CIRAD-CP
RUBBER PROGRAMME

SOCIO-ECONOMIC MISSION TO GREL:

LAUNCHING OF A SURVEY ON PRODUCTION COSTS AND OUTGROWER INCOMES DURING THE IMMATURE PERIOD OF RUBBER PLANTATIONS

From 8 to 13 June 2002

Bénédicte CHAMBON

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Contents

1 - Introduction

This mission was carried out in connection with support provided by CIRAD to ROPP II for implementation of the applied research programme of the Rubber Outgrower Plantations Project phase 2 (ROPP II). It was funded by ROPP and undertaken between 8th and 13th June 2002. The mission was carried out with Jean Marie Eschbach (CIRAD-CP agronomist).

Mission schedule

Saturday 8	Flight Douala-Abidjan
Sunday 9	Trip Abidjan-GREL
Monday 10	Meeting with farmers and visit to some rubber farms in Yediyesele
Thursday 11	Meeting with the Rubber Outgrowers and Agent Association executives Participation in a meeting in Takoradi for the launching of CIRAD ATP: "stratégies patrimoniales, épargne et décisions d'investissement dans les cultures pérennes." (heritage strategies, savings and decisions to invest in tree crops"
Wednesday 12	Meeting with farmers and visit to some rubber farms in Ewoku
Thursday 13	Meeting/debriefing with Mr de Rostolan, Mr Owusu, Mr Aikins and Mr Eschbach. Trip GREL-Abidjan and flight to Douala.

Main persons met

Patrick Berny-Tarente	GREL Managing Director
Edouard de Rostolan	Applied Research Manager - ROU
Emmanuel Akwasi Owusu	Rubber Outgrower Unit (ROU) Manager
A.A Aikins	Agricultural Technical Office Manager - ROU
Christian Ayisi Larbi	Field Manager - ROU
Nana Asaa-Kofi III	Chairman of ROAA
Isaac Appiah	Treasurer of ROAA

Acknowledgements

We should like to thank:

- Mr Berny-Tarente, Mr and Mrs de Rostolan for their welcome and hospitality
- Mr de Rostolan, Mr Owusu, Mr Aikins and Mr Larbi for their support during the field work and the time spent providing useful information
- Mr Eschbach for interesting discussions.

2 - Context and objectives of the mission

GREL was founded at the end of the 1960s and is now the main rubber company in Ghana. It is located in the western region of the country.

In 1995, the government of Ghana decided to launch a rubber outgrower development project and obtained support from AFD (Agence Française de Développement) and IDA funds from the World Bank to finance it. GREL was the technical operator of the programme. Outgrowers received agricultural credit through the Agricultural Development Bank.
1,200 ha of rubber were planted for some 400 farmers during the first phase of the project (1995-99) and 3,050 ha of old plantations were rehabilitated. In 1999, the second phase of the project was launched. It is due to plant some 2,800 ha of rubber farms for 500 new outgrowers over a period of five years, focusing on the same areas that were already developed during the first phase of the project. So far, 1,350 ha have been planted.

With the second phase of the project, a programme of applied research started. The objective is to improve the output of rubber outgrowers through technical recommendations adapted to the agro-climatic and socio-economic conditions of the country. It is to be implemented over five years. Current activities are especially concerned with agronomy. Since 1999, mainly on-farm trials concerning 41 farms (and 10 trials on rubber technology at a GREL processing factory) have been carried out.

In support of the applied research programme, this mission was intended to identify the key socio-economic issues to be addressed and launch a study on rubber outgrowers. The overall objective is to acquire a clearer understanding of the constraints and opportunities of rubber outgrowers involved in the project. A survey is to be conducted. It should provide some useful information for implementing development projects and guiding research in the future. The results expected from the mission were therefore:

1. a questionnaire, which will have to be tested by GREL on a few farmers and reviewed before moving on to a larger scale
2. a programme for implementation of the socio-economic survey.

3 - Present situation: outgrower opportunities and constraints

3.1 – A real enthusiasm for rubber

The first phase of the rubber outgrower plantations project was successfully implemented. It created a real interest among outgrowers. The demand from farmers now exceeds the offer from the project and the Rubber Outgrowers Unit (R.O.U) has to turn down some applicants.
Discussions with farmers have confirmed the persistence of strong motivation among outgrowers for rubber farming. The main reasons mentioned are:

- rubber appears as an alternative crop to coconut, which has long been cultivated in the area; but since the end of the 1980's, coconut has been severely attacked by Cape Saint Paul disease
- rubber is a long-term investment compared to the other perennial crops existing in the area. Oil palm is difficult to harvest after 15 to 18 years, whereas rubber can be tapped for at least 25-30 years. Coconut is not considered by the farmers as a sustainable crop because they believe that the risk of disease still exists even for the new hybrids

(tolerant of Cape Saint Paul disease) now being used for the Coconut Sector Development Project (CSDP).
This characteristic of rubber is particularly attractive for the youngest farmers (numerous in the project), who see in this crop a way to significantly improve their standard of living.

- the proximity of GREL is also a factor conducive to the development of rubber plantations, since rubber is seen by farmers to be a sustainable industry. Some outgrowers are nevertheless still worried about the risk that they may not be able to sell their production once the rubber trees are mature, as was the case between 1977 and 1992.

Women are also interested in rubber; so far, they account for 15% of the rubber outgrowers. In phase II of the project, this percentage is due to increase to 20%. Some are not married, so it is important for them to invest for the future, especially if they have children. Others are married but they want to join the project to acquire a plantation and contribute to meeting the family's basic needs, or to plant rubber on their own family land in order to be able to provide for their children's needs if they are abandoned by their husbands.
It is clear that farmers, men as well as women, are really concerned about the future.

