CHAPTER TWO

Research Methodology and Profile of Samples

Research Methodology

Research Design: A Survey Research

Considering the objectives of the study and types of questions that this study seeks to answer, the research design most suitable for its purposes is survey research. The first objective of the study involves two discrete time periods: cash crop price boom and price slump. This requires a longitudinal analysis. The study combines 'cross-sectional survey' and the use of 'cross-sectional survey to approximate longitudinal survey'.[1]

Taking Advantage of "Natural Experiment"

This survey takes advantage of an event that occurred naturally, which could not have been arranged for. This study is a natural experiment in the sense that it takes advantage of a price boom and a succeeding price slump. Recently, the prices of pepper and cocoa–two of the smallholders' favorite and important cash crops–have remained low from 1990 to 1993. The price slump in this study refers to the 1990-1993 period. The pepper and cocoa price boom that preceded this slump occurred from 1985 to 1989. On the other hand, palm oil has been enjoying a relatively stable and reasonably good price for the same periods. Kerlinger (1964: 378-394) refers to this type of research design as *ex post facto* research. However, according to Campbell and Stanley (1966: 70-71), this study falls into what they labeled as *ex post facto* experiment. More recently, Babbie (1992: 255-257) refers to this type of research design as natural experiment.

Sampling Procedures

Survey Population

An important task in survey research for the investigator is to define the population(s) carefully and completely before collecting a sample (Scheaffer, Mendenhall and Ott, 1990: 25). The population of interest in this study is the cash crop producers or

[1] Babbie (1990: 56-60) categorizes survey research to three basic designs namely cross-sectional surveys, longitudinal surveys and the use of cross-sectional surveys to approximate longitudinal surveys.

collectively labeled as smallholders in this study. Smallholders in Sarawak can be arbitrarily categorized into two main groups namely (1) independent smallholders and (2) centrally managed smallholders. These two main groups of smallholders provide the survey populations of this study. The distinction between these two types of smallholders is as follows:

Independent Smallholders

A number of cash crops in the state of Sarawak are cultivated predominantly by independent smallholders. Examples of these cash crops are pepper, rubber, coconut and cocoa just to mention but a few. Amongst these cash crops, pepper farming is absolutely the preserve of independent smallholders in the state. By independent smallholders we mean, individual households who operate their small farms, holdings or gardens independently of each other so that the daily management of their holdings is totally in their hands. In this case, the household head has almost complete freedom in his management decisions of his family farm.

Centrally Managed Smallholders

The cultivation of several cash crops principally oil palm, cocoa, coconut and rubber may also be centrally managed. Under this mode of management, participants contribute some, if not all, of their land to the designated authority or land development agency to develop–usually planted with a single cash crop in a consolidated or contiguous area on a plantation basis. The authority also provides processing and marketing facilities to the participants. The main feature of this mode of management is that the responsible authority or land agency draws laborers of the project from the land owners and other members of the community. The cost of developing the land, excluding administrative costs, will be charged to the participants as loans to be repaid through deductions on the sale of the crop. The participants get their incomes from the scheme from two sources: a fixed daily wage in return for labor provided, and from annual bonus paid out to them based on profit made by the scheme.

In essence by contributing part of their land, the participants become smallholding cash croppers of the scheme. Under this system, the daily management and supervision of the scheme are in the hands of officials of the land agency until it considers the

participants are able to manage their holdings. Therefore, the centrally managed smallholders have little or no say in the daily management of their respective schemes.

Study Population

To minimize environmental and cultural variations, the sample of the study was selected from an area of similar type of environmental conditions and belonging to people of similar origin. On this basis the study was confined to the Iban smallholders from the Sri Aman Division of Sarawak, where the majority of the centrally managed smallholders as well as the independent smallholders are concentrated in the state.

Sarawak's population consists of various ethnic groups: the major ones being Iban, Chinese, Malays, Bidayuh and Melanaus. The Iban is by far the largest indigenous ethnic group in Sarawak. In 1990 the estimated count of the Iban stood at about 493,000 constituting about 29.5% of the total population for the whole state.[2] Their settlements are scattered within the midland and mountainous regions, mostly concentrated in the rural areas of the Sri Aman, Sibu, Bintulu, Miri and Kapit Divisions, but they are also found in other Divisions.

The Ibans are primarily hill paddy farmers, but have adapted their system of shifting cultivation to wet paddy planting in swampy lowlands in a number of districts. Apart from paddy farming, they are also engaged in cultivating rubber, cocoa and pepper smallholdings. The Ibans also take part in the estate or plantation form of land development schemes, that were centrally managed by SLDB in the early 1970s. Today, they are also a few hundred Iban households participating in cocoa and oil palm schemes that are centrally managed by SALCRA.

The longhouse (*rumah panjai*) remains virtually the sole form of dwelling for an Iban village. The longhouse has an average of about 15 households or *bilik* and rarely go beyond 30 *bilik*. The household is the basic unit in Iban society. It is usually numerically small, averaging 5 to 6 members, and genealogically simple, with nuclear or stem families. A household is able to join any longhouse in which there are close kin of either

[2] This figure is obtained from Annual Statistical Bulletin, Sarawak, 1991 compiled by Department of Statistics Malaysia, Sarawak Branch in 1992.

the husband or wife. There is usually a high degree of inter-relatedness within a longhouse.[3]

Sampling Design

In a sample survey study, the medium of inference is the sample, which is a subset of measurements selected from the population. Thus, the objective of a survey research is to make an inference about the population based on the characteristics of the sample–that is, the information contained in the sample (Scheaffer, Mendenhall and Ott, 1990: 1; Babbie, 1990: 65). The procedure for selecting the sample is called the sampling design. Two factors affect the quantity of information contained in the sample and, hence, the precision of our inference-making process (Scheaffer, Mendenhall and Ott, 1990: 55). The first is the size of the sample selected from the population. The second is the amount of variation in the data. This variation can frequently be controlled by the method of selecting the sample or the sampling design.

