation off discrete tasks such as billing and collection functions of a public service delivery agent

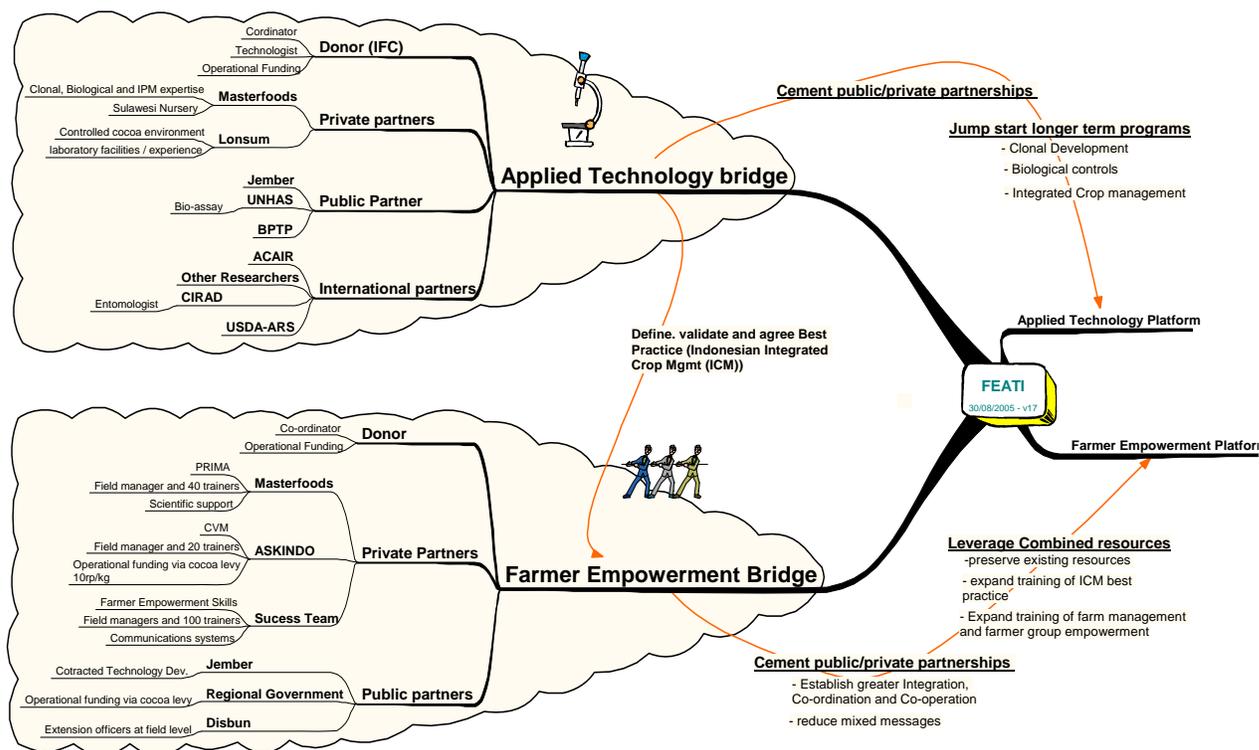
In these arrangements, there is a clear transfer of risks to the private sector, together with tight public control to ensure achievement of social objectives, typically through some form of *output based, performance rewarded* remuneration.

111. Dutz (2004) notes that *the main benefits of PPP arise from the efficiency gains associated with private management of relevant risks and enhanced government accountability, rather than from access to private finance*. He is scathing of any suggestion that PPP involves “a warm and fuzzy partnership with both public and private parties working together for the same objective”. Yet in agricultural services at an early stage of transition from public sector to shared responsibility among multiple partners, such arrangements may arise. In the case of cocoa improvement in Indonesia, for example (Fig 3.6), partnership may be formalized in a joint venture management board, with operation through dedicated management teams drawn from both public and private sectors. However, the achievements would be assessed in terms of outputs and outcomes for the wider cocoa industry, rather than as short run joint venture profit. That situation arises because the partners include both a family owned company free of pressure from management for short run profit and major bilateral donors who are also interested mainly in outcomes.

Past projects

112. Constraints to improving cocoa production and overcoming pest infestation in smallholder cocoa are usually linked to low level of agricultural knowledge, low level of technology adoption, and poor farming practices. In response to this problem, ACDI/VOCA joined with USAID/Indonesia, Mars Inc. and the World Cocoa Foundation to form a private/public sector partnership called the Sustainable Cocoa Extension Services for Smallholders (SUCCESS) Alliance project (1998-2004), which has promoted an integrated approach to farmer training (based on Farmer Field School/FFS methodology), information exchange and applied research to control cocoa pests in Indonesia and increase productivity of smallholder farmers. The partnership increased farmers’ income, improved yields and promoted sustainable cocoa development. Under the Success Alliance partnership, each partner had defined roles and responsibilities.

Fig 3.6 Bridges to a Cocoa Improvement Program under World Bank/GOI Investment



113. USAID/Indonesia is the primary funding source. It conducted and supported policy dialogue with the government of Indonesia and studies on cocoa. Mars Inc is a major international food company that seeks to maintain a sustainable supply of cocoa from Indonesia. It finances cocoa consultants and makes its staff and laboratory facilities in Sulawesi available. World Cocoa Foundation, with members represent the international chocolate manufacturers and allied companies, provides technical support and funding, and serves as a coordinator and information resource. ACDI/VOCA managed and implemented the field training and research activities, coordinated and reported on project activities and maintained a website on program initiatives for controlling CPB. The Indonesian government agencies involved in the project were Dinas Perkebunan (Provincial Tree Crops Services), BPTP (Provincial Assessment Institute for Agricultural Technology) and the Cocoa and Coffee Research Institute at Jember, East Java.

114. To date about 35,000 farmers have been trained (by some 800 farmer trainers and 140 full time independent technicians developed by the project) in integrated pest management, emphasizing non chemical controls and also in principles of business management emphasizing the value adding chain so that producers can determine fair prices for their product. Based on

comparisons between demonstration plot data and assessments of farmers' garden, crop losses have decreased about 30%, and incomes have increased by an average of about US\$400 per year in project areas. Due to this success and strong partnership with the chocolate industry, ACDI/VOVA has received additional funding to train an additional 40,000 farmers and to expand the activities in Sulawesi, Bali, Irian Jaya (West Papua) and North Sumatra. Nevertheless, cultural controls alone have been shown to be adequate in keeping percentage losses in yield down to about 20% (down from 50% loss without treatment). In addition, the emphasis on one time training without follow up has limited the sustained impact of the work. USAID is now seeking means of improving trade in a wider spectrum of high value crops across Indonesia.

115. Recently, the program has begun to emphasize marketing, launching a farmer organization project that focuses on organizational development and business skills training for farmer groups and organizations. The complicated marketing chain and poor implementation of quality standards can mean that farmers often do not receive premiums for better quality, limiting their initiative to invest in cocoa improvements. The farmer organization program will support farmers to organize their marketing efforts, gain skills to deliver good quality cocoa to the market, and learn how to maximize the price they receive. The farmer training will focus on practical skill development, organizing information resources, and linking farmers to local industry training resources and sources of commercial credit. Under the Success Alliance project, ACDI/VOCA's private sector partners, including Hershey, ADM and Masterfoods, have agreed to purchase at least US\$10 million per year in cocoa beans from Sulawesi. The commitment will guarantee a market for the smallholders' cocoa and potentially provide chocolate companies with access to more and better beans for their products. The project is, however, due to close in December 2005.

116. The Success Alliance activity has been complemented by similar programs, including both PRIMA Cocoa in Noling village, Kecamatan Bupon, Luwu Selatan District (funded by Dutch Government and Mars Inc./PT. Effem) and Cocoa Village Model in Kalonding village, Mamuju District (funded by ASKINDO = Asosiasi Kakao Indonesia). In the PRIMA, project, emphasis is on development and demonstration of a range of techniques for cocoa pod borer control (side grafting, pruning, biological control, fertilizer, pod sheaths, pesticides and others. The project works through eight farmer blocks on soils of varying fertility using an extension team with a leader and several farmer coordinators. The extension support is concentrated because both applied research and extension are involved and because a group of convinced farmers with demonstrably higher yields and quality is sought as a nucleus for cross farm visits and training in the future. Farmer training focuses on practical skill development, organizing and analyzing information critically, and linking farmers to local industry, training resources and sources of commercial credit. About 40 trainers have been trained under the project and the activities have spread to a new demonstration site involving a further 1000 farmers. The work has had strong local political support, however, it is constrained by both its limited geographic scope (two small project areas of 1000 ha each) and by the lack of an industry wide stakeholder representative body which might act to replicate the initiatives elsewhere. Thus, although farmers in the PRIMA area produce a top quality product and receive better prices for it, the overall industry impact is quite small. PRIMA is a demonstration of the combination of inputs needed, not a solution to the problem.

117. An interesting part of PRIMA is the potential for both small enterprise development (from agribusiness consultancy to contract pruning gangs) and for the development of an exit strategy based on greater independence of farmer groups. One of the key links missing in the program, which needs to be filled by a partnership with the public sector, is the lack of information on soil fertility and fertilizers and the lack of access to laboratories for quality testing of cocoa linked to maintenance of standards.

118. IFC has recently established the Program for Eastern Indonesia Small-Medium Enterprise Assistance (PENSA), jointly funded by IFC and governments of Australia, Canada, Japan, the Netherlands and Switzerland. One of the PENSA programs is in agribusiness linkages focusing on improving market efficiency-warehouse receipts, up-country buying and attracting multilateral investment for cocoa productivity improvement on small farms. IFC has started its assistance to ASKINDO by developing a strategic plan for the organization. Based on the initial survey to ASKINDO members, the consultants have identified several priorities such as (i) strengthening and increasing ASKINDO's skill and expertise (organizational management, accounting management, training management); (ii) ASKINDO's new products and services (increase farmers' productivity and quality, socialization of government regulations, developing code of conduct and fair trading, develop criteria to accept farmer groups as member); and (iii) supporting membership related work and advocacy. These will be prioritized further based on the needs.

The Supply chain and the Information Chain- Sources of Partnership

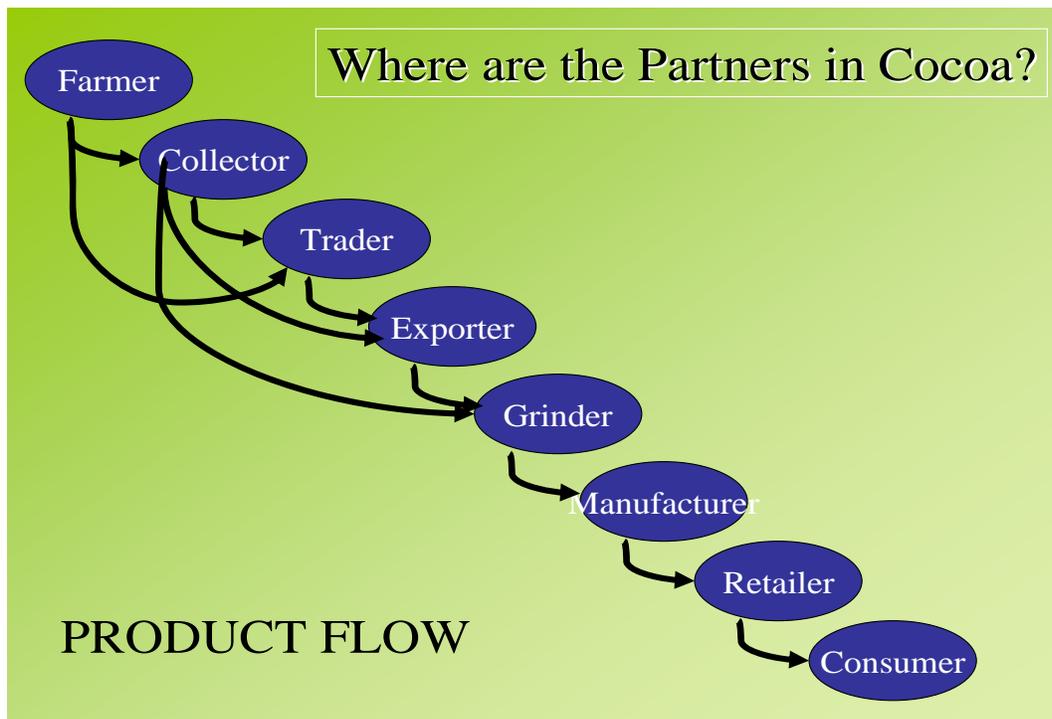
119. Cocoa provides a good model for reform and productivity improvement in high value cropping by smallholders in Indonesia. However, the solutions to the multiple problems of production, product quality, trade and export, research and extension require a partnership approach involving the whole supply chain. The product flow in cocoa is quite different to the web of relationships involved in information flow for production, trade, extension, and research and funding. (Figs 3.7, 3.8).