If outgrowers are now interested in rubber, it is because they are also aware of the importance of not relying on a unique commercial crop. Rubber is mostly a form of crop diversification at the moment. Outgrowers also grow food crops as well as other perennial crops. The farmers do not abandon the previous cash crops, because they want to diversify their sources of income and secure it with crops they can process by themselves (coconut, oil palm), and also consume locally.

3.2 - The non-productive period of a rubber plantation: a critical period for outgrowers

Rubber therefore has to find a place in the existing diversified farming system. A number of farmers also have an off-farm activity. There can be some competition between the different crops and activities for labour use. In this context of diversification, 1 to 1.5 ha seems to be the maximum area which can be maintained during the non-productive period by a family of two persons, without paying for outside labour. This hypothesis needs to be confirmed by the survey. Above this area, the family has to pay for labour to help it to maintain the plantation. This means that, if farmers plant rubber every year, after the second planting family labour is no longer sufficient. Labour seems to be easily available since plenty of workers are looking for a job. But financing this labour can be a constraint for some outgrowers. Many of them complain that repayments from the Agricultural Development Bank arrive too late.

Most of the outgrower rubber plantations established during the first phase of the project are still immature: only three farms were opened for tapping in 2001. The 3,050 ha of old plantations (seedlings), which were rehabilitated for 190 farmers, have almost exhausted their potential. They should be replanted (as per the project report phase 1). So the main concern for outgrowers now is the immature period of their plantation[1].

[1] The managers of the Rubber Outgrowers and Agents Association (R.O.A.A) also pointed out two problems concerning the productive period: rubber pricing and DRC calculation. These two points should be solved before most of the outgrower plantations are opened for tapping.

From our discussions with farmers and from the visit to some of their plantations, it is clear that maintenance of the rubber plantation during the non-productive period is one of the main problems they have had to face up to now. This is an important issue insofar as the success of a plantation mainly rests on upkeep prior to tapping. For outgrowers, it is highly dependent on:

- labour availability and management on a farm level
- investment capacity of the farmers to pay for outside labour.

The Rubber Outgrower Plantations Project supports farmers during this critical period of the plantation. Through credit, it provides outgrowers with all the inputs needed from establishment to tapping, gives technical advice and assists them in technical operations. Some of the work (part of land preparation work, planting, fertiliser applications) is supervised by the project using contract labour charged to the outgrowers.

The tables in annex 1 give the norms for labour requirements and the cost of setting up and maintaining a rubber plantation.
Farmers are partially refunded for the labour they provide: 60% of the total labour for year –1 to 1; 50% for years 2 and 3 and 30% for years 4 to 6.
The norms applied to calculate repayment were determined on the basis of GREL data. This is the information given to outgrowers, but it is likely that it does not correspond to the reality.

4 - The survey: analysis of production costs and outgrower incomes

4.1 - Objectives

During the four days spent in the field, management of the immature period of the rubber plantation was found to be a major constraint for outgrowers. The survey will therefore focus on analysing true conditions during that period. It will study outgrowers' agronomic practices, the cost of setting up and maintaining a rubber farm, in terms of labour, and sources of income during the non-productive period of the plantation. Indeed, it is important to have an idea of the possibility for farmers to contribute towards the cost of maintaining their rubber plantation: What kind of labour do they use? How do they pre-finance labour? What is the role of other crops, including intercropping? What is the role of off-farm activities?

The main objective is to provide some information that may help in finding out how to minimise the cost of setting up and maintaining a rubber plantation under the project.
This socio-economic study will be closely linked to the agronomic survey for at least two reasons:

1. the reduction of production costs must be achieved without any negative impact on agronomic performance
2. if we link agronomic practices to the associated cost, it is possible to identify the best management for the non-productive period of the plantation, from both an agronomic and economic point of view.

As the survey will characterize the outgrowers' present situation, it will also serve as a reference for future studies, which would probably be conducted at the end of the project, once the rubber trees have started to produce. At that time, it will be possible to analyse the impact of the project on outgrower strategies.

4.2 – Drafting of the questionnaire

The main topics addressed in the survey are:

1. farmer identification
2. characterization of available production factors: land, labour and capital
3. characterization of the farming system:
    - non-tree crops
    - rubber
    - other tree crops
    - animal farming
4. family expenses.

The farming system analysis focuses on the management of labour (kind of labour, period of work) and capital (cost, income, period of investment and income) in relation to agronomic practices. It should make it possible to characterize farm work scheduling and cash flow management in order to identify possible bottlenecks.

The characterization only concerns the current year (2002). In particular, for rubber farming, in order to obtain reliable data, it is suggested that farmers only be asked about their practices for the current year, separating the different planting years. By considering all the farmers interviewed, it will be possible to ascertain the agronomic practices and labour needs from planting to tapping.

Family expenses for one year are necessary to estimate the investment capacity of the farmers, which is more important information than income.

The questionnaire was prepared using survey and data analysis software: Sphinx. It is given in annex 2. For people not yet familiar with Sphinx, it should be noted that when a farmer is supposed to give only one answer to a question, the space provided for the answer is round and when he can choose several answers, it is square.

4.3 - Implementation of the survey

The technical officer from the Ministry of Food and Agriculture, who will be involved in the applied research programme of ROPP II for the next four years, will largely contribute to the implementation of the survey. These are individual interviews which will take place in farmers' homes.

Before it is implemented on a large scale, the questionnaire needs to be tested and validated with some farmers (2 to 3). This preliminary survey should be carried out by the applied research manager. He could be accompanied by the technical office, for training at the same time. The final questionnaire will be drafted in accordance with the results from this survey.