The sampling design that was most appropriate for the selection of the respondents for this survey study was cluster sampling. According to Scheaffer, Mendenhall and Ott (1990: 224), cluster sampling is an effective design for obtaining a specified amount of information at minimum cost under the following conditions:

1. A good frame listing population elements is either not available or is very costly to obtain, while a frame listing clusters is easily obtained.

2. The cost of obtaining observations increases as the distance separating the elements increases.

Cluster Sampling Procedure

The first task in cluster sampling is to specify appropriate clusters from the selected study population. Once appropriate clusters have been specified, a frame that lists all clusters in the population must be composed. A simple random sample of clusters is then selected from this frame.

[3] For a more detail description of the Ibans see the following classic works: Buma (1987), Freeman (1992), Gomes (1910), Jensen (1974), Sandin (1991), and Sutlive (1992).

To reap the economic advantages of cluster sampling the clusters created should be as heterogeneous (different) as possible within, and one cluster should look very much like another (Scheaffer, Mendenhall and Ott, 1990: 246). In other words, the variation between clusters should be minimized while the variation within a cluster should be maximized. To minimize variation between the clusters the following steps were employed. The first involves the selection of respondents from an area of similar environmental conditions and belonging to people of similar origin. As mentioned above, it was confined to Iban smallholders from the Sri Aman Division of Sarawak where the majority of the centrally managed smallholders and independent smallholders in Sarawak are located. The second step was to reduce the variance due to the different stages of agricultural production; and to achieve this, the investigation further limits itself to studying farms, holdings or schemes that are at the production or matured stage.

To secure a high degree of heterogeneity within each cluster, the clusters included in the study were partitioned into three different cash crops namely oil palm, cocoa and pepper. As noted above, both pepper and cocoa smallholders experienced a price slump from 1990 to 1993. On the other hand, the oil palm smallholders enjoyed a relatively good price for the same period.

Survey Clusters

The three main clusters selected for the study consist of (1) independent pepper smallholders, (2) centrally managed cocoa smallholders and (3) centrally managed oil palm smallholders. These clusters were created by combining the survey populations picked for this study, that is, independent and centrally managed smallholders with the three cash crops of interest namely pepper, cocoa and oil palm. To reiterate, the first two crops suffered a rather prolonged price slump between 1990 and 1993, while palm oil enjoyed relatively better and stable prices during the same period. In this study the control group is the centrally managed oil palm smallholders.

Sampling Frame

This study has three separate frames namely (1) centrally managed cocoa smallholders, (2) centrally managed oil palm smallholders, and (3) Bukit Begunan independent pepper smallholders. Information on the sampling frame for the centrally managed smallholders for both oil palm and cocoa was obtained from SALCRA's

headquarters in Kuching, Sarawak and the site office in the respective schemes (see Appendix 2.2).

As I have indicated earlier, the survey was confined solely to farms or schemes that are at the production or matured stage. This means that the survey automatically excludes oil palm and cocoa schemes that have not reached the production stage. Similarly, oil palm and cocoa schemes whose participants included non-Ibans were excluded. As noted earlier, this strategy was adopted to minimize variations between clusters.

There are nine SALCRA cocoa schemes (CS) in Sarawak. Five of these belong to non-Iban participants. Thus, the final frame for centrally managed cocoa smallholders consists of only four schemes namely Paku-Layar CS, Pantu CS, Bajo Extension CS and Btg. Ai Resettlement CS.

Altogether there are nineteen SALCRA oil palm schemes (OPS) in Sarawak. However, the majority (14) are still immature. Hence, the final frame consists of only five schemes that are currently at the production stage and they are Lemanak OPS, Batu-Kaya OPS, Pakit-Undop OPS, Roban-South OPS and Btg. Ai OPS.

The third or the last cluster for this study is Bukit Begunan independent pepper smallholders (see Map 1.1). The Bukit Begunan cluster consists of or covers several longhouse territories or *menoa rumah*[4] namely Rapak, Lachau, Punggu and Ran that extends from the 137 km to the 153 km of the Kuching-Sri Aman trunk road. It also includes the following *menoa rumah*: Kandis, Kubau, Bangkong, Kara, Empalanjau, Bait, Empili, Sungai Besai, Selanjan and Enchiap, all located around the 15 km long Lachau-Sungai Besai feeder road (see Map 2.5). Lachau bazaar, a small but busy trading center for the Begunan area is about 142 km from Kuching, less than two hours away. This bazaar serves 50 odd neighboring Iban longhouses and the small Chinese communities of Lachau. It is also a favorite landing place for commuters traveling along the Kuching-Sri

[4] The *menoa rumah* covers a large area including the longhouse(s) proper, the old longhouse-sites and fruit groves (*tembawai*), the farms and gardens, fallow land, *pulau* (copse of trees left uncleared in a farm or between farms), cemeteries, the water (all the rivers or streams running through the territory), and the surrounding forest that is used for hunting and collecting wild products.

Aman road and beyond, and for visitors or customers from the Kalimantan side of Indonesia.

The Bukit Begunan area was selected to represent the independent smallholders for three good reasons. First, because of its proximity to the other clusters of the study, and thus saves traveling time and cost. Proximity also means that it shares considerable environmental and cultural similarities with the two other clusters–a factor required for creating of good clusters. Second the Iban from this area has a long history of pepper planting, extending as early as the 1950s. Finally, several longhouses that are situated along the 137 km to 153 km Kuching-Sri Aman main trunk road are involved in the exploitation of common property resources (CPRs) for sale, notably the *Jinggau* (*Ploiarium alterifolium*) wood, for coping with the pepper price slump.