- Product flow can be more or less complicated than depicted in Fig 3.7, however Information flow and dependencies are more complex (Fig 3.8). Effective farmer organization is not a simple matter, although the potential for meaningful price premiums above existing farm-gate prices is a powerful incentive for farmer mobilization. In turn, these groups provide an important conduit for the dissemination of appropriate farm management techniques amongst growers. An important lesson learnt from the PRIMA project is that the promotion of farmer institutions is an essential element of farmer empowerment.
- Local collectors (tengkulak) perform an important social and economic function within the cocoa growing community. They have, for example, a vested interest in improving cocoa production and serve as unpaid extension agents in, for example, Papua. However, these collectors also frequently contribute negatively to price transparency at the farmer level, with direct consequences for cocoa quality. Developments in the PRIMA area suggest that the assumption of this local collecting function by farmer institutions may offer a progressive solution to the problem. The same push for farmer organization is seen in Flores .However, to be effective, far organizations must combine the collective power of farmers

with commercial ability and business skills. Such skills are too often missing in the farming community.

- As an example, the process of determining price from moisture content almost always works against farmers. 7% moisture content equals 'full price' and every % point moisture content above that equals a 1% discount. However, moisture content is difficult to determine on site without tools - it is an estimate and this is always in favor of the collectors and traders. And in most cases beyond the extent needed to cover labor cost to dry the beans further

Fig 3.7 Product Flow for a typical Indonesian Supply Chain



Source: Survey data

Typically, farmers count the days they've dried the beans:

2 days drying (minimum) results in a 20 - 25% discount

3 days drying results in a 15 - 20% discount

4 days results in a 10 - 15% discount

After 5 days drying, cocoa can be nearly dry if weather is good and there will be around 10% moisture left, resulting in a 3-5% discount. A way to get better prices would be to have a better understanding of real moisture content. A two prong moisture meter (Aqua boy is the popular tool) costs 750 - 1,000 US\$ which is expensive and out of reach for village collectors of farmers. A larger trading posts, the moisture meter is always used and farmers could be taught how to read and interpret the moisture meter there. Another approach is to train farmers to dry beans until they 'crack' when squeezed, which means moisture content is well below 10% and farmers should not accept 3% discount or more.

The Cocoa Value Chain and the role of Partnership in Improving Value Added

120. The Cocoa Value chain in quantitative terms as of October 2005 is described in Appendix 3, from data for a value chain from Masamba to Makassar in South Sulawesi provided by PT.Effem Indonesia. The data are based on an update of original estimates made by IFC (B. Wise, pers comm.) in 2003. They show that farmers are obtaining a large proportion of value addition in the chain (63%) relative to industries such as paddy or vegetables where farmers may have a share of less than 30% of the total value. Nevertheless, they could improve their position by increasing yields and decreasing moisture content at delivery. A farmer empowerment system would achieve this by partnering private sector trainers trained by past projects such as SUCCESS and PRIMA with Government Dinas Perkebunan technical staff at the sub district level. FEATI would fund the establishment or refurbishment of about 75 sub district rural extension centers and would provide equipment and staff them as both permanent employees and contracted trainers would move into private consultancy at project conclusion.

121. The proportion of value added (6 and 9%) by Community and village collectors appears to reflect a greater gain in value than the cost of drying required to reduce moisture from 8 to 7 perhaps 7.8%, although actual moisture content is often higher and the trader has to deal with high trash levels in most samples. Town collectors commonly add value/profit by purchasing trash on an informal secondary market to add back in to clean samples up to 3.5% - slightly higher than the Indonesian Export standard of 2.5% but low enough to obtain export certification. Without the 3.5% trash, a typical town collector might add 3% value. With it, profit rises to 8%. Not surprisingly, traders are currently pressing government for a lowering of the Indonesian Export Standard to 5% trash. The solution is to improve profitability by reducing discounts on Indonesian cocoa and thus improving the prices available from grinders to lower levels of the chain and by improving yields to increase the volume available to individual collectors and traders. In the interim, a project based on partnership would work with the traders to inform them of these principles and the need for them to support quality improvement in their own best long term interests.

122. International Exporters of raw beans have a relatively low value addition (3%) but deal in large volumes and are profitable. They would add more value if they received higher prices. Their support in industry advocacy with foreign buyers would assist in obtaining higher prices.

123. Grinding presents problems in profitability for local grinders because of the low butter content of Sulawesi beans of approximately 35% (as a result of high trash in samples, poor tree nutrition and excessive tree age) compared to 50% or more for beans from, for example, Africa. In addition an adequate ratio of final product price of butter and powder to the New York price must be available. Commonly, at processing costs of around \$250 /ton locally, the ratio must exceed 3.1 for combined butter (2.7) and powder (0.4). Given these benchmarks the modeling data of Appendix 3 suggest the following conclusions. Grinding locally is marginally profitable, with an 8% share of value added in the chain. International grinders, faced with shipping costs of \$100/ton, charges into the US of \$60 and world prices of around \$1500/ton, plus higher processing costs of \$400, make an 11% loss if they process Sulawesi beans alone. If they have access to higher value beans from Africa, they can still make an 18% profits at a processing cost of \$400 per ton. Overall the value chain demonstrates that profits are sensitive to moisture, trash

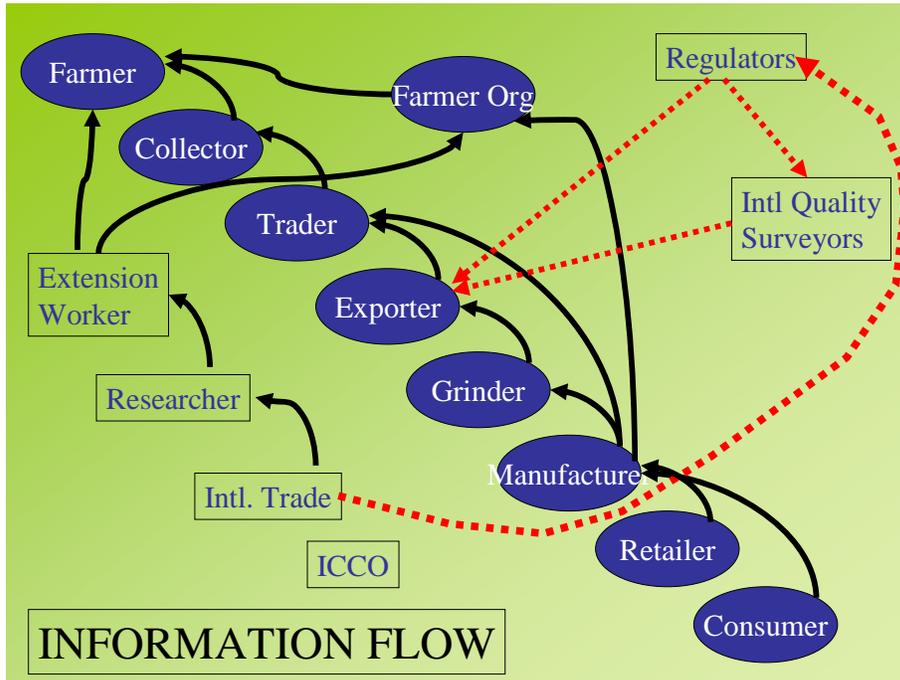
content and bean quality as well as yield. Education of farmers in these basic principles is needed to improve the sustainability of the industry. Grinders need to support policy and project initiatives which make quality enhancement by farmers easier. Their current push for a tax on exports would result in reduced prices to farmers and is not in their best long term interests. Grinders need to be represented on a Cocoa Industry Commission along with traders, farmers, government and the international buyers so that the industry acts with a single purpose and with a single voice on issues of policy affecting quality enhancement.

124. The relationship between regulators, quality surveyors and the trade, have been discussed above. As indicated by incomplete connection in Fig 3.8 they are in need of improvement through a consensus on the advantages of quality improvement and brand image over short run profit. Similarly a partnership with ICCO would bring considerable benefits to an important industry at low cost.

Organizing Funding for Extension and Research in Support of the Value Chain

125. Initial attempts at PRIMA to establish new forms of coordination along the Sulawesi cocoa supply chain signify an interesting development which foreshadows what might be possible under a well funded and coordinated approach under FEATI. There has been a shift towards de facto service provision by a local trader, and innovative systems of quality evaluation and certification are being explored. The establishment of a sustainable, quality-informed cocoa supply chain will require that a number of important, yet unresolved, issues be satisfactorily addressed. These include the efficient functioning of local warehousing arrangements, how extension services can be embedded within the system, and what institutional form culturally appropriate farmer organizations might assume.

Fig 3.8 Information flow and dependency in the cocoa supply chain



Source: Survey data

126. The Decentralized Agriculture and Forestry Extension Project (DAFEP) (1999-2005) under World Bank funding used a combination of district and national level funding for projects prioritized by farmers. The projects were accurately costed and funds allocated and accounted for at District level. Thus both funds flow and accountability were secured. In a public private partnership, extension could be contracted using several different partners. Direct central funding could flow to a Cocoa Industry representative body (Cocoa Commission). The Commission would contract the AIATs, (locally known as BPTPs).to provide both research and outreach services at Provincial level. At District and sub district level contracted service providers such as Dinas Perkebunan would be funded for particular project activities according to priorities agreed among participating members of the Commission. The widely successful Indian model of Agricultural Technology Management Agencies implemented in India under World Bank funding during 1998-2005 includes many of the features of all of these approaches. It uses a District level management committee with farmer, NGO, private and banking sector representatives and government agencies to decide on extension funding. The emphasis is on marketing as well as technology.

3.4 Criteria for Success in Partnership

127. As a result of study in Sulawesi, Manokwari, Jayapura and East Flores a series of criteria for success can be identified

Mutual Benefit

128. The criteria for partnership differ depending on the location of partners along the supply chain those private sector enterprises closest to producers are obviously most influenced by short run profit, whereas the Government of Indonesia and World Bank must take a long term perspective. In general, successful partnerships for long term assistance seem to need the corporate governance ethic of an international partner. The business shocks of the late 1990s are still keenly felt even by larger national level industries which would be potential sources of technical assistance. The objectives of the major partners are summarized in Table 3.5.

129. Benefits also need to be clear for farmers. Because no substantive field research/demonstration effort has occurred in which the design allowed clear separation of treatment and social/environmental effects, no definitive strategy is available for all situations. Even in PRIMA, treatment effects are confounded by soil type and lack of replication so that the value of the work as a definitive demonstration is reduced. Nevertheless it is clear that farmers adopt single innovations such as pruning and complete harvesting widely but are less enthusiastic about under tree hygiene, pod disposal and fertilization because they do not see consistent proof of benefits. Similarly farmers use pesticide (although more frequently when it is supplied by Dinas Perkebunan as a subsidized input) because they see direct benefit in terms of CPB incidence and thus product quality. The ideal combination for further development is thus some form of integrated pest management. In PRIMA, a spray regime of 12 sprays has given acceptable control with reduced expenditure compared to more frequent spraying, particularly where cultural controls are also practiced.