A total of 100 outgrowers should be interviewed. We suggest proceeding in two steps.
The first step should focus on the 50 farmers who are currently participating in the on-farm agronomic trials. Some data necessary for the socio-economic study are already available in the agronomic database. Consequently, it will not be necessary to ask farmers some of the questions. However, as they are not really representative of the total population of outgrowers involved in the project, in the second step, the sample will be extended to another 50 or so farmers.

The total outgrower population comprises men and women, young and old people, farmers and non-farmers. All these categories of outgrowers have to be represented in the sample. Indeed, these characteristics can influence the labour and capital available, hence the practices of the farmers and the agronomic performance of their plantation. It is therefore important to consider the sex, age and occupation of the farmer as criteria for the selection of the 50 outgrowers not involved in on-farm trials. These 50 farmers should be selected so as to balance the different categories of outgrowers.

The project has been implemented in four zones (Central, Western, Eastern and Northern) with a maximum distance from the factory by road of 120 km. About 90% of the outgrowers and of the area planted are located in three of these zones: Central (46.36% of the outgrowers), Western (27.53%) and Eastern (16.77%). Therefore, if the Northern zone is not really different from the other zones in socio-economic terms, since the entire area in which the project has been implemented has similar agro-climatic conditions favourable for rubber farming, the survey could be focused on the main three zones. This would limit the cost of the survey and would not affect the reliability of the data collected.

The survey could start at the end of 2002. It would be conducted by the technical officer. Two farmers could be interviewed per day; so if the technical officer works full time on this study, data collection should be finished within three months.

4.4 - Data capture and processing

CIRAD will provide ROPP with the table necessary for data capture (Sphinx or Excel depending on the ROPP preference). The technical officer could be in charge of data capture. This work should be finished within one and a half months (on the basis of 4 questionnaires processed per day).

It should take two months for data processing and interpretation. This period includes two weeks in Montpellier for a Ghanaian to be trained in data interpretation.
Data processing and interpretation could be completed by the technical officer supported by an applied research manager and/or rubber outgrower manager.

Schedule for implementation of the survey

Activity		Period
Preliminary surveys	2 to 3 outgrowers	2 days
Beginning of the survey		End of 2002
Implementation of the survey	100 outgrowers	3 months
Data capture	4 questionnaires/day	1.5 months
Data processing and interpretation		2 months
End of the survey		Mid-2003

4.5 – Results expected from the survey

This survey will provide ROPP with:

1. a socio-economic database (see annex 3). This needs to be linked to the agronomic database for outgrower plantations, which is already established by the R.O.U for each participant in the project.
2. a typology of farmers taking into account both agronomic and socio-economic characteristics. We suggest basing it on three criteria:
    - outgrower agronomic practices, notably concerning management of interrows
    - management of labour (family labour, full-time workers, mutual aid...). For each group of outgrowers, a farm work schedule will be drawn up separating the different kinds of labour employed (see annex 4). This will show the possible labour bottlenecks.
    - income and investment capacity of the family. For each group of farmers, a calendar for cash flow management should be proposed (see annex 5).

5 - Conclusion

There is a need to study the socio-economic issues concerning outgrowers in Ghana, since up to now, the applied research programme has focused on agronomy and technology. Both aspects (agronomy and socio-economics) are complementary and should be analysed together to develop rubber farming and improve outgrower conditions. A better understanding of the farmers' constraints and opportunities is essential for improving the efficiency of rubber development programmes and for reducing the cost of implementing them. This is very important now that international funding agencies (particularly the World Bank) are tending to fund very expensive projects, but are limiting the credits provided to farmers and encouraging them to contribute towards the self-financing of their development.

ANNEXES

Annex 1 : norms for labour requirements and cost of setting up and maintaining a rubber plantation – As per ROPP appraisal report by Didier SIMON / AFD / November 1998

Annex 2 : questionnaire

Annex 3 : socio-economic database

Annex 4 : farm work schedule

Annex 5 : cash flow management

Annex 1:
norms for labour requirements and cost of setting up and maintaining a rubber plantation – As per ROPP appraisal report by Didier SIMON / AFD / November 1998

Table 1: norms of work and rounds per hectare

Work	Man-days per round	Number of rounds						
		Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Row cleaning	2.5	8	12	9	7	5	4	2
Interrow slashing	4	2	3	3	2	2	2	1
Pruning	0.3	3	10	10	10	0	0	0
Creeper cleaning	0.3	0	0	0	0	6	6	0
Fertilisation		0	contract	contract	contract	0	0	0
Census and treatment		ROU	ROU	ROU	ROU	ROU	ROU	ROU
Replacement	2.7	1	1	0	0	0	0	0
Boundary road cleaning	2	0	1	1	1	1	1	1

Table 2: total requirement in man-days and cost of setting up and maintaining one hectare

Work	Man-days per round	Number of rounds	Total man-days	Cost for the farmer Cedis	Rate of refunding %	Amount refunded Cedis
YEAR - 1						
Under-brushing	Lump sum			250000	60	150000
Felling	Lump sum			800000	60	480000
Burning (1st and 2nd)	Lump sum			60000	60	36000
Piling (1st and 2nd)	Lump sum			150000	60	90000
Removal of wood (row clearing)	Lump sum			250000	60	150000
S/T YEAR – 1				1510000	60	906000
YEAR 0						
Lining and pegging			6.5	65000	60	39000
Holing			6.8	68000	60	40800
Planting			Contract			
Cover crop			0.5	5000	60	3000
Row cleaning	2.5	8	20	200000	60	120000
Interrow slashing	4	2	8	80000	60	48000
Pruning	0.3	3	0.9	9000	60	5400
Census			ROU			
Replacement	2.7	1	2.7	27000	60	16200
S/T YEAR 0			45.4	454000		272400

Table 2 :