The sampling frame for Bukit Begunan independent pepper smallholders was furnished by the Department of Agriculture at the Pantu sub-district of Sri Aman Division, Sarawak, Malaysia. There is a total of forty-four longhouses in the Bukit Begunan area (see Appendix 2, Table A 2.3). To maximize the use of survey enumerators and other resources, longhouses with less than 15 households were left out of the frame. Thus, the final frame of Bukit Begunan independent pepper smallholders consisted of 29 longhouses.

Sampling and Sample Size

Limited funds and time constraints restrict this study to sampling one scheme each from the final frame of the centrally managed oil palm smallholders and cocoa smallholders. Thus one representative oil palm scheme and one cocoa scheme were randomly selected from each cluster using the random selection method. Two of the schemes selected were Paku-Layar Cocoa Scheme and Pakit-Undop Oil Palm Scheme (see Map 2.1).

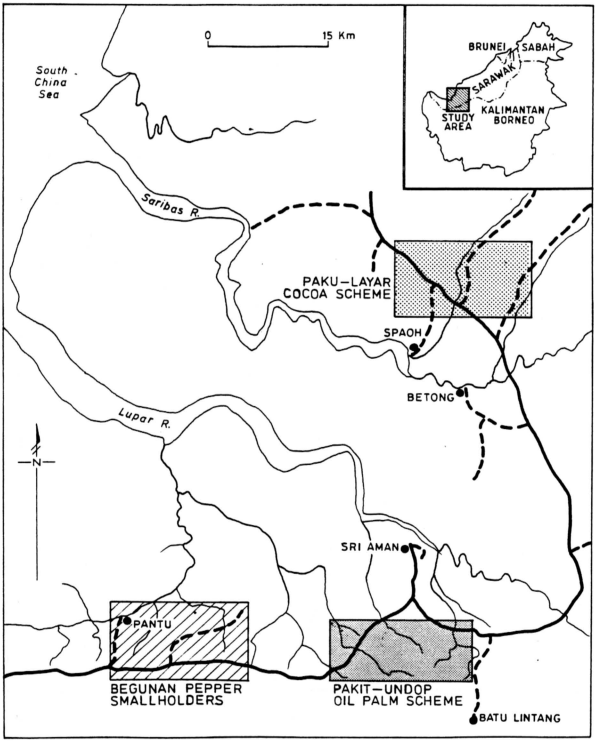
The Paku-Layar Cocoa Scheme is approximately 256 km by road from Kuching, the capital city of Sarawak, a journey that takes up to more than three and one half hours. This scheme is about an hour's drive from the Pakit-Undop OPS, and approximately one hour and thirty minutes from Bukit Begunan area. The scheme also has a 20 km feeder road that runs parallel to the Paku river (see Map 2.2). There are seventeen longhouses

participating in the Paku-Layar CS (for a detail profile of this scheme see Map 2.2 and Table 2.5). Seven of these longhouses have ten or fewer households and are thus not economical to survey, and therefore were left out of the survey. The ten longhouses surveyed were Matop, Serudit, Samu, Tanjung, Plandok, Penom, Bangkit Rambai, Ng. Bong, Engkraji and Plawa (see Map 2.3). Two trading centers that lie within the vicinity of this scheme are Betong and Spaoh.

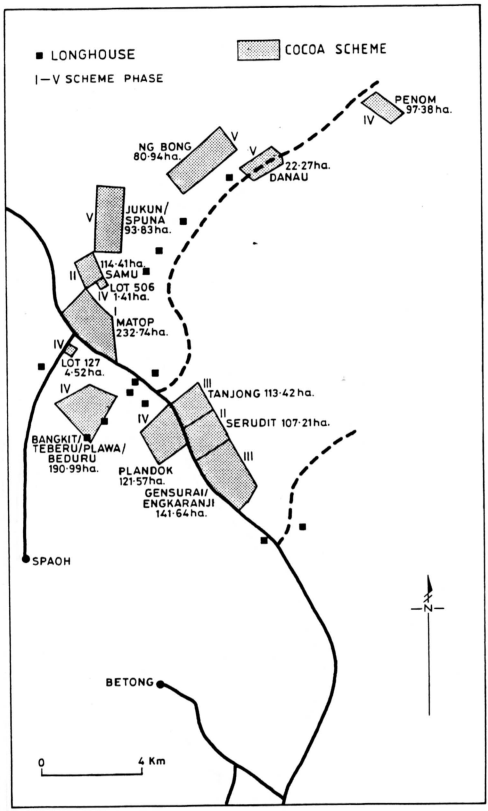
The Pakit-Undop Oil Palm Scheme is about 160 km away from Kuching by road. The journey to the scheme from Kuching may take up to two hours and thirty minutes. The scheme is located very close to Sri Aman town[5] (about 12 km), the administrative and the main trading center of the Sri Aman Division, and it is about one-half hour away from the Bukit Begunan area. This scheme is one of the earliest oil palm schemes developed by SALCRA in Sarawak. The development of the Pakit-Undop OPS was staggered into five phases. The first phase was developed way back in 1982 while the second phase started two years later, that is, in 1984. The third phase was begun in 1985 and the fourth started at about the same time but extended well into 1986. The development of the final phase of the scheme was begun in 1987. The staggered cultivation means that the palms mature or reach the production stage at different times (see Appendix 2, Table A 2.2). To avoid variation due to different stages of production, the survey confines itself to only the first phase of the Pakit-Undop OPS. The first phase of the Pakit-Undop OPS comprises six main blocks namely Pakit, Bayai, Sutong, Entulang, Panggau and Batu Besai. These six blocks belong to the following ten longhouses: R. Briku, R. Ayok, R. Anek, R. Sali, R. Jimi, R. Kendawang, R. Jepin, R. Muyuh, R. Untol and R. Riang (see Map 2.4).[6]

[5] It is previously known as Simanggang. For a brief account of the origins and growth of this town, see Chew (1982).