Table 3.5 Contrasting but complementary visions of partners

| Vision | Private Sector Partner | World Bank/GOI |
|-------------|---------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| Long Term | A socially, environmentally and economically sustainable cocoa industry with motivated farmers and assured supplies | Poverty reduction and economic growth through a market and trade oriented agriculture in Eastern Indonesia |
| Medium Term | Better Quality and more reliable supply of cocoa from Indonesia by combating CPB | Sustainable high quality technical support for implementation |
| Short Term | Opportunities in trading Infrastructure, training, policy support to complement TA | Multiple freely provided person months of international, regional technical assistance per year for training under parallel in-kind financing |

130. By contrast, in the estate sector near Manokwari, CPB control involves 26 sprays annually (mainly targeting Mirid control) but cultural controls, particularly pruning, are relatively neglected. The difference between best practice and average yields is interesting. Average yield on Ransiki estate (100km south of Manokwari) is 900 kg/ha. Highest yields are over 3tons/ha on

similar soils even when only part time management is practiced. However, there is a heavy emphasis on pesticides rather than integrated pest management. Elsewhere in Manokwari, particularly on older smallholder areas, CPB effects on yield have been severe.

131. Ultimately spray frequency may be able to be reduced in smallholder operations to spraying at the two main periods of pod development (i.e. March and July) with occasional sprays where serious infestation is obvious. A regime of four to six annual sprays seems possible in an IPM program at PRIMA.

Reliable Public Sector Partners

132. Reliable partnership for the international private sector in the cocoa industry must start at a high level. The private sector is encouraged by the involvement of the World Bank as an intermediary and financier, but must be able to deal with staff having an understanding of and background in the private sector. Encouragement and confidence can also be developed through the Agricultural Attaches of Indonesian Embassies abroad, as was the case in the present study. Political support at the local level is also essential. In the present study, strong support for private sector involvement has been obtained from the Governor of South Sulawesi.

133. The major local level concern of private sector partners is that any obligation to cash contribution be avoided through parallel financing. Thus all inputs must be in-kind and essentially consist of technical assistance to complement infrastructure, mobility, training and research costs provided under loan or counterpart funding. However, the planning process and reliability of funds flow to the Public Sector initiatives are also crucial to efficient use of private sector resources. Partnerships need a carefully defined and costed plan agreed by all parties, with adequate milestones at the outset and a flexible planning process to allow adjustment according to need and opportunity. These conditions are difficult given the common delays in arrival of National (APBN) funds and a plan must allow for delays. Thus support to a village community must comprise a potential menu of training, cross visits, demonstration sites and extension materials, with electronic media (internet accessed by satellite dish and solar panel) a possible future option. In this way, delays in one area may be compensated by action in others to keep faith with communities. The implementation plan must allow for participatory appraisal of local priority problems and identification of the best means of solving them.

134. In general, the reliability of the public sector at present is good but their availability is limited by limited operational funds after decentralization. A partnership for cocoa improvement will need flexible arrangements for service provision as the public sector cannot now and never will be able to supply, all the personnel and skills required.

Community Motivation

135. Motivation to improve cocoa yields and thus income is widespread but it is also tempered by time demands for food garden maintenance, particularly in Papua and competition by off farm income sources in Sulawesi. A useful index seen in field visits of whether communities are motivated was the incidence of self funded (i.e. self motivated with no government assistance) expansion of cocoa area, which is widespread in Papua, moderate in Flores and generally low in South Sulawesi. Nevertheless Sulawesi farmers respond enthusiastically to clear benefits and proven income impact as seen in the popularity and spread of the PRIMA initiative, not only among farmers but also with district political leadership. In contrast aid fatigue and dependency are evident in some communities in Manokwari, especially where CPB damage has occurred (for example in transmigration areas north of the capital).

Supportive Business Environment

136. Reliable and low cost air access, adequate road infrastructure, landline and cell phone communication and adequate freedom to operate commercially were all found to be useful indices of the ability of the private sector to participate and reap rewards in trading as partial compensation for their longer term vision. Such services are generally weak but developing in Papua and Flores but quite adequate in Sulawesi. Access to email is a real problem in most areas except Makassar. Much more public investment would be needed in Maokwari to make it commercially attractive.

Low Risk Environment

137. Most areas are free of major risks such as volcanic eruption, flooding, political strife and communication or transport failure. The rating of risk is probably more affected by the combination of public sector and community support and the likelihood of massive devastation of the crop or a switch to alternatives. In general this criterion was highly rated for most locations.

Fair Return on Commercial Investment

138. The cocoa industry is a competitive one but there is still room for exchange of ideas and mutually beneficial initiative. Access to new entrants in trading can be restricted by temporary cartels but in most places the actual or potential tonnage of good quality beans justifies further investment. If the current difference of \$50/ton between the actual discount for beans with 5% waste content and the real value of the discount (\$270/ton) is applied to exports to the United States, the gross value of annual losses to processors is about \$12 million. Recent reforms of export inspection have reduced that gap but the incentive to improve overall productivity remains. One major buyer is currently seeking to increase purchases by at least 75,000 tons within five years. That volume alone at current FOB prices can be valued at \$90 million. Only where large public sector investment is needed in roads or communications or where available land and labor are limited could potential returns to addressing the CPB problem be seen as limited.

Human Resources

139. Human resources can be rated both in terms of actual and potential skills. In most areas the younger generation with the best education and initiative is leaving to seek opportunities elsewhere, even where good educational facilities such as a University exist as in Manokwari. In Flores the initiative and rigor of the population compensates for poor educational facilities but development of industry is nonetheless limited by human resources. Jayapura and Sulawesi are more vibrant and provide few limitations to commercial expansion.

Potential Impact

140. A commercial investment or a public investment can only be justified if the benefits from yield and quality improvement outweigh costs adequately. In this case the current industry losses of some \$300 million are so large that even projects with very small impact and relatively high costs can be contemplated. In Sulawesi in particular, a trade volume of some 300,000 tons with potential to regain a volume of 450,000 tons seen before CPB, would justify a quite large investment. By contrast the potential benefits of improving a current production of 1850 tons (from combined estate and smallholder areas) at Manokwari may justify a public investment on grounds of equity but the impact is hardly large enough to justify diversion of relatively scarce private sector resources.

Sustainable Farming Systems

141. The smallholder cocoa industry is seldom completely specialized to the extent that unexpected crop failure would mean a social disaster. Farming systems incorporate livestock, for example, even when land areas are so small that most land is devoted to the most profitable and reliable crop-cocoa. However, there is awareness of the need for a farming systems approach rather than a specialized focus solely on cocoa. The problems of soil fertility in older established cocoa areas of South Sulawesi must be understood and understanding the dynamics of social obligations, labor supply and competition with food crops is still essential to addressing CPB in Papua. These are difficult but not impossible problems but require a partnership especially with the BPTPs where the best farm systems understanding is located. The private sector is best placed to work with the local Dinas Perkebunan and the Ministries of Agriculture and Trade on cocoa technical and marketing problems. The publicly funded generalist extension service should provide complementary skills in farming systems technical areas and, importantly, in farmer organization and business skill development.

142. The overall results of the survey based on these skills are presented in Table 3.6 and indicate that South Sulawesi is the priority target, with a group of other areas to follow at a later date. Manokwari requires more background study and possibly public investment before it would be an attractive prospect for private sector investment in partnership.

Table 3.6 Priority areas for future Partnership Investment (expressed as percentage)

| Province | Average of Criteria Scores (1-5) expressed as % maximum score |
|---------------------------|----------------------------------------------------------------------|
| South Sulawesi | 81 |
| Central Sulawesi | 57 |
| Southeast Sulawesi | 56 |
| NTT- East Flores | 55 |
| Papua- Jayapura | 50 |
| Papua- Manokwari | 31 |

3.5 Summary

143. Potential exists to develop a public private partnership approach to implementation of projects for productivity improvement in particular circumstances. Success in developing a partnership will require

- The combined commitment of donors, GOI and the national and international private sector, to enable a long term (10-15 years) vision to be applied to the problem at hand. In particular the technical and managerial expertise of the private sector is required to add value to loan and donor funding.
- Strong local and national political support for reform of financing and implementation of agricultural extension and research.
- GOI willingness to take a lead in encouraging the spread of ideas generated by past donor funded projects such as PRIMA and SUCCESS. To maintain the initiative, reform of the funds allocation mechanism from a subsidy orientation to one directed at productivity improvement by funding knowledge acquisition is also required. The experience of these prior projects suggests that both research and farmer empowerment activities are needed to develop an adequate integrated crop management program
- Flexibility on the part of public institutions in allowing the involvement of both regular staff and short term contracted staff as appropriate for a particular location. Reform of extension and research pay, conditions, training and mobility under a wider initiative would be needed to ensure public sector staff are available to undertake training for and implementation of the program
- Ideally some promise of early benefit from a reasonably large scale program in the short term (1-5 years) to offset costs of the private sector partner.
- Efficient utilization of existing producer levies toward solution of field problems
- Continued commitment to tight regulatory standards and the development of a “Gold brand” image for Indonesian cocoa
- Wider engagement with the international cocoa industry to leverage additional research and development funding and access to markets

4.0 Applying Partnerships in an Investment Project

144. In response to the summary points of Chapter 3, a comprehensive cocoa improvement program involving public private partnership can be identified among the existing stakeholders in cocoa in Indonesia. However, the program requires both national level policy and funding reform combined with extension and research strengthening as well as local level initiatives in cocoa growing areas to address cocoa productivity issues. Public private partnerships can contribute to the efficient management of funds and the improvement of technical competence in the extension and research services, if national policies allow such cooperation.

145. Public Private partnership in this case is not one of the classic forms described by Dutz (2004) involving substantial transfer of risk to the private sector as operator of a service. The PPP envisaged is essentially a not for profit service provider, responsible for the efficient use of Government funds and private sector in-kind contributions through management and allocation of research, training and extension funds. The service provided is primarily public goods in the short term. This situation arises because the private sector in this instance does not seek immediate benefits from service provision but is satisfied with long term indirect benefits through sustainable Indonesian and world market cocoa supplies. The potential reforms to financing and to extension services required to make such a partnership sustainable after World Bank loan funding (under the FEATI project) ceases are described below.

4.1 National Level Reforms

Financial reform

146. The inherent problem of financing agricultural productivity improvement in Indonesia is that funds need to be provided for reform of the public institutions managing funds flow before effective programs can be put in place. At present, after poor experience with public sector administration of funds during 1998-99, the Government of Indonesia has reduced the emphasis on programs relying on a publicly administered funds flow. Instead, it is aiming to devolve funds as directly as possible to the people (World Bank 2004) through a microfinance program as described in Table 4.1.