Work	Man-days per round	Number of rounds	Total man-days	Cost for the farmer Cedis	Rate of refunding Cedis	Amount refunded Cedis
YEAR 1						
Row cleaning	2.5	12	30	300000	60	180000
Interrow slashing	4	3	12	120000	60	72000
Pruning	0.3	10	3	30000	60	18000
Boundary road cleaning	2	1	2	20000	60	12000
Fertilisation			Contract			
Census and treatment			ROU			
Replacement	2.7	1	2.7	27000	60	16200
S/T TOTAL YEAR 1			49.7	497000		298200
YEAR 2						
Row cleaning	2.5	9	22.5	225000	50	112500
Interrow slashing	4	3	12	120000	50	60000
Pruning	0.3	10	3	30000	50	15000
Boundary road cleaning	2	1	2	20000	50	10000
Fertilisation			Contract			
Census and treatment			ROU			
S/T TOTAL YEAR 2			39.5	395000		197500
YEAR 3						
Row cleaning	2.5	7	17.5	175000	50	87500
Interrow slashing	4	2	8	80000	50	40000
Pruning	0.3	10	3	30000	50	15000
Boundary road cleaning	2	1	2	20000	50	10000
Fertilisation			Contract			
Census and treatment			ROU			
S/T TOTAL YEAR 3			30.5	305000		152500
YEAR 4						
Row cleaning	2.5	5	12.5	125000	30	37500

Interrow slashing	4	2	8	80000	30	24000
Boundary road cleaning	2	1	2	20000	30	6000
Creeper cleaning	0.3	6	1.8	18000	30	5400
Census and treatment			ROU			
S/T TOTAL YEAR 4			24.3	243000		72900
YEAR 5						
Row cleaning	2.5	4	10	100000	30	30000
Interrow slashing	4	2	8	80000	30	24000
Boundary road cleaning	2	1	2	20000	30	6000
Creeper cleaning	0.3	6	1.8	18000	30	5400
Census and treatment			ROU			
S/T TOTAL YEAR 5			21.8	218000		65400
YEAR 6						
Row cleaning	2.5	2	5	50000	30	15000
Interrow slashing	4	1	4	40000	30	12000
Boundary road cleaning	2	1	2	20000	30	6000
Census and treatment			ROU			
S/T TOTAL YEAR 6			11	110000		33000
TOTAL YEAR -1 to 6			222.2	3 732 000		1 997 900

Note: in 2001, the cost of one man-day was 10,000 Cedis
As of January 2002: 1 Euro = 7,000 Cedis.

Annex 2: Questionnaire

PRODUCTION COSTS AND INCOME DURING THE NON-PRODUCTIVE PERIOD OF RUBBER PLANTATIONS

1. Date of the interview

___/___/_____

2. Name of the interviewer

_____

3. Name of the zone

_____

4. Name of the district

_____

5. Name of the village

_____

FARMER IDENTIFICATION

6. Name of the farm owner

_____

7. Sex of the farm owner

○ 1. male ○ 2. female

8. Civil situation of the farm owner

○ 1. single ○ 2. married ○ 3. divorced ○ 4. widow

9. Number of wives

_____

10. Age of the farm owner

_____

11. Level of education of the farm owner

○ 1. no school ○ 2. primary school ○ 3. secondary school
○ 4. high school ○ 5. more than high school

12. Ethnic group of the farm owner

_____

13. Origin of the farm owner

○ 1. native ○ 2. non-native

14. Place of residence of the farm owner

○ 1. permanent ○ 2. non-permanent ○ 3. non-resident

15. Social functions of the farm owner

○ 1. chief ○ 2. elder, opinion leader ○ 3. other

16. If 'other', specify :

17. Previous occupation

18. Current occupation of the farm owner

19. Composition of the family

Relationship with farm ownerr	Age	UTH 10 to 15 years : 16 to 59 : > 60 years :	Annual number of weeks available to work on farm	Activity off farm (if school, level)
TOTAL				

20. Who will inherit the farm?

○ 1. oldest son ○ 2. other son ○ 3. oldest daughter ○ 4. other daughter
○ 5. brother ○ 6. sister ○ 7. wife ○ 8. nephew
○ 9. niece ○ 10. other

21. If 'other', specify :

22. Kind of house

☐ 1. wooden house ☐ 2. mud house ☐ 3. concrete house ☐ 4. bamboo roof
☐ 5. sheet metal roof

23. Equipment of the house

☐ 1. electricity ☐ 2. radio ☐ 3. television
☐ 4. refrigerator ☐ 5. modern sitting room ☐ 4. None

24. Means of transport

☐ 1. bicycle ☐ 2. motor bike ☐ 3. car ☐ 4. minibus ☐ 5. truck ☐ 6. None

PRODUCTION FACTORS

LAND

25. Area of land owned by the farm owner (including annual crops, perennial crops, fallow, non-cultivated lands)

_____

26. Cultivated lands (ha)

_____

27. Are these lands sufficient for your current needs?

○ 1. yes ○ 2. no ○ 3. no idea

28. If land is not sufficient, why (what does the farmer need land for)?

LABOUR

29. How much family labour?

30. How many full-time workers?

31. Salary of full-time workers (cedis/month)

32. Do you employ seasonal workers?

○ 1. yes ○ 2. no

33. Do you employ sharecroppers?

○ 1. yes ○ 2. no

34. What for?

35. Area in sharecropping

36. Sharecropping production costs (per ha)

37. Income from sharecropping (per ha)

38. Do you use mutual aid?

○ 1. yes ○ 2. no

39. What is the cost for one day of mutual aid?

40. Do you sometimes have difficulties employing labour?

○ 1. yes ○ 2. no

41. Periods when the demand for labour exceeds availability (which month)?

42. How do you cope with a workforce shortage?

CAPITAL

43. Off-farm income of the farm owner and the members of the family (including money received from family, tontines...)

Source of income	Number of working days per month	Working period	Payment (per day of month)	Annual income