[6] R is an acronym for *rumah*. A longhouse is usually named after the chief or the *tuai rumah*. For example, the house of *tuai rumah* Briku, is called Rumah Briku, which figuratively means, " the house of Briku" and is normally followed by a name of the place or a longhouse communal land boundary or *menoa*. In our example then it should be Rumah Briku, Pakit. Actually in Pakit there are two longhouses: Rumah Briku and Rumah Ayok.

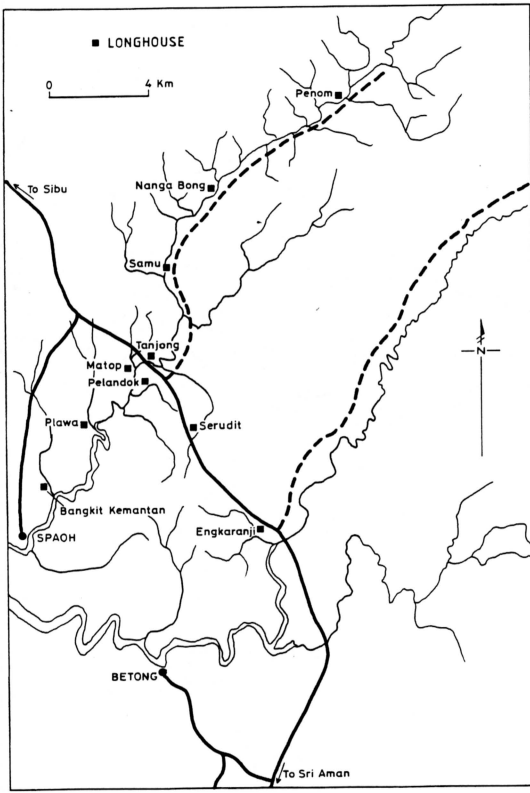


Map 2. 1: A Sketch Map Showing the Location of the Bukit Begunan Area, the Pakit-Undop Oil Palm Scheme and the Paku-Layar Cocoa Scheme, Where the Survey Was Conducted



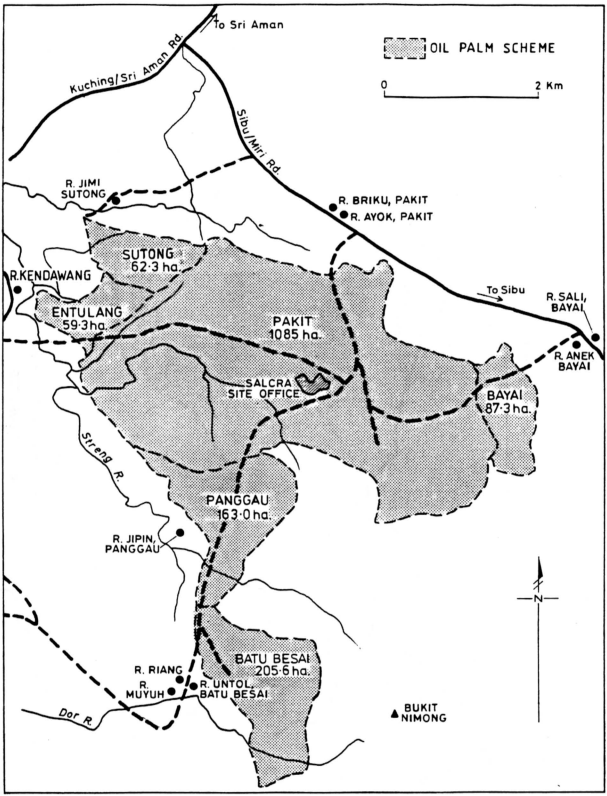
Source: Paku-Layar Cocoa Scheme site office.

Map 2. 2: A Sketch Map of the Paku-Layar Cocoa Scheme Showing the Location and the Perimeter Size of Each Phase of the Scheme



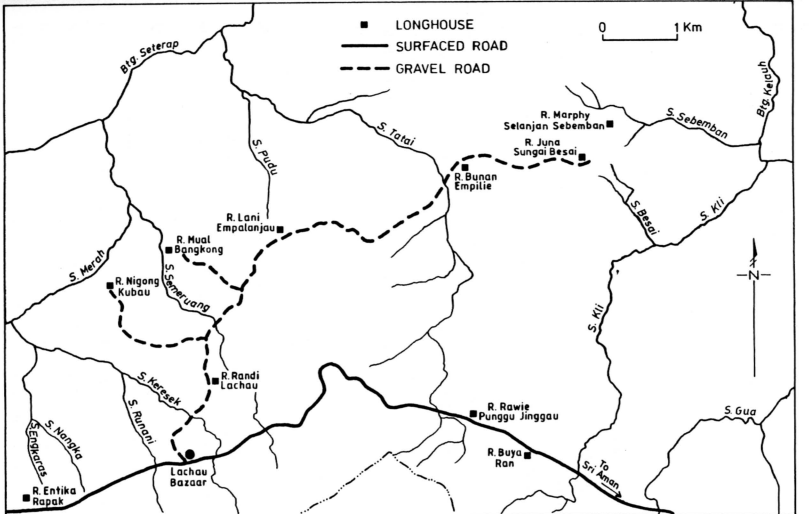
Source: Paku-Layar Cocoa Scheme site office.