147. Table 4.1 shows that considerable public funds are spent on interest rate subsidies, fuel subsidies and non –performing revolving funds. Administration of public funds for agricultural projects relies on supervision by Dinas staff of the Kabupaten level Directorates. Inadequate budgets for such supervision and for operations in both research (a research budget amounting to 0.5% of GDP- the lowest national research allocation in the region) and extension agencies mean that staff cannot adequately supervise or administer flows of funds in their care. *The most pressing need is thus for funds to be reallocated from various subsidy programs to the strengthening of research and extension services.*

Table 4.1 Publicly Funded Targeted Program Credit in Indonesia 2003

| Program | Responsible Agency | Budget Allocation (2003 Rp Trillion) | Comments |
|--------------------------------------------------------------------------------------|------------------------------------------------|---------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| Pemberdayaan Masyarakat Agribisnis Melalui Penguatan Modal Usaha Kelompok (PMAMPMUK) | Ministry of Agriculture | 1.8 | Mainly (non performing) revolving funds with inadequate or no annual performance review |
| Kredit Ketahanan Pangan (KKP) | Ministry of Agriculture (and commercial banks) | 0.88 | Interest rate subsidies for at-risk capital in agricultural enterprises |
| Program Kompensasi Pengurangan Subsidi Bahan Bakar Minyak (PKPS-BBM) | State Ministry of Cooperatives and SMEs | 0.15 | Fuel subsidy reduction compensation program channeled into under performing revolving funds |
| Pemberdayaan Ekonomi Masyarakat Pesisir (PEMP) | Ministry of Marine Affairs | 0.12 | |
| Program Kemitraan dan Bina Lingkungan | State Ministry of SOEs | 0.95 | A share of all state enterprise alter tax profit managed by those SOEs for assistance to small scale enterprise |

Extension Service Reform

148. Individual initiatives in extension such as public private partnerships cannot function in the absence of a reliable, publicly funded extension structure which is capable of adopting and extending the initiatives across an industry. At present, agricultural extension and research are so poorly funded and, since decentralization, neglected, that they cannot function in this role. The proposed FEATI project aims to address some of these problems but commitment to reform from within is needed. In this regard, Indonesia has recently (August 5 2005) published a research paper (Anon, 2005) in support of a new Law on Extension Reform being developed by the Ministry of Agriculture. The paper recognizes the difficulties faced by extension services in the post decentralization era but also traces the history of extension programs from the technically oriented top down commodity approach of the food self sufficiency drive of the 1960s and 1970s to more participatory programs such as DAFEP and DELIVERI. It notes the need for solutions to a range of problems in both delivery and funding of extension:

1. Agricultural extension services are not delivered according to the participatory principle and in an integrated way as part of a farmer empowerment system. This leads to the low participation of farmers and the termination of a relationship between agricultural extension and other farmer empowerment activities (research, provision of farming production facilities, product processing and marketing).
2. Agricultural extension programs cannot meet the needs in the field and are not based on the preparation principles. As a result, the programs prepared are not realistic and do not reflect farmers' needs.
3. Partnerships between farmers, the private sector, and Non-Governmental Organizations are not promoted yet. As a result, the involvement and development of self-motivated and private agricultural extension officers are not effective.
4. The delivery of agricultural extension services is still project-oriented and the activities are partial without the support of sufficient facilities and infrastructure. As a result, agricultural extension services are dependent on projects.
5. The agricultural extension materials and methods do not fully support agribusiness development for important commodities due to lack of information and meager resources. As a result, agriculture-related dinases feel that they have no support for their agricultural extension activities

The problems in the provision and use of agricultural extension resources are seen as follows:

1. It is difficult to find information and technology that can meet the locality-specific needs due to officers' limited skills to access the sources of information and technology. As a result, agricultural extension officers' knowledge, skills and perspective to provide extension materials needed by farmers are not developed well.
2. Agricultural extension officers have limited facilities and infrastructure to perform their tasks and functions. As a result, their mobility becomes low and the services they provide for farmers are not optimal.
3. There is a limited amount of funds for financing agricultural extension activities generated from the Government, Provinces and Kabupatens/Cities in the forms of de-concentration grants, General Grants (DAU) and Regional Budget (APBD), and contributions from farmers and the private sector. As a result, agricultural extension activities are not optimal and this condition will eventually inhibit the implementation of agricultural development programs.

To address these constraints a new vision of agricultural extension is foreseen within the context of globalization which strongly supports the concept of partnerships and also recognizes the role of private providers of extension advice:

To make agricultural extension a strong farmer and agribusiness empowerment system to enhance their competitiveness and welfare.

To achieve the vision, the Agricultural Extension Missions are formulated as follows:

1. Develop agricultural extension institutions;
2. Improve the quality of agricultural extension personnel;
3. Expand agricultural extension services;
4. Develop participatory agricultural extension approach, methodology and model;
5. Develop farmer organizations to be strong socioeconomic organizations; and
6. Develop an institutional relationship between farmers, agribusinesses, extension officers and researchers.

149. A possible model for reform under the wider FEATI project now being prepared, could comprise the following steps, which have been piloted in part during implementation of DAFEP but which also emulate positive experience in other Bank funded projects such as the ATMA (Agricultural Technology Management Agency) project in India during 1998-2004. (Note that the model for general agriculture and food crops would operate at District level, whereas the cocoa industry model would be coordinated at a Regional level through a Cocoa Coordinating Committee).

1. Research and Extension capacity improvement would be assured by first targeting reasonable expenditure allocations (%GDP) for research and extension based on those of regional competitors such as Thailand and Malaysia. Staff ceilings would be established with reasonable five year targets for staff reduction. A training program for remaining staff and reasonable base pay scales would be prepared and implemented on a national basis, with local allowances to be paid by district government.
2. Productivity Improvement Funds (PIF) would be developed at Province and District level to supplement APBN financing of local initiatives in productivity improvement in much the same way as competitive research grants under the successful Agricultural Research Management II project. The funds would be allocated for 12 month terms over a five year period initially. MOA would review existing capital and interest rate subsidy programs with a view to reducing them and reallocating funds to institutional strengthening and Productivity Improvement Funds subject to annual performance review. PIF funds would not subsidize capital purchases or credit interest rates and would not pay for the infrastructure items normally provided for under core budgets, but would provide for inputs and technical services to improve the productivity of existing enterprises. *A pre-qualification for PIF funding of any farmer association would be that the group had undertaken adequate training in preparation of business plans and accounting for funds flow.*

3. Each participating province and district would develop an agricultural research and extension plan (using technical assistance or the combined expertise of public and private sectors) linked to the identified needs of a sample of participating farmer groups as established by participatory appraisal techniques. The emphasis would have to be on productivity improvement of existing enterprises rather than capital inputs for new enterprises i.e. scaling up success. Funds to implement the activities of the district/province and the farmer groups would be drawn from the PIF and from local Kabupaten or Provincial budgets based on a funding proposal reviewed by the central government annually but with continued funding subject to achieving the outputs and outcomes described in the plan. The records of both Kabupaten/Provincial public services and farmer group business plans would be used for monitoring. Decisions on what priorities in agriculture should be funded would be made jointly in a management committee consisting of farmer group representatives, agricultural extension and research staff, representatives of private sector input supply and output marketing organizations and locally relevant organizations such as colleges and schools. (In the case of the cocoa industry, the Cocoa Commission and its secretariat, rather than the district governments and their management committees, would take the lead role in setting funding priorities, allocating funds, and submitting prioritized plans to central government and donors for funding.

4. Where a partnership was involved, the funds allocation process would require a development plan giving clear annual milestones/ targets for disbursement by the relevant PIF and clear targets for technical services provision (person months and specific activities) by the private sector partner.

4.2 Local Level Improvement to the Cocoa Industry

150. A diagrammatic representation of the proposed partnership arrangement at national level is given in Fig 4.1. and the institutional arrangements are presented in Fig 4.2 the partnership would involve both research and extension/empowerment activities among seven partners

| Partner | Role |
|--------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ministry of Agriculture and Ministry of Trade and Industry, Provincial, District and sub District Government | Personnel and facilities for research and extension |
| World Bank | Major funding (estimated at \$20 million) for a five year program under FEATI |
| Mars Inc including Masterfoods and PT Effem (Indonesia). | Managerial and technical personnel for strengthening of organization, farmer training and research |
| London Sumatra Plantations | Field and laboratory facilities in Sumatra for plant breeding and IPM systems development |
| The Australian Center for International Agricultural Research (ACIAR) | Continuing biological control research and possible major assistance to the adaptive research centers (Agricultural Institutes for Adaptation of Technology) including a new |

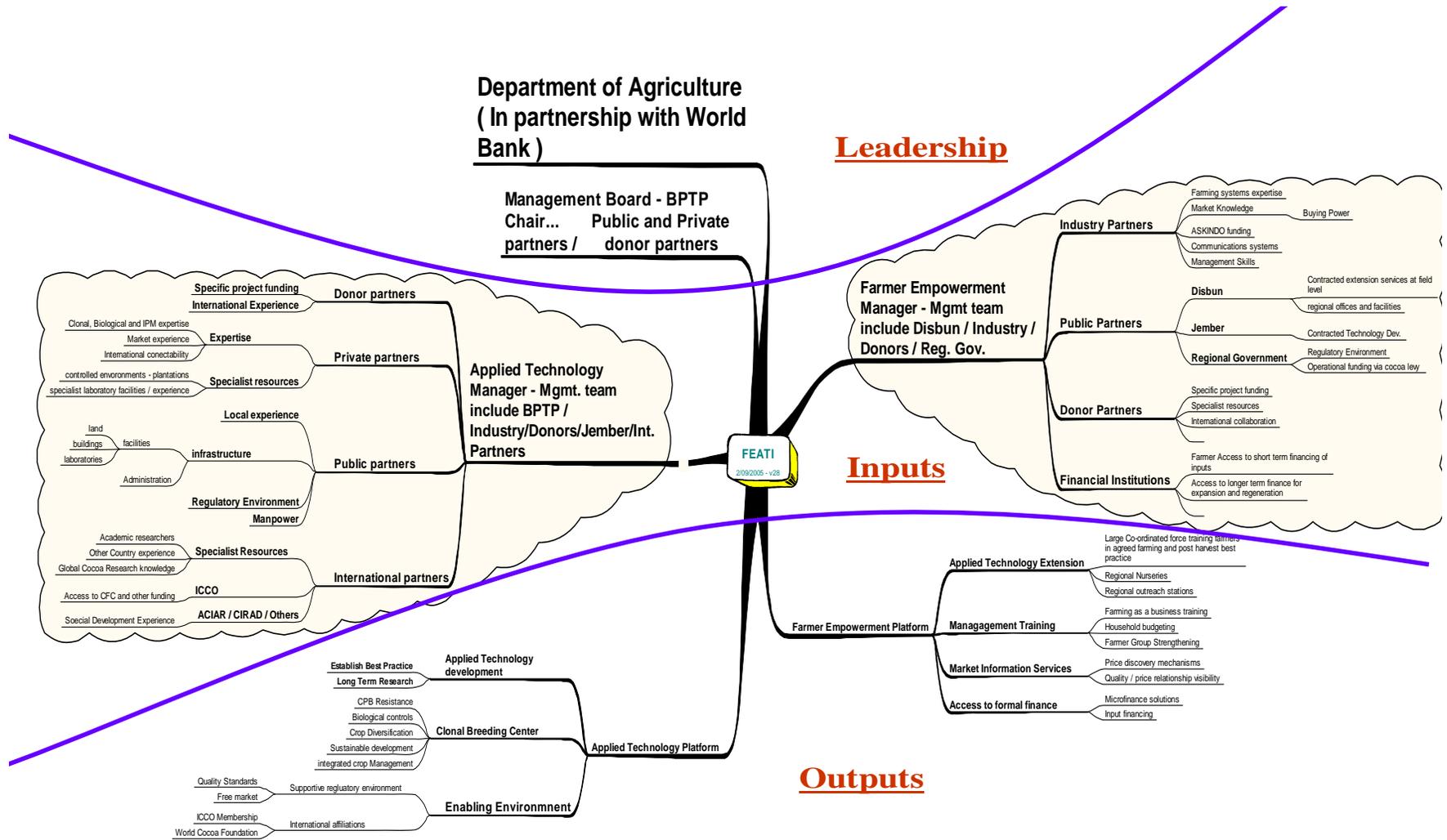
| | |
|-------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| | field station in Sulawesi |
| ASKINDO and farmers' organizations (to be identified) | Representation of the interests of traders and farmers |
| International Finance Corporation | Funding of technical assistance for design and partial implementation of a bridging program between SUCCESS/PRIMA and FEATI |

The structure under which the partners would cooperate would be a commission formed under Ministerial Decree similar to the commission controlling public and private funding of the Oil Palm industry. The commission would have its own attached technical secretariat with sections for Farmer Empowerment, Applied Research, Monitoring and Evaluation (including a Management Information System to incorporate farmer feedback), Financial Management (with independent audit) and Industry Advocacy. As a legal entity in Indonesia the partners would operate both a treasury account and a private bank account and would agree on their own terms of employment for employees including the trainers from past projects such as SUCCESS, PRIMA and COCOA village. The Commission would direct management through the Secretariat. The Commission would have seats allocated to provide adequate representation of all stakeholders but with a deciding vote of the chairperson if required who would be from a unit of the Government of Indonesia with tenure of twelve months. The Commission would appoint administrative and management staff from the public and private sector as appropriate to the Secretariat to manage the research, empowerment, advocacy, financial management and monitoring functions. The emphasis would initially be on 15 priority Districts in South Sulawesi with later outreach to Eastern Indonesia, Sumatra and Java.