44. What is the main source of income for the family ?

○ 1. food crops ○ 2. perennial crops ○ 3. off-farm activity ○ 4. other

45. If 'other', specify :

46. What are the opportunities for obtaining a loan?

☐ 1. no opportunity ☐ 2. village group ☐ 3. bank ☐ 4. private loan
☐ 5. family loan ☐ 6. other

47. If 'other', specify :

48. Did you contract a credit in 2002 (other than the loan from the rubber project)?

○ 1. yes ○ 2. no

49. What was this credit for?

○ 1. coconut development project ○ 2. small farm material
○ 3. inputs ○ 4. labour wages
○ 5. improvement of standard of living ○ 6. family event
○ 7. other

50. If 'other', specify :

51. Kind of savings

☐ 1. no savings ☐ 2. home ☐ 3. women's group ☐ 4. bank
☐ 5. other

52. If 'other', specify :

53. Amount of money saved in 2002?

FOOD CROPS NOT INTERCROPPED WITH RUBBER

54. Non-tree crop management sequences for the year (crops intercropped or not with perennial crops except rubber)

Plot number	Area (ha)	Crop	Planting (month)	Fertilisation (periods)	Weeding (periods)	Start of harvest (month)	Number of months' harvest
		- - -					
		- - -					
		- - -					
		- - -					

55. Management of the non-tree crops

Crop	Manager	Function of the crop	Who spends the money if sold	What is the use of the money

56. Farm work schedule: man-days and separate family, mutual aid and paid labour

Crop	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.

57. Production costs for one hectare

Crop	Cost of inputs	Cost of paid labour	Other costs (process, transport…)	Total cost	Periods of investment

58. Production and income for one hectare

Crop	Production	Unit price	Total of sale	Period of sale

59. Do you keep in stock some food crop production?

○ 1. yes ○ 2. no

60. What kind of production do you stock?

61. Why do you keep some production in stock (strategy of the farmers concerning the stocks in relation with capital management)

RUBBER

62. Why did you join the project?

63. Problems while setting up the rubber plantations

64. Problems during the non-productive period

65. Would you like to extend your rubber plantation?

○ 1. yes ○ 2. no ○ 3. no idea

66. If yes, what are the constraints?

67. If not, why not?

2002 PLANTING (YEAR 0)

68. Area

_____

69. Previous vegetation

○ 1. secondary forest ○ 2. annual crop ○ 3. cassava ○ 4. banana
○ 5. perennial crop ○ 6. other

70. If 'other', specify :

71. How many man-days for underbrushing?

_____

72. Cost of man-day for underbrushing

_____

73. How many man-days for felling?

_____

74. Cost of man-day for felling

_____

75. How many man-days for wood cutting?

_____

76. Cost of man-day for wood cutting

_____

77. How many man-days for burning?

_____

78. Cost of man-day for burning

_____

79. How many man-days for piling?

_____

80. Cost of man-day for piling

_____

81. How many man-days for removal of wood?

_____

82. Cost of man-day for removal of wood

_____

83. How many man-days for lining?

_____

84. Cost of man-day for lining

_____

85. How many man-days for hole digging?

_____

86. Cost of man-day for hole digging

_____

87. How many man-days for one row cleaning round?

_____

88. How many rounds for row cleaning?

_____

89. Cost of man-day for row cleaning

_____

90. How many man-days for one interrow slashing round?

_____

91. How many rounds for interrow slashing?

_____

92. Cost of man day for interrow slashing

_____

93. How many man-days for one pruning round?

_____

94. How many rounds for pruning?

_____

95. Cost of man-day for pruning

_____

96. How many man-days for one replacement round?

_____

97. How many rounds for replacement?

_____

98. Cost of man-day for replacement

_____

99. Do you plant any cover crops?

○ 1. yes ○ 2. no

100. How many man-days for establishment of a cover crop?

_____

101. Cost of man-day for establishment of a cover crop

_____

102. Do you intercrop the interrow yourself?

○ 1. yes ○ 2. no

103. If 'no', do you rent out the interrow?

○ 1. yes ○ 2. no

104. How much do you rent it out for?

_____

105. Area intercropped

_____

%

106. Kind of intercropping

☐ 1. peanut ☐ 2. corn ☐ 3. cassava ☐ 4. sweet potato ☐ 5. chilli

☐ 6. pineapple ☐ 7. other

You may tick several boxes (maximum of 6).

107. If 'other', specify :

108. How many man-days for intercropping?

_____

109. Cost of man-day for intercropping

_____

110. Cost of inputs for intercropping

_____

111. Production intercropping 1

_____

112. Production intercropping 2

_____

113. Total income from intercropping

_____

2001 PLANTING (YEAR 1)

114. Area

_____

115. How many man-days for one row cleaning round?

_____

116. How many rounds for row cleaning?

_____

117. Cost of man-day for row cleaning

_____

118. How many man-days for one interrow slashing round?

_____

119. How many rounds for interrow slashing?

_____

120. Cost of man-day for interrow slashing

_____

121. How many man-days for one pruning round?

_____

122. How many rounds for pruning?

_____

123. Cost of man-day for pruning

_____

124. How many man-days for one replacement round?

_____

125. How many rounds for replacement?

_____

126. Cost of man-day for replacement

_____

127. How many man-days for one boundary road cleaning round?

_____

128. How many rounds for boundary road cleaning?

_____

129. Cost of man-day for boundary road cleaning

_____

130. Do you plant any cover crops?

○ 1. yes ○ 2. no

131. How many man-days for cover crop establishment?

_____

132. Cost of man-day for cover crop establishment

_____

133. Do you intercrop the interrow yourself?

○ 1. yes ○ 2. no

134. If 'no', do you rent out the interrow?

○ 1. yes ○ 2. no

135. How much do you rent it out for?

_____

136. Area intercropped

_____

%

137. Kind of intercropping

☐ 1. peanut ☐ 2. corn ☐ 3. cassava ☐ 4. sweet potato ☐ 5. chilli

☐ 6. pineapple ☐ 7. other

You may tick several boxes (maximum of 6).