Map 2. 3: A Sketch Map of the Paku-Layar Cocoa Scheme Showing the Location of the Longhouses Surveyed



Note: The figure that appears below the name of each communal block indicates the perimeter size in hectare.
Source: Pakit-Undop Oil Palm Scheme site office.

Map 2. 4: A Sketch Map of Phase I of the Pakit-Undop Oil Palm Scheme Showing the Location and the Perimeter Size of the Main Communal Blocks, and the Longhouses Surveyed



Map 2. 5. Sketch Map of Bukit Begunan Area Showing the Location of Longhouses Surveyed

Ten representative longhouses were randomly selected from the Bukit Begunan independent pepper smallholders sampling frame using the random selection method. The longhouses selected were R. Buya, Ran; R. Rawie, Punggu Jinggau; R. Entika, Rapak; R. Randi, Lachau; R. Nigong, Kubau; R. Mual, Bangkong; R. Lani, Empalanjau; R. Bunan, Empili; R. Juna Sungai Besai and R. Marphy, Selanjan Sebemban (see Map 2.5).

Unit of Analysis

One of the objectives of this study is to assess the household coping strategy. Hence, the element under study in this survey or its unit of analysis is the household, referred to as *bilik* in Iban. A *bilik* is, therefore, a living apartment of a longhouse or a home unit consisting of a living room (*bilik besai*), a loft (*sadau*), gallery (*ruai*) and open platform (*tanju*). The apartment is the normal location for cooking, eating, sleeping and other family activities (Jensen, 1974: 27-29; Kedit, 1980: 30; Freeman, 1992: 1-7; Sutlive, 1992: 50-55). A *bilik* is independently owned. Membership is gained in one of four ways: by birth, marriage, adoption or by being incorporated into a new family. Thus, a *bilik* is a corporate group consisting of individuals related to each other by consanguinity, affinity, adoption or incorporation. In economic terms, the *bilik* is an allodial unit, possessing land and property in its own right. Further, it is an independent unit, having its own farm for the immediate family needs.

In short, the striking characteristics of the Iban *bilik* or household are as follows: physically, it constitutes a basic unit of a longhouse structure; economically, it is an allodial group; and sociologically, it is either a simple or extended family. As *bilik* is a corporate group, each member is obligated to his or her family first. His or her primary duties and contributions should be for the general welfare of his or her *bilik*.

Unit of Observation

The element from which information is collected for this survey or its unit of observation is the head of household or *tuai bilik*. The *tuai bilik* assumes the practical leadership of the *bilik* or household affairs and is responsible for farm management. The *tuai bilik* is normally a male although in some cases a female may be in charge. Therefore, the heads of households were the respondents of this survey. The *tuai bilik* was

interviewed to collect information about the household or every member of the household.

The size of respondents interviewed was determined by two limiting factors: financial support and time. Considering these constraints, a total of 506 heads of households from thirty Iban longhouses was interviewed for this survey. Out of this total, 135 were from Paku-Layar CS, 155 for Pakit-Undop OPS and the remaining 216 were from Bukit Begunan independent pepper.

Although the research had planned to interview all heads of households as the units of observation, some heads were not available at the time of interview and, therefore, had to be replaced by a knowledgeable household member. Nonetheless, the majority (82.8%) of the respondents were actually heads of their respective households; 10.7% were wives of the *tuai bilik*, 4.7% (24) were children of the heads of the households and 1.0% (5) were either the brother or sister of the heads of households. The remainder (0.8%) were either parents or grandchildren of the *tuai bilik*.

The mean age for respondents from Bukit Begunan independent pepper smallholders was 46.9 years while that of Pakit-Undop OPS was about the same (47 years). In contrast, the respondents from Paku-Layar CS are significantly older (54.8 years) than respondents from Bukit Begunan and Pakit-Undop OPS (see Table 2.4).

On the average, it took the enumerators about one hour and 15 minutes to complete an interview. According to the enumerators' rating, nearly all the respondents (93.7%) were either "very cooperative" or "cooperative" towards the enumerators during the interviews. Only 6.1% of the respondents were perceived to be "less cooperative" by the enumerators.

Operationalization and Measurement

Independent Variables

The two main independent variables investigated in this study are (a) commodity price, and (b) types of smallholder. In this study the independent variable 'commodity price' has two levels:[7] commodity price boom and commodity price slump. It should be

[7] Levels refer to subdivisions or categories within an independent variable.

pointed that this independent variable is not manipulated by (under the control of) the investigator but is an "assigned" variable.[8] In this case, the investigator has no control over the movement of the prices of the commodities. Instead, the investigator relies on normal or natural occurrence of a price slump or a price boom. This study therefore takes advantage of a price boom and a succeeding price slump as they occur normally in real-life or in the real-world. Recently, the prices of pepper and cocoa–two of the smallholders' favorite and important cash crops have remained low from 1990 to 1993. So the price slump in this study refers to the 1990-1993 period. The pepper and cocoa price boom that preceded this slump occurred from 1985 to 1989. On the other hand, palm oil has been enjoying a relatively stable and reasonably good price for the same periods. Thus the price boom period of 1985-1989, and oil palm smallholders provide the so-called 'control period' and 'control group' respectively.