151. The proposed structure would satisfy most of the necessary conditions for a partnership as summarized in the concluding paragraph of Chapter 3 above, including

- Long term commitment from GOI and all parties through Memoranda of Understanding
- Sustainability of past initiatives through long term GOI financing of training personnel from SUCCESS, PRIMA ,Cocoa Village and others under Quality Based Selection

Fig 4.1 Structure of a Public Private Partnership for Cocoa Improvement

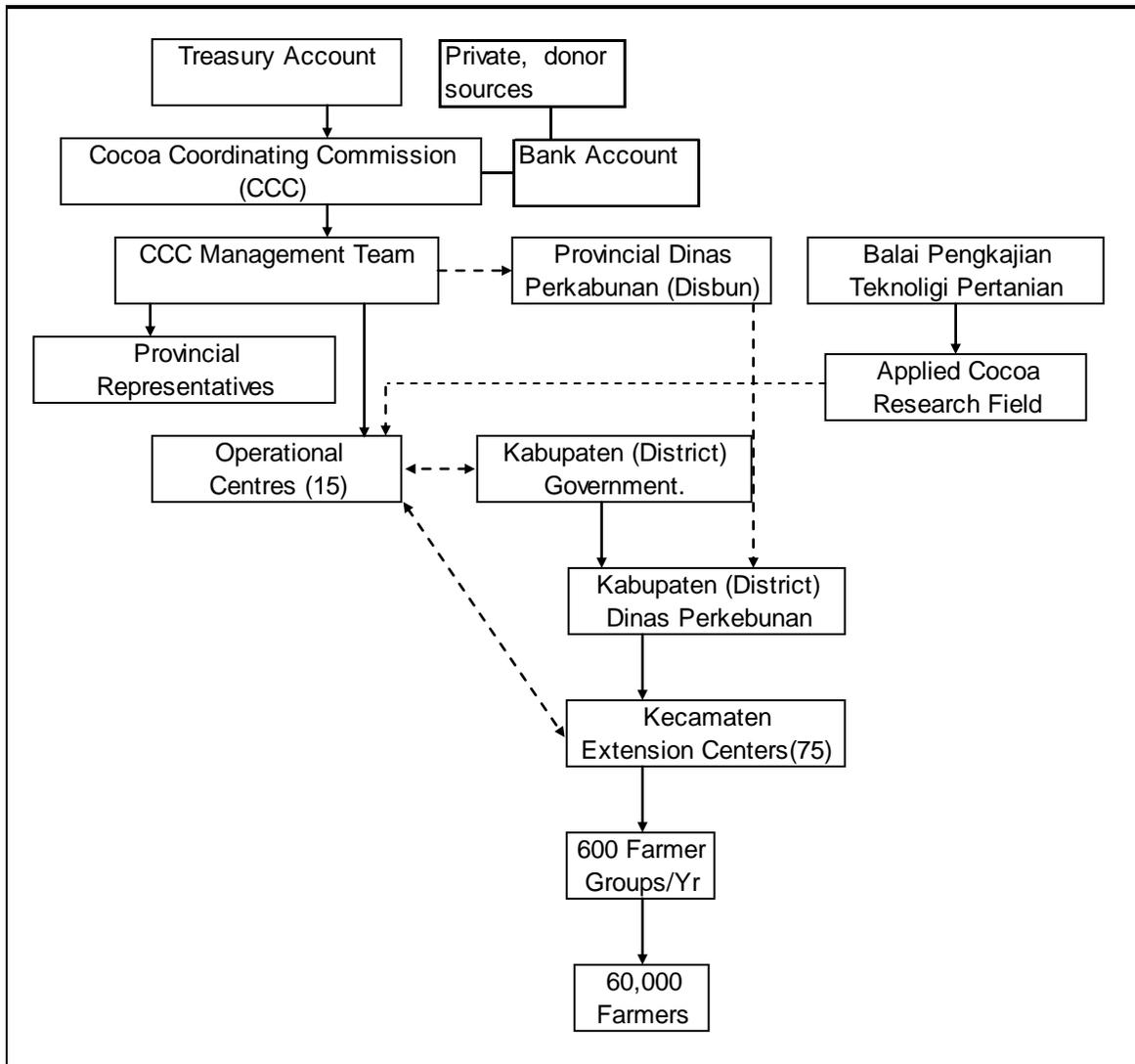


Source: Survey information of PT Effem, Makassar and IFC PENSA program Makassar

- Flexibility in employment according to the situation since employees would be hired on terms of the Coordinating Commission rather than under the civil service code. The civil servants to be trained under the project would benefit from the wider reforms of the FEATI project.
- Similarly, FEATI would promote the financial reform of agricultural support mechanisms to ensure they were more directed toward productivity improvement rather than subsidy.
- Short term benefits would be sought through the combined efforts of some 160 trainers who would operate with Dinas Pertanian and Dinas Pertanian staff in addressing problems with 200 farmers in two groups each per year in conjunction with two Dinas Pertanian or Dinas Pertanian staff. Thus the program would deliver support to farmers on approximately 32,000 ha per year
- Both research and extension efforts would be involved in determining the best technology to be applied to the CPB problem and in developing longer term biological controls such as host plant resistance
- Involvement of the Ministry of Trade and industry and the BPSMB would ensure continued commitment to tight regulatory standards
- Involvement of ASKINDO and the efficient use of its producer levies would ensure representation of producers and efficient and accountable use of their contributions

It should also be noted, however, that the partnership concept is not without risks, particularly in terms of trust between public and private sector partners. These risks will be addressed in the appraisal documentation of the FEATI project

Fig 4.2 INSTITUTIONAL LINKAGES OF A COCOA SECTOR IMPROVEMENT PARTNERSHIP



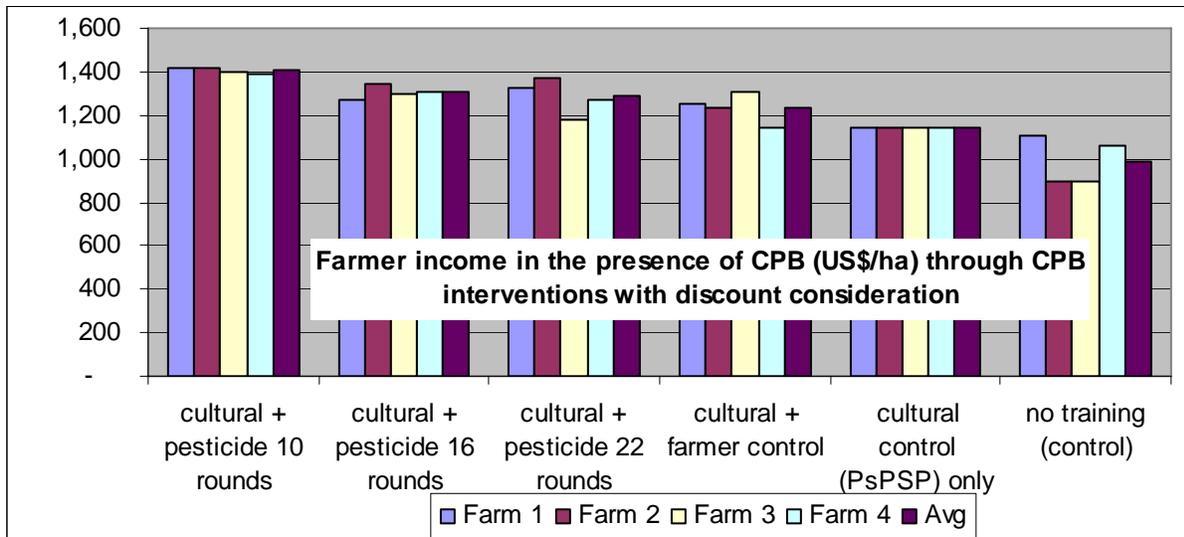
Farmer Empowerment Initiatives

152. Because cocoa has to be treated as part of a sustainable farming system, two types of initiatives are required to raise productivity. The first involves an understanding of the village level farm systems and their input/output relationships. The approach needed is similar to that used in DAFEP, involving participatory problem appraisal and subsequent business training/development of business plans to qualify the village for PIF funding. A range of Dinas staff could potentially be involved although Dinas Perkebunan staff would probably play a lead role. The second initiative requires a specific focus on improvement of the cocoa related components of the system. The task is best suited to a partnership between private sector technical trainers plus Dinas Perkebunan or contracted staff to manage implementation at village level.

153. The experience gained on the PRIMA cocoa improvement demonstration project implemented under Netherlands Government and Mars Inc. funding at Noling village, Bupong Kabupaten in South Sulawesi from 2002-05 provides a starting point for a wider local level cocoa improvement initiative. The emphasis at PRIMA is on development and demonstration of a range of techniques for cocoa pod borer control (side grafting, pruning, biological control, fertilizer, pod sheaths, pesticides and others). The project works through eight farmer blocks on soils of varying fertility using an extension team with a leader and several farmer coordinators. The extension support is concentrated because both applied research and extension are involved and because a group of convinced farmers with demonstrably higher yields and quality is sought as a nucleus for cross farm visits and training in the future. Farmer training focuses on practical skill development, organizing and analyzing information critically, and linking farmers to local industry, training resources and sources of commercial credit.

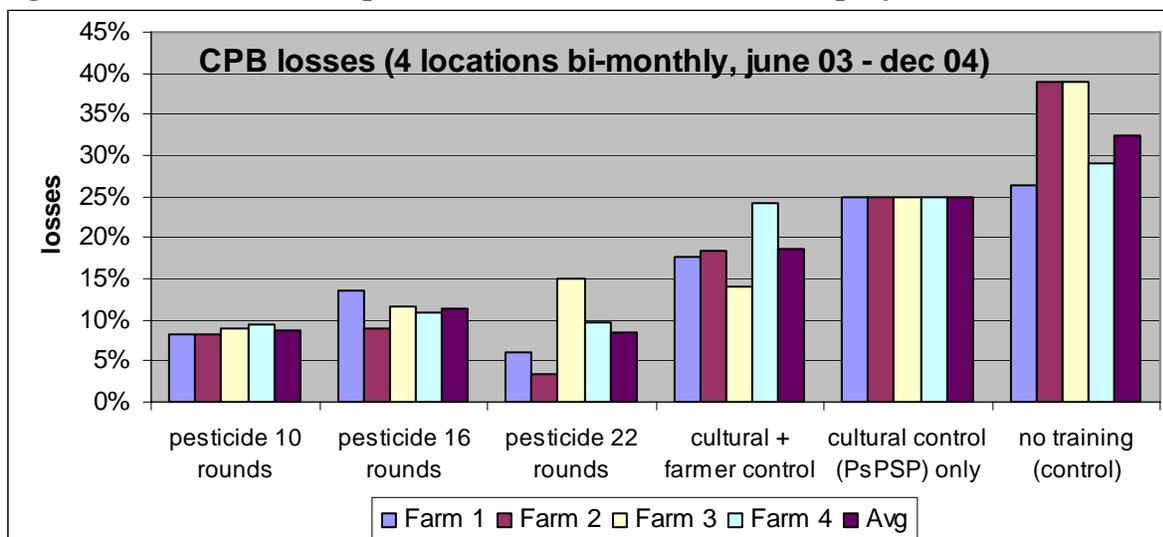
- Similarly, in a project situation, development would be linked from research centers to a Kabupaten level center where propagation of new planting materials, training and small business development could occur. The Kabupaten centers would in turn support revitalized Kecamatan centers where a public sector and a private sector trainer/extension worker would assist farmer groups. Better office facilities, internet connectivity and a meeting place for farmers would be part of the infrastructure. Although a partnership might directly train only 60,000 of the 450,000 cocoa farmers in Indonesia, it would influence more through farmer to farmer contact.
- The PRIMA demonstrations have been linked to the interests and support of local Kabupaten government by welcoming the support and involvement of the local Bupati (Head of Kabupaten Government) at “public days” involving a fiesta atmosphere and demonstrations of the technology and benefits to Kabupaten constituents. Similar close involvement of government is needed in future.