138. If 'other', specify :

139. How many man-days for intercropping?

_____

140. Cost of man-day for intercropping

_____

141. Cost of inputs for intercropping

_____

142. Production intercropping 1

_____

143. Production intercropping 2

_____

144. Total income from intercropping

_____

2000 PLANTING (YEAR 2)

145. Area

_____

146. How many man-days for one row cleaning round?

_____

147. How many rounds for row cleaning?

_____

148. Cost of man-day for row cleaning

_____

149. How many man-days for one interrow slashing round?

_____

150. How many rounds for interrow slashing?

_____

151. Cost of man-day for interrow slashing

_____

152. How many man-days for one pruning round?

_____

153. How many rounds for pruning?

_____

154. Cost of man-day for pruning

_____

155. How many man-days for one boundary road cleaning round?

_____

156. How many rounds for boundary road cleaning?

_____

157. Cost of man-day for boundary road cleaning

_____

158. Do you plant any cover crops?

○ 1. yes ○ 2. no

159. How many man-days for cover crop establishment?

_____

160. Cost of man-day for cover crop establishment

_____

161. Do you intercrop the interrow yourself?

○ 1. yes ○ 2. no

162. If 'no', do you rent out the interrow?

○ 1. yes ○ 2. no

163. How much do you rent it out for?

_____

164. Area intercropped

_____

%

165. Kind of intercropping

☐ 1. peanut ☐ 2. corn ☐ 3. cassava ☐ 4. sweet potato ☐ 5. chilli

☐ 6. pineapple ☐ 7. other

You may tick several boxes (maximum of 6).

166. If 'other', specify :

167. How many man-days for intercropping?

_____

168. Cost of man-day for intercropping

_____

169. Cost of inputs for intercropping

_____

170. Production intercropping 1

_____

171. Production intercropping 2

_____

172. Total income from intercropping

_____

1999 PLANTING (YEAR 3)

173. Area

_____

174. How many man-days for one row cleaning round?

_____

175. How many rounds for row cleaning?

_____

176. Cost of man-day for row cleaning

_____

177. How many man-days for one interrow slashing round?

_____

178. How many rounds for interrow slashing?

_____

179. Cost of man-day for interrow slashing

_____

180. How many man-days for one pruning round?

_____

181. How many rounds for pruning?

_____

182. Cost of man-day for pruning

_____

183. How many man-days for one boundary road cleaning round?

_____

184. How many rounds for boundary road cleaning?

_____

185. Cost of man-day for boundary road cleaning

_____

186. Do you plant any cover crops?

○ 1. yes ○ 2. no

187. How many man-days for cover crop establishment?

_____

188. Cost of man-day for cover crop establishment

_____

189. Do you intercrop the interrow yourself?

○ 1. yes ○ 2. no

190. If 'no', do you rent out the interrow?

○ 1. yes ○ 2. no

191. How much do you rent it out for?

_____

192. Area intercropped

_____

%

193. Kind of intercropping

☐ 1. peanut ☐ 2. corn ☐ 3. cassava ☐ 4. sweet potato ☐ 5. chilli

☐ 6. pineapple ☐ 7. other

You may tick several boxes (maximum of 6).

194. If 'other', specify :

195. How many man-days for intercropping?

_____

196. Cost of man-day for intercropping

_____

197. Cost of inputs for intercropping

_____

198. Production intercropping 1

_____

199. Production intercropping 2

_____

200. Total income from intercropping

_____

1998 PLANTING (YEAR 4)

201. Area

_____

202. How many man-days for one row cleaning round?

_____

203. How many rounds for row cleaning?

_____

204. Cost of man-day for row cleaning

_____

205. How many man-days for one interrow slashing round?

_____

206. How many rounds for interrow slashing?

_____

207. Cost of man-day for interrow slashing

_____

208. How many man-days for one boundary road cleaning round?

_____

209. How many rounds for boundary road cleaning?

_____

210. Cost of man-day for boundary road cleaning

_____

211. How many man-days for one creeper cleaning round?

_____

212. How many rounds for creeper cleaning?

_____

213. Cost of man-day for creeper cleaning

_____

214. Do you intercrop the interrow yourself?

○ 1. yes ○ 2. no

215. If 'no', do you rent out the interrow?

○ 1. yes ○ 2. no

216. How much do you rent it out for?

_____

217. Area intercropped

_____

%

218. Kind of intercropping

☐ 1. peanut ☐ 2. corn ☐ 3. cassava ☐ 4. sweet potato ☐ 5. chilli

☐ 6. pineapple ☐ 7. other

You may tick several boxes (maximum of 6).