The second independent variable of this study is 'types of smallholders.' There are two types of smallholders found in Sarawak namely, independent smallholders and centrally managed smallholders. The main reason for including this particular variable is that it gives the overall representation of the different types of smallholders found in the state. Another consideration for doing this is to ascertain whether an intervention such as an *in-situ* land scheme (a centrally managed smallholders) affects the dependent variables to be investigated. Thus, three samples of smallholders were studied. The first sample of the study was the Begunan pepper smallholders (an acronym Begunan PS is used henceforth). This particular group represents the independent smallholders who experienced a prolonged commodity price slump at the time of this survey. The second sample was the Paku-Layar cocoa scheme smallholders (henceforth called the Paku-Layar CS). This group represents the centrally managed smallholders affected by a prolonged commodity price slump. The third sample was the Pakit-Undop oil palm scheme smallholders (henceforth to be referred to as Pakit-Undop OPS), and they represent a group of centrally managed smallholders who were not affected by commodity price slump. Hence, the Pakit-Undop OPS sample provides the so-called 'control group' in this study. The inclusion of the Pakit-Undop OPS helps to uncover intervening or extraneous

[8] Assigned independent variable is one in which the investigator is not free to produce the condition, although one can select the levels to include in the investigation.

variables that affect the dependent variables. Thus, the variable, types of smallholders, is an example of the so-called 'blocking variable'[9] in the study.

Dependent Variables

The response measurements made on the units of observation (heads of households) constitute the dependent variables of the study. The dependent variables of the study, include the following four main strategies: (1) income remedial strategies, (2) subsistence-based strategies, (3) reciprocally based strategies, and (4) production and consumption modifying strategies. These strategies have been discussed in the conceptual model that was introduced in Chapter One. Indicators and the various dimensions of each strategy are briefly given below and their actual measurements are found in the questionnaire (see appendix 2.1).

The possible paths of income remedial strategies that can be employed by households include (1) fall-back cash cropping, (2) engaging in non and/or off-farm employment (NOFE), (3) exploitation of CPRs for sale, and (4) disposal of household assets.

Household subsistence-based strategies are in three areas. The first is the production of sufficient staple food to secure adequate consumption throughout the year. The second group of subsistence-based strategies refer to the exploitation of CPRs. The CPRs coping strategies are (1) gathering activities, (2) fishing, and (3) hunting. The third one is backyard livestock production and home gardening.

The main reciprocally based strategies or paths postulated are (1) reciprocal labor exchange, (2) cash borrowing, (3) sharing of production resources, (4) income-sharing through remittance transfers, and (5) patron-client exchange.

The production and consumption modifying strategies include the various austerity measures employed by the household such as production rationing, consumption rationing, and *ex-ante* and *ex-post* farm diversification strategies.

[9] Initial measures obtained prior to the conduct of the investigation that are used to form homogeneous groups are called blocking variables.

Data and Instrumentation

Data Collection Instrument

The primary data for this study were collected by survey interviews by using a standardized questionnaire. The original questionnaire was developed in English and then translated to the Iban language–the language of the population studied to facilitate the interview. The questionnaire has thirteen main parts, and each part or section was conceptualized and operationalized according to the content of the research objectives (see Appendix 2.1 for details).

The interview survey by a questionnaire was selected because interviewers can provide a guard against confusing questionnaire items. If the respondent clearly misunderstands the intent of a question or indicates that he or she does not understand, the interviewer can clarify matters, thereby obtaining relevant responses. In addition, three tape recorders and note taking were used for parts of the survey interviews, the case study, community profile interview with the longhouse chief or *tuai rumah* and interviews with schemes' managers.

Pretesting Questionnaire

A selected group of experts was asked to evaluate the appropriateness and completeness of the statements. They were asked to react to the questions or statements for clarity, uniformity and content validity. The draft instrument was field tested on a small purposive sample of nine smallholders that were not included in the actual survey populations. The field test of the questionnaire was to provide opportunities to improve the order of questions, general organization of the instrument, question construction, clarity and appropriateness of wordings, understanding and general outlook. From results of the field test, necessary modifications were made and the final questionnaire was printed and reproduced into booklets for ease of handling (see Appendix 2.1). A total of 700 sets of the questionnaire was reproduced.

Data Gathering Procedures

The recruitment of seven enumerators from a group of Iban students of the Universiti Pertanian Malaysia, Bintulu Campus was carried out in April 1993. This group of Iban students had just ended their three-year studies in the Diploma of Agriculture

program. All of them are from Sri Aman Division and are thus not only familiar with the research locations but also the environment and culture of the Iban in the Sri Aman Division. Most important, each of them had previous experience in doing survey interviews with the researcher. Despite this, a training session to familiarize them with the instruments and its contents, and the technique of interviewing and probing was carried out on 24 April 1993.

The field work began on 2 May 1993 and concluded on 15 June 1993.[10] The survey kicked-off from the Paku-Layar Cocoa Scheme, the farthest of all the three clusters selected for the study. The next was the Pakit-Undop Oil Palm Scheme, and finally the Bukit Begunan Area. Upon completion a survey cluster, a two to three-day intermission was observed to freshen ourselves and to restore dynamism for the next round of field-work.

To enhance good response, every longhouse selected for the survey was informed well ahead of our visit through a letter written in Iban language. Each letter was addressed to the *tuai rumah*, or chief of the longhouse, and hand delivered to him either by the research team or with the assistance of the scheme's field supervisor. The letter properly identified the institution that was involved in the study, the reasons and possible uses of the results of the study, and the date and time of the survey. The chief or *tuai rumah* of the longhouse in turn informed all the heads of households (*tuai bilik*) of our visit and arrival.