Fig 4.2 Income (\$/ha) in response to farm level treatments at PRIMA



Discounts are proportional to waste level and cocoa butter, cocoa powder yield, which is lower where CPB levels are highest

Fig 4.3 Cocoa Losses in response to treatment- PRIMA cocoa project, 2003-04



- An interesting part of the development is the potential for both small enterprise development (from agribusiness consultancy to contract pruning gangs) and for the development of an exit strategy based on greater independence of farmer groups. One of the key links missing in the program, which needs to be filled by a partnership with the public sector, is the lack of information on soil fertility and fertilizers and the lack of access to laboratories for soil testing and pesticide residue monitoring of cocoa.

154. A summary of the financial benefits of improved cocoa management techniques as observed at PRIMA is given in Fig 4.2

155. Understanding the financial implications of better management and understanding the role of better business management by farmers has been a key activity under SUCCESS and should be continued under FEATI.

- An extension of the PRIMA concept is being developed for a cluster of farmers at Masamba, in a neighboring Kabupaten and a future project could adopt a similar model. The concept would be to establish demonstration sites involving a cluster of up to 100 farmers organized into a producer association with a common interest in quality cocoa for improved incomes. Such clusters of farmers would not be chosen in a top down manner by public institutions but identified from a wider list of villages expressing interest in the program after an initial public information campaign. Priority would go to clusters close to regional centers and on main roads to maximize demonstration value of the work to other farmers traveling to local markets. The chosen cluster of farmers would probably implement a demonstration involving contrasting treatments of “do nothing”, “good practice” (frequent harvesting, good sanitation, pruning, fertilizers and removal of husks) and “good practice plus pesticides”. The latter treatment would seek to identify optimum timing and frequency of pesticide use to complement good practice in reducing CPB infestation from current average levels of perhaps 35% in South Sulawesi to an acceptable 10-15%.
- Experience at PRIMA has shown that such demonstrations need to involve both a group of motivated farmers and two or more coordinators, ideally from Dinas Perkebunan but

also from suitable technically oriented farmers or NGOs who would benefit from further training supplied by international, regional and local technical assistance staff. The private sector partners would supply 3-4 person months of international technical assistance per year for cocoa management, marketing and research support. Regional technical assistance (12 person months per year) would be supplied for design of farmer organization and management structures, local government coordination and field demonstration design. The project partnership, with GOI funding would supply local technical assistance and training over 5 years through the trainers and their managers available from previous PRIMA, SUCCESS and Cocoa Village training programs.

- The demonstration sites would be supported by the familiar mix of mass media presentations, particularly television and radio, cross visits for technicians, public fiesta days and possibly the use of an E-Choupal style internet communication method developed in India to improve both production technology and market access.

Applied Technology Initiatives

156. Applied technology for addressing CPB would involve a cooperative effort between the private sector partners (Mars Inc and London Sumatra Plantations), ACIAR and the Indonesian Institute for Cocoa Research (IICR), Jember, East Java.

The research projects would include in particular:

1. Development of an optimum IPM package including spray schedules for various climatic conditions and both estate and smallholder management. Work on this problem is already underway at London Sumatra Plantations research facility near Medan, Sumatra. Pesticide use is controversial in the cocoa industry following memories of residue problems derived from use of chlorinated hydrocarbon pesticides by a farmer in Malaysia in the 1980s. The best available pesticides with the least environmental impact and health risks are still not being used in Indonesia, primarily because of the lack of registration data. However, apart from endosulfan (class 1) and chlorpyrifos (top of class 2) pesticides in use are class 2 or class 3 and have no long term residue problems. Research is needed by the Indonesian Cocoa Research Institute at Jember, East Java to contribute to the database on effective pesticide controls and their management. Nevertheless, sufficient registered pesticides are available for use in a structured integrated pest management approach.
2. Development of improved cocoa clones for grafting. The work would be linked to development of a cocoa research field station, possibly at Soppeng Kabupaten in South Sulawesi, which would become a field station for IICR. Other work at this field station and at Jember and Medan could include the following:
 - side grafting and the associated pruning management techniques,
 - development of hybrid seed gardens for improvement of new cocoa plantations (cocoa is still expanding in area in Sulawesi at approximately 8% per annum)
 - fertilizer trials and development of a soil fertility database linked to improvement of the soil and plant tissue testing laboratory at BPTP Maros, South Sulawesi.
 - marketing initiatives to link producers of quality cocoa to buyers paying a premium for the product- the generation of a gold brand image
 - monitoring of export standards and quality with regular reporting to the Ministry of Trade and Industry. The initiative may require renewal of laboratory equipment at the pesticide residue testing laboratory, Maros

APPENDIX 1 Heterosis

1. Amongst temperate cattle breeds, that are similar genetically e.g. Angus and Hereford; crossbreeding gives small increases in average daily gain, live weight and carcass weight however it gives significant gains in reproductive performance and longevity.

A rule of thumb is that heterosis improves traits of low inheritance rather than traits of moderate to high inheritance that tend to respond better to selection. An F1 calf will exhibit 'direct' hybrid vigor for birth weight, pre-weaning ADG, post-weaning retained ADG, scrotal size and for dressing percentage, and longevity in the case of females.

2. Heterosis has a small effect on carcass traits, if compared at the same carcass weight. An F1, crossbred dam will exhibit 'maternal' hybrid vigor for traits such as milk and fertility. Crossbred calves suckle more than purebred calves. That extra suckling will generally stimulate the dam to produce more milk. *However, if nutrition is poor extra milk production will impact negatively on reproductive performance of that cow.*

3. Classically, crossbreeding systems are designed to capture the cumulative effects of both maternal and direct heterosis by using an F1 crossbred cow mated to a third breed. However, a 3-breed cross is not necessary to improve productivity significantly in Indonesia at this stage. The two-breed system takes advantage of heterosis only in the offspring and requires a large number of purebred females to be available in the system both in the crossbreeding program and for replacement females. The purebred Bali population of NTB would supply that purebred Bali female base. *However, if smallholders were so impressed by the F1 female and decided to retain them they would be faced with the disadvantages of additional feed demand for additional milk production described in Table 8.*

4. To be controllable and to ensure conservation of the Bali breed in addition to improvement in smallholder income by crossbreeding, artificial insemination for cross breeding rather than natural mating by bulls at village level is essential in a crossbreeding program. *Sale of all crossbred animals for slaughter is also desirable.*

5. There has been very little AI practiced on Sumbawa or in NTB generally until 2004 when a few hundred straws were used. The practice is constrained by lack of equipment, particularly liquid nitrogen canisters and the operation of the service at village level by Dinas Peternakan officers as a supplementary income source. *As in many areas of Indonesia, AI is not likely to be a widely used breeding mechanism until the service is reliable under a privatized system. (see also Bandenburg and Sukobagyo, 2003) Thus cooperation with the private sector is needed for as well as the discipline of producing animals suited to the demand of the market, through a public private partnership*

6. Crossbreeding can exploit breed differences. For example, by using a breed of greater muscling, less fat and increased carcass yield % e.g. Limousin (originally French breed) with a breed of less muscle (e.g. Holstein-Friesian), the carcass yield% characteristic will be improved in the offspring. Choice of breeds in a crossbreeding project is therefore always important

7. For Indonesia the following breeds are characterized in terms of their production and adaptive traits in Table 1.

Table 1. Adaptation – Tropical Zone e.g. Sumbawa

| Breed group | Growth | Fertility | Mature Size | Meat Quality | Ticks | Worms | Heat | Drought |
|----------------------|--------|-----------|-------------|--------------|-----------|-------|-----------|---------|
| Bos Sondaicus | | | | | | | | |
| Bali Cattle | + | +++++ | + | +++ | ++++ | ? | ++++ + | +++++ |
| Bos Taurus | | | | | | | | |
| British breeds | ++ | ++ | ++++ | ++++ + | + | ++ | ++ | ++ |
| European breeds | ++ | ++ | ++++ | ++++ | + | ++ | ++ | + |
| Bos Indicus | | | | | | | | |
| Brahman | +++ | +++ | +++ | +++ | ++++ + | +++++ | ++++ | ++++ |
| Ongole (local) | ++ | +++ | ++ | ++ | ++++ | +++++ | ++++ | ++++ |
| Crossbreds | | | | | | | | |
| F1 British x Ongole | ++++ | ++++ | +++ | ++++ | +++ | ++++ | +++ | ++ |
| F1 Euro x Ongole | +++++ | +++ | ++++ | ++++ | +++ | ++++ | +++ | ++ |
| F1 Brahman x Bali | ++ | ++++ | ++ | +++ | ++++ | +++++ | ++++ | +++ |
| F1 Euro x Bali | +++ | ++ | +++ | +++ | ++ | ++ | +++ | ++ |

More + is better. Source: adapted from Dr.H. Burrow (pers. comm.)

8. Since purebred Bali replacement females would be difficult for smallholders to buy outside their local networks, crossbreeding in Bali herds should only be done with cows 5 years and older. *Maiden Bali heifers and young cows should be mated to purebred Bali bull's thus ensuring purebred Bali replacement females from within the system and thereby also drastically reducing any risk of dystokia (birth difficulty).*

9. Since data on heterosis for Bali-cross cattle is scarce, the data in Table 4 are presented to give indications of the size of effects that may be possible. In the literature *Bos Indicus* x *Bos Taurus* crosses have traditionally given the highest levels of heterosis (Prayaga 2003). Given the genetic diversity between Bali cattle and other breeds it is suggested heterosis levels will be high. The data in Table 2 is taken from Queensland, Australia tropical and sub-tropical crossbreds and are based on the performance of the Zebu x British breed F1.

Table 2. The approximate direct effects of heterosis on economically important traits in *Bos Taurus* x *Bos Indicus* crosses

| Trait | Heterosis % | Trait | Heterosis % |
|--------------------------------|-------------|---------------------------------|-------------|
| Calf birthweight ¹ | 11% | Weaning weight ₂ | 8.5% |
| Weaning rate ¹ | 10% | Pre-weaning ADG ² | 8% |
| Sale weight ¹ | 6% | Yearling Weight ₂ | 13.1% |
| Fat depth ¹ | 10% | Final weight (18m) ² | 12.7% |
| Retail Meat Yield ¹ | 0.5% | Post-weaning ADG ² | 18.8% |
| Adult cow weight ¹ | 3% | | |

Source ¹: adapted from the Breeding Edge Workshops notes p. 3.33 MLA 2004

Source ²: adapted from Prayaga, K.C. 2003 (highest estimates)

10. There is a paucity of information and evaluation of Bali cattle and their crossbreds by other breeds. It is known from previous work that Bali-cross bulls are infertile (Kirby 1979). With a Bali dam and a Simmental or Brahman sire, it is likely that these estimates for growth heterosis could be higher, based on the crossbreds inspected.

APPENDIX 2 Visit to a private Cattle Breeding company (PT. Lembu Satwa Prima) Serang (Banten).

April 26, 2005.

Company's Background.