219. If 'other', specify :

220. How many man-days for intercropping?

_____

221. Cost of man-day for intercropping

_____

222. Cost of inputs for intercropping

_____

223. Production intercropping 1

_____

224. Production intercropping 2

_____

225. Total income from intercropping

_____

1997 PLANTING AND EARLIER (YEAR 5 AND BEYOND)

226. Area

_____

227. How many man-days for one row cleaning round?

_____

228. How many rounds for row cleaning?

_____

229. Cost of man-day for row cleaning

_____

230. How many man-days for one interrow slashing round?

_____

231. How many rounds for interrow slashing?

_____

232. Cost of man-day for interrow slashing

_____

233. How many man-days for one boundary road cleaning round?

_____

234. How many rounds for boundary road cleaning?

_____

235. Cost of man-day for boundary road cleaning

_____

236. How many man-days for one creeper cleaning round?

_____

237. How many rounds for creeper cleaning?

_____

238. Cost of man-day for creeper cleaning

_____

239. Do you intercrop the interrow yourself?

○ 1. yes ○ 2. no

240. If 'no', do you rent out the interrow?

○ 1. yes ○ 2. no

241. How much do you rent it out for?

_____

242. Area intercropped

_____

%

243. Kind of intercropping

☐ 1. peanut ☐ 2. corn ☐ 3. cassava ☐ 4. sweet potato ☐ 5. chilli
☐ 6. pineapple ☐ 7. other

You may tick several boxes (maximum of 6).

244. If 'other', specify:

245. How many man-days for intercropping?

_____

246. Cost of man-day for intercropping

_____

247. Cost of inputs for intercropping

_____

248. Production intercropping 1

_____

249. Production intercropping 2

_____

250. Total income from intercropping

_____

251. Farm work schedule for rubber (man-days, separate family labour, paid labour and mutual aid)

Work done	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.

252. How do you prefinance setting up and maintaining the rubber farm?

253. How do you use the money from cash refund?

OTHER TREE CROPS

254. Farm work schedule for tree crops (man-days) separate family labour, paid labour and mutual aid

Work done	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.

255. Production costs for tree crops in 2002

Crop	Planting date	Cost of inputs	Cost of labour	Other costs (processing, transport…)	Period of investment

256. Production and income for tree crops in 2002

Crop	Date production began	Annual production	Unit price	Total sale	Period of sale

257. Do you keep any tree crop production in stock?

○ 1. yes ○ 2. no

258. What kind of production do you stock?

259. Why do you keep some production in stock (strategy of the farmers concerning stocks in relation to capital management)

ANIMAL FARMING

260. Investment in animals (purchase) for 2002

261. Production costs for animal farming

262. Total income from animal farming in 2002

263. Farm work schedule for animal farming

FAMILY EXPENSES

264. Family expenses

Expenses	Annual cost
Food	
Cooking oil	
Hygiene	
Health	
Clothing	
Other	
TOTAL BASIC NEEDS	
School	
Illness	
Family event	
Feast	
Other	
TOTAL EXCEPTIONAL EXPENSES	
Farm equipment	
Tree crop	
House equipment	
Other investment	
TOTAL INVESTMENT	

Annex 3: Socio-economic database

"Identification" file

	Farmer 1	Farmer 2	Farmer 3
date			
interviewer			
zone			
district			
village			
sex			
civil situation			
wives			
age			
education			
ethnic group			
native			
residence			
social functions			
previous occupation			
present occupation			
family			
schooling children			
next of kin			
house			
equipment			
transport			
basic needs, expenses			
exceptional expenses			
investment			

"Production factors" file

	Farmer 1	Farmer 2	Farmer 3
total land			
cultivated lands			
lands sufficient			
reason land insufficient			
family labour			
full-time workers			
salary full-time workers			
seasonal workers			
sharecropper			
sharecropping			
area sharecropping			
cost sharecropping			
income sharecropping			
mutual aid			
cost mutual aid			
difficulties in employing labour			
periods of shortage			
facing labour shortage			
number of persons working off farm			
total off-farm income			
main source of income			
opportunities for loan			
credit in 2002			
use of credit			
savings			
amount of savings			

"Annual" file

	Farmer 1	Farmer 2	Farmer 3
non-tree crop area 1			
crop or intercrop 1			
non-tree crop area 2			
crop or intercrop 2			
non-tree crop area 3			
crop or intercrop 3			
manager crop 1			
function crop 1			
use of income crop 1			
manager crop 2			
function crop 2			
use of income crop 2			
manager crop 3			
function crop 3			
use of income crop 3			
total man-days crop 1			
total man-days crop 2			
total man-days crop 3			
total production costs crop 1			
total production costs crop 2			
total production costs crop 3			
production/ha crop 1			
production/ha crop 2			
production/ha crop 3			
gross income crop 1			
gross income crop 2			
gross income crop 3			
stock food crop production			
food crops stocked			
FC stocking strategy			

"Rubber" file

	Farmer 1	Farmer 2	Farmer 3
reasons for joining the project			
problems in setting up			
problems for non-productive period			
extension rubber plantation			
constraints to extension			
reason for no extension			
2002 planting = year 0			
area			
previous vegetation			
man-days for underbrushing			
cost of man-day for underbrushing			
man-days for felling			
cost of man-day for felling			
man-days for wood cutting			
cost of man-day for wood cutting			
man-days for burning			
cost of man-day for burning			
man-days for piling			
cost of man-day for piling			
man-days for removal of wood			
cost of man-day for removal of wood			
man-days for lining			
cost of man-day for lining			
man-days for hole digging			
cost of man-day for hole digging			
man-days for one row cleaning round			
rounds for row cleaning			
cost of man-day for row cleaning			
man-days for one interrow slashing round			
rounds for interrow slashing			
cost of man-day for interrow slashing			
man-days for one pruning round			
rounds for pruning			
cost of man-day for pruning			
man-days for one replacement round			
rounds for replacement			
cost of man-day for replacement			
cover crop			
man-day for cover crop			
cost of man-day for cover crop			
intercropping			
rental of interrow			
income from rent			
area intercropped			
kind of intercropping			
man-days for intercropping			
cost of man-day intercropping			
cost of inputs for intercropping			