In conducting the fieldwork, a certain number of days were allotted to cover the interview in each longhouse. A range of two to three days was allocated for each longhouse varying according to the number of households or *bilik* in the longhouse. All the interviews were conducted at night–the time when everybody was at home after a busy day. Each interview usually begins at 8 o'clock or earlier, after every one had taken their dinner and rest for the evening, and it lasted until midnight. Before each interview session was held, the *tuai rumah* would marshal and congregate the head of the households (*tuai bilik*) to his *ruai* (common room or gallery). When every one had turned

[10] May/June was selected as the interview period in order to increase the chances of locating household head or *tuai bilik* returning to the longhouse for the Gawai Dayak celebration. During this period the longhouse population should have been close to its maximum.

up, a briefing was made. One of the enumerators was designated to introduce the research team. After the introduction, the researcher then delivered a brief speech to explain the objective and significance of the research. In addition, confidentiality was assured and no individual was identified with any response. After the speech, a short duration was set aside for question and answer session. Immediately after this session, the process of assigning respondents (the *tuai bilik*) to each enumerator was made with the assistance of the *tuai rumah*. The interviews were conducted either in the *bilik besai* (living room of the respondent) or outside, on the *ruai*. The enumerators, being Iban themselves, did not encounter any communication problem with the respondents during the interview. Parts of the interviews were tape recorded using three portable tape recorders for each outing. All enumerators were given equal chance to use the recorders.

The researcher also accompanied the enumerators on every outing to supervise and assist them to make sure that everything ran smoothly. After each interview session, the following day was set aside for data checking or editing to ensure that there were no mistakes or incomplete answers. Editing work was done at two levels. The first one was between the enumerators themselves. They swapped questionnaires and edited each other's work. The researcher then went through each of the questionnaires in turn.

Data Processing

Data processing was carried out according to the following sequence: (a) coding of data, (b) data entry into computer flat files, (c) data cleaning using exploratory data analysis (EDA), and (d) carry out specific statistical analysis. The data collected from this study was processed using SPSS/PC+ version 5.0 for windows (The Statistical Package for Social Sciences for Personal Computer). It is a powerful microcomputer version of the package designed by SPSS Incorporation to run on IBM personal computers and compatible machines.

Coding of Data

The questionnaire for this study has been adequately designed to allow direct data entry into the computer without using separate code sheets or even edge-coding. To facilitate data entry, numeric codes or value labels were preassigned to all the responses for all the categorical, character or string variables during the construction of the

questionnaire. Coding is not necessary for non-string or non-categorical variables. Before data entry, each response in the questionnaire was assigned a specific variable label or given a SPSS/PC+ Version 5.0 default variable name (Norusis, 1992a: 63, 1992b). Besides that, all variables with open-ended response were given appropriate numeric codes.

Data Entry

The SPSS/PC+ Version 5.0 for windows has a special data editor window for data entry. The data editor window provides a convenient spreadsheet-like facility or method for defining, entering, editing, and displaying the data. The data editor has many similarities to a spreadsheet program, but there are several important distinctions:

1. Each row represents a case or observation.
2. Each column represents a variable or characteristic being measured.
3. Each cell contains a single value of a variable for a case.
4. The data file is rectangular and the dimensions of the data file are determined by the number of cases and variables.

The first step in data entry is defining and naming the variables in columns. Each variable was assigned an appropriate variable label, value labels and missing values. The data entry was done by case or by respondent (see Norusis, 1992a: 61-86 for details).

Exploratory Data Analysis (EDA)

The next important step in data processing is data cleaning or elimination of errors. No matter how carefully the data were keyed in, some error is inevitable. Errors may result from incorrect coding, incorrect entry of code, and so forth. Cleaning of data can be accomplished by running EDA. Therefore, before running specific statistical analysis for the quantitative measurement, exploratory data analysis was carried out for all the variables. Hartwig and Dearing (1979); and Norusis (1992a: 173) recommended that a researcher should examine in detail or learn about a variable or a set of variables before running any specific or confirmatory statistical analysis on any data collected by using EDA. The EDA approach is basically a way of thoroughly examining the data by looking at the data, and often looking at all the data using resistant statistics and visual

representations such as the histogram, box-and-whisker plot, stem-and-leaf display, spread-versus-level plots, and the normal probability plot of the variable. All these are aimed at identifying errors, skewness, outliers, gaps and multiple peaks so that necessary correction, smoothing and reexpression of the data can be made accordingly. The Explore Procedure of the SPSS/PC+ version 5.0 for windows provides a variety of descriptive plots and statistics, including stem-and leaf plots, boxplots, normal probability plots, and spread-versus-level plots. Also available are the Levene test for homogeneity of variance, Shapiro-Wilks' and Lilliefors tests for normality, and so forth (see Norusis, 1992a: 187-192).

Statistical Analysis

Two statistical procedures used for data analysis in this study were (a) descriptive statistics and (b) inferential statistics. Descriptive statistics are merely summaries or descriptions of the data that include statistics such as the mean, median, mode, range, frequency, percentage, standard deviation, kurtosis, skewness and so forth. Inferential statistics allow us to draw conclusions about whether, for example, two or more samples differ, or whether there is an association between two variables that cannot simply be attributed to chance. The use of such statistics allow us to make an inference. Hence they are called inferential statistics.

Two inferential statistics used in this study are (a) test of homogeneity using chi-square and (b) one-way analysis of variance (abbreviated ANOVA) and they are described below. The former is used exclusively in association with categorical data (nominal and ordinal measurements) while the latter is solely used with the analysis of continuous data (ratio and interval measurements).

Test of Homogeneity

In a test of homogeneity, we test if two (or more) populations are homogeneous (similar) in terms of the distribution of a certain characteristic. Thus, a test of homogeneity involves testing the null hypothesis that the proportions of elements with certain characteristics in two or more different populations are the same (Mann, 1992: 566). The alternative hypothesis is that these proportions are not the same. This test is

performed by using the chi-square distribution. The chi-square distribution is sometimes written as χ^2.