1. PT. Lembu Satwa Prima (LSP) is a sister company of a bigger company called PT. Lembu Jantan Perkasa (LJP) doing business in cattle fattening, cattle breeding and trading. The company was established in 1990 with its core business in beef cattle trading, import and fattening. The company claimed that it is one of the best cattle fattening companies in Indonesia although it is not the biggest. In its marketing strategy, PT. LJP prefers to locate the feedlots close to markets. At present PT. LJP has feedlots and in cooperation with other partners in several locations such as Serang, Bekasi (east of Jakarta), Cariu and Jatinangor (West Java, near Bandung), Belawan and Langkat (North Sumatra). PT. LJP also has 3 feedmills in Serang, Tambun and Langkat for its own use as well as for sales. To anticipate the decreasing beef cattle population and increasing demands, in 2004 PT. LJP started the intensive beef cattle breeding in Serang with the expectation to meet the demands from regions for quality heifers. It is the only one company in Indonesia that have 2 intensive activities, both fattening and breeding.
2. LJP has initiated a collaborative breeding program with Ministry of Transmigration where the Ministry will finance for 300 heads of cattle and after 5 years PT. LJP will give back 900 heads of cattle to be distributed to transmigrants. Another collaborative program is with Kabupaten Sawahlunto government (West Sumatra) where the local government will finance 100% of the program and is expected to start on October 1, 2005.

Objectives of the breeding program.

3. To program aims to improve the genetic quality and economic value of beef cattle and to produce high quality heifers which have good hereditary characters such as: good temperament (easily handled), sufficient milk production for the calf, resistant to diseases and parasites, faster growth, high fertility, and good adaptability to local environment and feeds.

Facilities in Serang.

4. The location is about 9.5 km from Serang city (about 1.5 – 2 hours from Jakarta by car) with a total area of 16 ha with about 80 pens (pregnancy pens, calving pen, cows and calves pens, weaner pens, heifer pens, bull pens and medical care pen) to hold a total of about 2,000 cattle, an office, a feed mixing plant, AI laboratory and several staff houses. Currently there are about 1,800 head of cattle at various ages consisting of various Brahman crosses (Simmental and Limousin). Unproductive cows and young bulls are sold or sent to feedlots for fattening

Artificial Insemination (AI).

5. The breeding is done by AI using frozen semen from Singosari (near Malang, East Java), West Sumatra and some imported from Australia (Brahman, Simmental and Limousine breeds). The cows are imported from Australia (Brahman cross) as heifers at 1 – 1.5 years of age,. Sometimes as pregnancy tested animals. The company has also imported 4 Simmental young bulls from Australia and these are expected to be ready for semen collection in the next 6 months. There are 3 skilled inseminators and some time they provide training to Dinas Peternakan staff.

Financial analysis (simplified, excluding indirect and overhead costs)

1. Up-keep of 3 month pregnant heifer up-to calving (in Rupiah)

| No | | | | Expenditures | | | | No | | | | Revenues | | | |
|----|---------------------------|-----|---|------------------|---|---------------|---|-----------|--|--|--|----------|------------------|--|--|
| 1 | 3 month pregnant heifer | | 1 | 6,500,000 | 1 | Breeder value | 1 | 7,000,000 | | | | | | | |
| 2 | Transportation | | 1 | 500,000 | 2 | Calve value | 1 | 2,000,000 | | | | | | | |
| 3 | Guarding during transport | | 1 | 25,000 | | | | | | | | | | | |
| 4 | Insemination | | - | --- | | | | | | | | | | | |
| 5 | Upkeep until calving | 180 | 1 | 549,360 | | | | | | | | | | | |
| 6 | Upkeep during lactation | 90 | 1 | 540,180 | | | | | | | | | | | |
| 7 | Treatment | | 1 | --- | | | | | | | | | | | |
| 8 | Risk | 1% | | 81,145 | | | | | | | | | | | |
| | T o t a l | | | 8,195,685 | | | | | | | | | 9,000,000 | | |
| | Profit (loss) | | | | | | | | | | | | 804,315 | | |
| | Annual Rate of Return | | | | | | | | | | | | 13.09% | | |

2. Up-keep of male calve 3 up-to 15 months old (in Rupiah).

| No | | | | Expenditures | | | | No | | | | Revenues | | | |
|----|---------------------------|-----|---|------------------|---|-------------------------------|---|-----------|--|--|--|----------|------------------|--|--|
| 1 | 3 months old calve | | 1 | 2,000,000 | 1 | Bull at 350 kg @ Rp.16,000/kg | 1 | 5,600,000 | | | | | | | |
| 2 | Transportation | | | | | | | | | | | | | | |
| 3 | Guarding during transport | | | | | | | | | | | | | | |
| 4 | Upkeep to 12 months old | 270 | 1 | 824,040 | | | | | | | | | | | |
| 5 | Upkeep to 15 months old | 90 | 1 | 553,680 | | | | | | | | | | | |
| 6 | Treatment | | | | | | | | | | | | | | |
| 7 | Risk | 1% | | 33,777 | | | | | | | | | | | |
| | T o t a l | | | 3,411,497 | | | | | | | | | 5,600,000 | | |
| | Profit (loss) | | | | | | | | | | | | 2,188,503 | | |
| | Annual Rate of Return | | | | | | | | | | | | 64.15% | | |

3. Up-keep of heifer 3 – 15 months old (in Rupiah)

| No | | | | Expenditures | | | | No | | | | Revenues | | | |
|----|---------------------------|-----|---|------------------|---|--------|---|-----------|--|--|--|----------|------------------|--|--|
| 1 | 3 months old calve | | 1 | 2,000,000 | 1 | Heifer | 1 | 6,000,000 | | | | | | | |
| 2 | Transportation | | | | | | | | | | | | | | |
| 3 | Guarding during transport | | | | | | | | | | | | | | |
| 4 | Upkeep to 12 months old | 270 | 1 | 824,040 | | | | | | | | | | | |
| 5 | Upkeep to 15 months old | 90 | 1 | 553,680 | | | | | | | | | | | |
| 6 | Treatment | | | | | | | | | | | | | | |
| 7 | Risk | 1% | | 33,777 | | | | | | | | | | | |
| | T o t a l | | | 3,411,497 | | | | | | | | | 6,000,000 | | |
| | Profit (loss) | | | | | | | | | | | | 2,588,503 | | |
| | Annual Rate of Return | | | | | | | | | | | | 75.88% | | |

4. Up-keep of heifer up-to 3 months pregnant (in Rupiah)

| No | Expenditures | | | | No | Revenues | | | |
|----|------------------------------|-----|---|------------------|----|----------------------|---|-----------|------------------|
| 1 | 3 months old heifer | | 1 | 2,000,000 | 1 | 3 month pregnant cow | 1 | 7,000,000 | |
| 2 | Transportation | | | | | | | | |
| 3 | Guarding during transport | | | | | | | | |
| 4 | Upkeep to 12 months old | 270 | 1 | 824,040 | | | | | |
| 5 | Upkeep to 18 months old | 180 | | 738,360 | | | | | |
| 6 | Artificial Insemination | | 1 | 25,000 | | | | | |
| 7 | Treatment | | 1 | 67,900 | | | | | |
| 8 | Upkeep to 3 months pregnancy | 90 | 1 | 274,680 | | | | | |
| 9 | Risk | 1% | | 39,300 | | | | | |
| | T o t a l | | | 3,969,280 | | | | | 7,000,000 |
| | Profit (loss) | | | | | | | | 3,030,720 |
| | Annual Rate of Return | | | | | | | | 59.90% |

Address: PT. Lembu Satwa Prima (LSP)
 Jln. Raya Serang – Pandeglang Km. 9.6, Serang – Banten
 Telp./Fax : 0254 – 250166

Head Office:
 PT. Lembu Jantan Perkasa
 Jln. Tarum Barat E 11-12, No. 8, Kalimalang – Jakarta 13430
 Telp: 021-8611990; Fax: 021-8631783; E-mail: lembu@cbn.net.id

Contact persons: Mr. Djaya Gunawan – President Director. No. HP: 0811834150
 Mr. Suyadi Reksohadiprodjo – Business Development.
 Mr. Toni M. Wibowo – Director.

APPENDIX 3 Cocoa Value Chain October 2005

Farmer

| | Unit | Quantity | Price | INR | US\$ | |
|-----------------------------------|---------|----------|-------|-----------|------------|------------|
| Income | | | | | | |
| Cocoa beans | kg | 1,100 | 8,350 | 9,185,000 | 919 | 8% moist |
| | | 924 | | | | 7% moist |
| Costs | | | | | | |
| Labour (family and hired) | | | | | | |
| Weeding | ha | | | 6,875 | 1 | |
| Fertiliser application | ha | | | 29,934 | 3 | |
| Foliar application | ha | | | 10,646 | 1 | |
| Spraying for pest and diseases | ha | | | 34,710 | 3 | |
| Herbicide application | ha | | | 4,560 | 0 | |
| Sanitation | ha | | | 1,548 | 0 | |
| Harvesting | ha | | | 830,589 | 83 | |
| Pruning | ha | | | 44,092 | 4 | |
| Materials | | | | | | |
| Fertilizer | ha | | | 789,099 | 79 | |
| Foliar fertilizer | ha | | | 44,126 | 4 | |
| Pesticide | ha | | | 148,663 | 15 | |
| Herbicide | ha | | | 1,602 | 0 | |
| Sanitation | ha | | | 1,840 | 0 | |
| Transport | ha | | | 29,866 | 3 | |
| Tools | ha | | | 715 | 0 | |
| Other (trash loss and replanting) | lumpsum | | | 1,450,000 | 145 | |
| Total costs | | | | 3,428,865 | 343 | |
| Total Profit/Value Added | | | | 5,756,135 | 576 | 63% |

Community Collector - one community collector collecting from 80 farmers

| | Unit | Quantity | Price | INR | US\$ | |
|-----------------------|---------------------------------|----------|-------|-------------|--------------|-----------|
| Income | | | | | | |
| Cocoa beans | kg | 88,000 | 8,809 | 775,214,000 | 77,521 | |
| Costs | | | | | | |
| Raw material | kg | 88,000 | 8,350 | 734,800,000 | 73,480 | |
| Transport | kg | 88,000 | 46 | 4,083,200 | 408 | |
| Labour | kg | 88,000 | 58 | 5,104,000 | 510 | |
| Other (moisture loss) | lumpsum | | | 1,160,000 | 116 | |
| | Total Costs | | | 745,147,200 | 74,515 | |
| | Total Profit/Value Added | | | 30,066,800 | 3,007 | 4% |

Village Collector - one village collector collecting from 7 community collectors and part drying

| | Unit | Quantity | Price | INR | US\$ | |
|-----------------------|---------------------------------|----------|-------|---------------|---------------|-----------|
| Income | | | | | | |
| Cocoa beans | kg | 616,000 | 9,690 | 5,969,147,800 | 596,915 | |
| Costs | | | | | | |
| Raw material | kg | 616,000 | 8,809 | 5,426,498,000 | 542,650 | |
| Transport | kg | 616,000 | 70 | 42,873,600 | 4,287 | |
| Labour | kg | 616,000 | 23 | 14,291,200 | 1,429 | |
| Other (moisture loss) | lumpsum | | | 8,120,000 | 812 | |
| | Total Costs | | | 5,491,782,800 | 549,178 | |
| | Total Profit/Value Added | | | 477,365,000 | 47,737 | 8% |

Town Collector - one town collector collecting from 5 village collectors

| | Unit | Quantity | Price | INR | US\$ | |
|---------------------------|---------------------------------|-----------|--------|----------------|----------------|-----------|
| Income | | | | | | |
| Cocoa beans | kg | 2,772,000 | 11,628 | 32,233,398,120 | 3,223,340 | |
| trash | | 107,800 | 11,628 | 1,253,521,038 | 125,352 | |
| | | 2,879,800 | 11,628 | 33,486,919,158 | 3,348,692 | |
| Costs | | | | | | |
| Raw material- cocoa beans | kg | 3,080,000 | 9,690 | 29,845,739,000 | 2,984,574 | |
| Raw material- trash | kg | 107,800 | 3,000 | 323,400,000 | 32,340 | |
| Government tax | kg | 3,080,000 | 59 | 182,212,800 | 18,221 | |
| Transport | kg | 3,080,000 | 29 | 89,320,000 | 8,932 | |
| Drying/grading | kg | 3,080,000 | 29 | 89,320,000 | 8,932 | |
| Labour | kg | 3,080,000 | 232 | 714,560,000 | 71,456 | |
| Financing | lumpsum | | | 366,237,237 | 36,624 | |
| Other (moisture loss) | lumpsum | | | 58,000,000 | 5,800 | |
| | Total Costs | | | 31,668,789,037 | 3,166,879 | |
| | Total Profit/Value Added | | | 1,818,130,121 | 181,813 | 6% |