production intercropping 1			
production intercropping 2			
total income from intercropping			
2001 planting = year 1			
area			
man-days for one row cleaning round			
rounds for row cleaning			
cost of man-day for row cleaning			
man-days for one interrow slashing round			
rounds for interrow slashing			
cost of man-day for interrow slashing			
man-days for one pruning round			
rounds for pruning			
cost of man-day for pruning			
man-days for one replacement round			
rounds for replacement			
cost of man-day for replacement			
man-days for one boundary road cleaning round			
rounds for boundary road cleaning			
cost of man-day for boundary road cleaning			
cover crop			
man-day for cover crop			
cost of man-day for cover crop			
intercropping			
rental of interrow			
income from rent			
area intercropped			
kind of intercropping			
man-days for intercropping			
cost of man-day for intercropping			
cost of inputs for intercropping			
production intercropping 1			
production intercropping 2			
total income from intercropping			
2000 planting = year 2			
area			
man-days for one row cleaning round			
rounds for row cleaning			
cost of man-day for row cleaning			
man-days for one interrow slashing round			
rounds for interrow slashing			
cost of man-day for interrow slashing			
man-days for one pruning round			
rounds for pruning			
cost of man-day for pruning			
man-days for one boundary road cleaning round			
rounds for boundary road cleaning			
cost of man-day for boundary road cleaning			
cover crop			
man-day for cover crop			

cost of man-day for cover crop			
intercropping			
rental of interrow			
income from rent			
area intercropped			
kind of intercropping			
man-days for intercropping			
cost of man-day for intercropping			
cost of inputs for intercropping			
production intercropping 1			
production intercropping 2			
total income from intercropping			
1999 planting = year 3			
area			
man-days for one row cleaning round			
rounds for row cleaning			
cost of man-day for row cleaning			
man-days for one interrow slashing round			
rounds for interrow slashing			
cost of man-day for interrow slashing			
man-days for one pruning round			
rounds for pruning			
cost of man-day for pruning			
man-days for one boundary road cleaning round			
rounds for boundary road cleaning			
cost of man-day for boundary road cleaning			
cover crop			
man-day for cover crop			
cost of man-day for cover crop			
intercropping			
rental of interrow			
income from rent			
area intercropped			
kind of intercropping			
man-days for intercropping			
cost of man-day for intercropping			
cost of inputs for intercropping			
production intercropping 1			
production intercropping 2			
total income from intercropping			
1998 planting = year 4			
area			
man-days for one row cleaning round			
rounds for row cleaning			
cost of man-day for row cleaning			
man-days for one interrow slashing round			
rounds for interrow slashing			
cost of man-day for interrow slashing			
man-days for one boundary road cleaning round			
rounds for boundary road cleaning			

cost of man-day for boundary road cleaning			
man-day for one creeper cleaning round			
rounds for creeper cleaning			
cost of man-day for creeper cleaning			
intercropping			
rental of interrow			
income from rent			
area intercropped			
kind of intercropping			
man-days for intercropping			
cost of man-day for intercropping			
cost of inputs for intercropping			
production intercropping 1			
production intercropping 2			
total income from intercropping			
1997 planting and earlier = year 5 and beyond			
area			
man-days for one row cleaning round			
rounds for row cleaning			
cost of man-day for row cleaning			
man-days for one interrow slashing round			
rounds for interrow slashing			
cost of man-day for interrow slashing			
man-days for one boundary road cleaning round			
rounds for boundary road cleaning			
cost of man-day for boundary road cleaning			
man-days for one creeper cleaning round			
rounds for creeper cleaning			
cost of man-day for creeper cleaning			
intercropping			
rental of interrow			
income from rent			
area intercropped			
kind of intercropping			
man-days for intercropping			
cost of man-day for intercropping			
cost of inputs for intercropping			
production intercropping 1			
production intercropping 2			
total income from intercropping			
prefinancing of maintenance			
use of cash refund			

"Perennial and animals" file

	Farmer 1	Farmer 2	Farmer 3
total man-days for tree crop 1			
total man-days for tree crop 2			
total man-days for tree crop 3			
total production costs for tree crop 1			
total production costs for tree crop 2			
total production costs for tree crop 3			
production/ha tree crop 1			
production/ha tree crop 2			
production/ha tree crop 3			
gross income tree crop 1			
gross income tree crop 2			
gross income tree crop 3			
stock tree crops production			
kind of production stocked			
tree crop stocking strategy			
total investment in animals			
total production costs for animal 1			
total production costs for animal 2			
total man-days for animal farming			
animal 1 gross income			
animal 2 gross income			

Note concerning the socio-economic database

Calculation of production costs

It is important to distinguish between paid labour and family labour:
- paid labour, the cost is defined as:
  - number of man-days × cost of one man-day for seasonal workers
  - monthly salary for full-time workers
- family labour, the cost is: number of man-days × opportunity cost of labour.

The opportunity cost of labour is defined as the maximum income that the farmer could derive from an alternative activity. In the case of rubber outgrowers in Ghana, if there is no opportunity to earn a salary from industry..., we can consider that the opportunity cost of labour corresponds to the cost of one man-day.

Calculation of gross income from food crops

For food crops intercropped or not with rubber, it is important to take into account the share of production consumed by the family.

Man-days, production costs and income must be indicated in the database for one hectare.

Annex 4: farm work schedule

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Family labour												
Food crops												
Rubber												
Coconut												
Cocoa												
Other tree crop												
Off-farm activity												
Full-time workers												
Food crops												
Rubber												
Coconut												
Cocoa												
Other tree crop												
Seasonal workers												
Food crops												
Rubber												
Coconut												
Cocoa												
Other tree crop												
Mutual aid												
Food crops												
Rubber												
Coconut												
Cocoa												
Other tree crop												

Annex 5: Cash flow management

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Food crops												
Investment												
Income												
Rubber												
Investment												
Income												
Coconut												
Investment												
Income												
Cocoa												
Investment												
Income												
Other tree crop												
Investment												
Income												