International Exporter - one exporter exporting 15,000 tonnes

| | Unit | Quantity | Price | INR | US\$ | |
|----------------------|---------------------------------|------------|--------|------------------------|-------------------|-----------|
| Income | | | | | | |
| Cocoa beans (graded) | litres | 15,000,000 | 12,326 | 184,888,539,000 | 18,488,854 | |
| Costs | | | | | | |
| Raw material | kg | 15,000,000 | 11,628 | 174,423,150,000 | 17,442,315 | |
| Transport | kg | 15,000,000 | 41 | 609,000,000 | 60,900 | |
| Drying/grading | kg | 15,000,000 | 58 | 870,000,000 | 87,000 | |
| Labour | kg | 15,000,000 | 58 | 870,000,000 | 87,000 | |
| Government taxes | kg | 15,000,000 | 50 | 750,000,000 | 75,000 | |
| Financing | lumpsum | | | 1,507,849,200 | 150,785 | |
| Other | lumpsum | | | 348,000,000 | 34,800 | |
| | Total Costs | | | 179,377,999,200 | 17,937,800 | |
| | Total Profit/Value Added | | | 5,510,539,800 | 551,054 | 3% |

Grinder - one local processor processing 12,000 tonnes per year at \$250/ton processing cost
35% Butter 45% Powder, 20% trash in beans

| | Unit | Quantity | Price | INR | US\$ | |
|---------------------|---------------------------------|------------|--------|------------------------|-------------------|-----------|
| Income | | | | | | |
| Cocoa butter | tonnes | 5,250,000 | 40,500 | 212,625,000,000 | 21,262,500 | |
| Cocoa powder | tonnes | 6,750,000 | 6,000 | 40,500,000,000 | 2,440,935 | |
| Cocoa residue | tonnes | 3,000,000 | 0 | 0 | 0 | |
| | Total revenue | | | 253,125,000,000 | 23,703,435 | |
| Costs | | | | | | |
| Raw material | kg | 15,000,000 | 12,326 | 184,888,539,000 | 18,488,854 | |
| Grading/sorting | kg | 15,000,000 | 156 | 1,361,664,524 | 136,166 | |
| Processing costs | kg | 15,000,000 | 625 | 5,446,658,098 | 544,666 | |
| Labour | kg | 15,000,000 | 223 | 1,939,010,283 | 193,901 | |
| Packaging | kg | 12,000,000 | 900 | 6,274,550,129 | 627,455 | |
| Marketing/promotion | kg | 12,000,000 | 516 | 3,600,615,733 | 360,062 | |
| Government taxes | kg | 12,000,000 | 57 | 396,272,699 | 39,627 | |
| Transport | kg | 12,000,000 | 250 | 3,000,000,000 | 300,000 | |
| Financing costs | lumpsum | | | 1,918,818,780 | 191,882 | |
| Management | lumpsum | | | 2,126,375,321 | 212,638 | |
| Depreciation | lumpsum | | | 3,904,164,524 | 390,416 | |
| Factory overheads | lumpsum | | | 4,392,185,090 | 439,219 | |
| | Total Costs | | | 219,248,854,181 | 21,924,885 | |
| | Total Profit/Value Added | | | 33,876,145,819 | 1,778,550 | 8% |

Grinder - one U.S. based processor processing 12,000 tonnes per year at \$400/ton processing cost and \$60/ton import cost of beans at NY price. Butter 35%, Powder 45%, trash 20%

| | Unit | Quantity | Price | INR | US\$ | |
|---------------------------------|---------|------------|--------|-----------------|-------------------|----------------|
| Income | | | | | | |
| Cocoa butter | tonnes | 5,302,500 | 40,500 | 214,751,250,000 | 21,475,125 | |
| Cocoa powder | tonnes | 6,817,500 | 6,000 | 40,905,000,000 | 2,465,345 | |
| Cocoa residue | tonnes | 3,030,000 | 0 | 0 | 0 | |
| Total revenue | | | | 255,656,250,000 | 23,940,470 | |
| Costs | | | | | | |
| Raw material | kg | 15,150,000 | 12,800 | 193,920,000,000 | 19,392,000 | |
| Grading/sorting | kg | 15,150,000 | 145 | 2,196,750,000 | 219,675 | |
| Processing costs | kg | 15,150,000 | 580 | 8,787,000,000 | 878,700 | |
| Labour | kg | 15,150,000 | 206 | 3,128,172,000 | 312,817 | |
| Packaging | kg | 12,000,000 | 835 | 10,022,400,000 | 1,002,240 | |
| Marketing/promotion | kg | 12,000,000 | 503 | 6,041,280,000 | 604,128 | |
| Government taxes | kg | 12,000,000 | 40 | 480,000,000 | 48,000 | |
| Transport | kg | 12,000,000 | 1,600 | 19,200,000,000 | 1,920,000 | |
| Financing costs | lumpsum | | | 3,302,745,600 | 330,275 | |
| Management | lumpsum | | | 3,660,000,000 | 366,000 | |
| Depreciation | lumpsum | | | 6,720,000,000 | 672,000 | |
| Factory overheads | lumpsum | | | 7,560,000,000 | 756,000 | |
| Total Costs | | | | 265,018,347,600 | 26,501,835 | |
| Total Profit/Value Added | | | | -9,362,097,600 | -2,561,365 | -10.70% |

Grinder - one U.S. based processor processing 12,000 tonnes per year of African beans+A75 at \$400/ton processing cost and \$60/ton import cost of beans at NY price. Butter 50%, Powder 30%, trash 20%

| | Unit | Quantity | Price | INR | US\$ | |
|---------------------------------|---------|------------|--------|-----------------|------------------|---------------|
| Income | | | | | | |
| Cocoa butter | tonnes | 7,500,000 | 40,500 | 303,750,000,000 | 30,375,000 | |
| Cocoa powder | tonnes | 4,500,000 | 6,000 | 27,000,000,000 | 1,627,290 | |
| Cocoa residue | tonnes | 3,000,000 | 0 | 0 | 0 | |
| Total revenue | | | | 330,750,000,000 | 32,002,290 | |
| Costs | | | | | | |
| Raw material | kg | 15,000,000 | 12,800 | 192,000,000,000 | 19,200,000 | |
| Grading/sorting | kg | 15,000,000 | 145 | 2,175,000,000 | 217,500 | |
| Processing costs | kg | 15,000,000 | 580 | 8,700,000,000 | 870,000 | |
| Labour | kg | 15,000,000 | 206 | 3,097,200,000 | 309,720 | |
| Packaging | kg | 12,000,000 | 835 | 10,022,400,000 | 1,002,240 | |
| Marketing/promotion | kg | 12,000,000 | 503 | 6,041,280,000 | 604,128 | |
| Government taxes | kg | 12,000,000 | 40 | 480,000,000 | 48,000 | |
| Transport | kg | 12,000,000 | 1,600 | 19,200,000,000 | 1,920,000 | |
| Financing costs | lumpsum | | | 3,302,745,600 | 330,275 | |
| Management | lumpsum | | | 3,660,000,000 | 366,000 | |
| Depreciation | lumpsum | | | 6,720,000,000 | 672,000 | |
| Factory overheads | lumpsum | | | 7,560,000,000 | 756,000 | |
| Total Costs | | | | 262,958,625,600 | 26,295,863 | |
| Total Profit/Value Added | | | | 67,791,374,400 | 5,706,428 | 17.83% |

APPENDIX 4 Visit to Papuan village Skiro

Location: 2, 5 hours drive South from Jayapura,

Date: 23 May 2005.

Discussion with 11 farmers from this and other villages and visit of cocoa gardens.

Participants: Rob Lockwood, Jennifer Bielman, Hussin bin Purung, Smilja Lambert

Main production in the village was cocoa, bananas, sago, cassava, coconut, pepper and mixed vegetables. They have also some cows provided by the government (annually supplied to 5 farmers, 2 cows per farmer). However, cocoa is the most important crop due to better income and its spread of annual production, providing cash throughout the year. Total area for the community is 170 ha of cocoa and each farmer has approximately 0.5 – 3 of planted area. Cocoa started in a small way in the early 1960s', but grew in area in the 1970's as the result of activity by a private company Sabonari Marti that provided seedlings (from Disbun, as a contractor) and also helped establishing cocoa gardens. They have also given the farmers the basic training on cocoa husbandry (pruning, fertilizing, but no training on spraying or fermentation). Farmers are not fermenting their cocoa beans, but are keeping fresh beans for 4 days in the bags and then dry them on the sun (similar as in Sulawesi, but keeping longer in the bags with some fermentation occurring). Collectors/traders are coming to the village. The main trader for their cocoa is Chinese Luis who brought us to the village. He organised 5-6 small collectors to cover this region, equipped them with mobile phones and they are paying good price to farmers (Rp. 9,000). Collectors are also helping farmers in their everyday life (bringing stock to their local shop etc.) and a very good relationship exist between farmers and trader. Farmers established a farmers group in 1997 that included 150 farmers at that time, however, only 75 remain as members. This group was established when they started to plant larger areas of cocoa and were cutting trees, preparing the land and planting cocoa together. In 2000 some farmers added one more hectare and they are still expanding. They have a subsidy from the government that is mainly providing the cocoa seeds for planting from Disbun. Two more farmers groups exist in neighboring villages.

In 2000 a cooperative was established that includes 48 farmers from Skiro village and 12 from neighboring village. The reason for the establishment was to market their cocoa beans in Jayapura. However, now they have good relations with trader Luis and they are selling everything to him. The Cooperative has also support from Disbun in form of cocoa seedlings and they are distributing 10,000 cocoa seedlings to 20 farmers (500 seedlings per farmer). As far they know seeds were from Jember.

Cooperative has a managing committee of 7 members that is meeting once monthly.

During our visit of the field it was very obvious that farmers do not have much understanding of what to do with their cocoa. Cocoa gardens looks like forests with some cocoa trees, without any organized pruning, sanitation or other husbandry with spacing from 3x3 to 5x5m. The impression that farmers gave is that they do not know what to do but they showed a lot of interest for new advice and knowledge. The main problem in the field are mirids, which damage pods, with some trees full of completely damaged pods. Additional problems are also rodents and stem borers. No serious problem with Phytophthora pod rot was observed neither with VSD infection. Farmers were complaining that many trees are healthy, but don't produce pods. Yields look very low with just few pods on the trees in spite of the fact that the visits was in the main harvesting period. Farmers were claiming that old Dutch planting materials (seen in one of the

cocoa gardens planted in the 1960's) are yielding better with more beans in each pod. It is quite obvious that with good training on cocoa husbandry and with some assistance these farmers would be able to improve production significantly.

Large quantities of were seen drying on the ground by the road in the village and we also saw 10 full bags of cocoa beans in the storage, prepared for the trader to take. Bagged beans looked good, clean, with reasonable bean size, but still very wet and some mold. Fresh cocoa beans that we have seen harvested in the field looked good with no traces of cocoa pod borer. Farmers were claiming some problems with clumping of beans but after examination of affected pods it was obvious that the reason for slight clumping was strong mirid infestation and not cocoa pod borer. They do not get any assistance from Disbun in the field of cocoa husbandry and pest/disease control.

There is a school in this community with 100 pupils in grades 1-6 and 3 permanent teachers. Medical service is on disposition for these 10 neighboring villages in a larger community 8 km far.

As a conclusion, in this community cocoa represents a very critical generator of income and farmers are expanding their plantations. They are quite well organized and active on the level of new plantings and marketing, but they are missing very basic knowledge of cocoa husbandry and with some training they could improve cocoa production and their cash income significantly.

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