When the value of χ^2 has been calculated we usually wish to know whether that value represents something significant. Generally, the higher the value of χ^2 the less frequently it would emerge by chance. Thus if a high χ^2 value is obtained then it is likely that this reflects some real pattern in the dataset rather than mere chance (Frude, 1987: 66). A common criterion for deciding whether there is a pattern in the data involves applying a 1 to 20 rule or 0.05 significance level. If the value obtained for χ^2 is higher than 0.05 than we would expect to emerge by chance alone on 5 percent or fewer occasions then we infer that our value is not the result of chance but is likely to reflect a real effect or pattern (Frude, 1987: 66). Therefore we say that such a result is significant if the observed significance level is small enough (usually less than 0.05). If the observed significance level is less than 0.05 then the null hypothesis that the proportions of elements with certain characteristics in two or more different populations are the same is rejected. In other words, the proportions of elements with certain characteristics among the different populations are unequal or heterogeneous.

One-way Analysis of Variance (ANOVA)

The one-way analysis of variance or, one-way ANOVA, is a statistical procedure used to test the null hypothesis that the means of two or more populations are equal or the same against the alternative hypothesis that the means of the populations are not equal. The alternative hypothesis is that all population means are not equal or the alternative hypothesis states that at least one of the population means is different from the others. One-way ANOVA is thus needed when one variable is used to classify cases into different groups in a single test. One-way ANOVA assumes that each of the groups is an independent random sample from a normal population; and in the population, the variances of the groups are equal.

More precisely, one-way ANOVA examines the variability of the observations within-group mean square and variability between-groups mean square. The statistical test for null hypothesis that all groups have the same mean in the population is based on *F*-ratio, called the *F* statistic, obtained by dividing between-groups mean square with

within-group mean square (Norusis, 1992a: 264). If the null hypothesis is true, the two numbers should be close to each other, that is, if you divide one by the other, the ratio should be close to 1. What one needs to look at next is the observed significance level. The observed significance level is obtained by comparing the calculated F value to the F distribution. If the observed significance level is less than 0.05, the null hypothesis that the groups' means are the same or equal can be rejected.

Bonferroni Multiple Comparisons

A significant F value tells that the population means are probably not all equal. It does not tell you which pairs of the groups appear to have different means. The null hypothesis (that all population means are equal) is rejected if any two means are unequal. To determine which pair of means are significantly different from each other, a special test called Multiple Comparison Procedures is applied. A few multiple comparison procedures are available. One of the simplest is Bonferroni Multiple Comparison Test, and it is being used in this study. In Bonferroni test, an asterisk (*) marks a pair of means that are different at 0.05 level after the Bonferroni correction is made. Differences are marked only once, in the lower diagonal of the table. If the significance level is greater than 0.05, the space is left blank (Norusis, 1992a: 265).

Profile of Samples

Farm Profile

Types of Landholding in SALCRA Schemes

There are two types of landholding in SALCRA's schemes (a) communal block, and (b) individual lot. The type of landholding is determined by how the Native Customary Right (NCR) land is surveyed or identified. For the individual lot, picket survey was carried out initially to identify size, shape, location and owners of the NCR land within the area consented for the SALCRA's schemes. Once the picket survey was completed, a detailed survey of the individual lots was done. These individual lots are eventually issued with land titles. By contrast, in the communal block, no picket survey was carried out initially to identify size, shape, location and owners of the NCR land within the area consented for the SALCRA's schemes, and thus no land titles are issued. In the communal block landholding, the locations and boundaries of longhouse communal

land or *menoa rumah* consented for a scheme project was identified first. This was followed by a perimeter survey of the boundaries of the communal land. Therefore, each communal block is a contiguous piece of NCR land that belongs to one or more Iban longhouses. In other words, the intricate work of surveying the individual lots was evaded and consequently the process of implementation of the scheme's project is expedited.

Size of Holding

Size of Communal Block in the Pakit-Undop Oil Palm Scheme

In the phase I of Pakit-Undop OPS, all the landholdings within the scheme perimeter are communal blocks. This scheme consists of six main communal blocks and each communal block belongs to a group of participants from one or several longhouses (see Map 2.4). Each communal block is therefore a contiguous piece of NCR land that belongs to one or more Iban longhouses. Normally, each communal block is named after the *rumah menoa* and thus, the phase I of Pakit-Undop Oil Palm Scheme have the following communal blocks: Pakit, Bayai, Sutong, Entulang, Panggau, and Batu Besai. For administrative and field management purposes, the communal block may be further divided into smaller administrative blocks depending on the size of the main communal block and the number of longhouses that own it.

Customarily, participants who own the block or blocks are the ones who maintain and harvest them. Their earnings thus depend on the size and output of their communal block. In Phase I of the Pakit-Undop Oil Palm Scheme, an annual dividend given out to the owners if any profit is made from the communal block; shared equally among the owners of the communal block, except for Pakit communal block. This mode of payment is labeled communal rata. Instead of using communal rata, the Pakit communal block uses a share system for the purpose of distributing annual dividend. They are four types of shares. Type A share is paid to Tuai Rumah Briku and Tuai Rumah Ayok at the rate of 1.987% and 32 others participants at the rate of 1.58%. Type B share is paid to a total of 31 participants at the rate of 1.01%. Type C share is paid to 11 participants at the rate of 0.736%, and (4) Type D share is paid at 0.29% to 10 participants. Thus type C and D shareholders received less annual dividend than type A and B shareholders. Consequently the income obtained from the scheme would be much lower.

As evident from Table 2.1, the perimeter size of phase I the Pakit-Undop OPS communal blocks vary extremely from 56.4 to 748.29 hectares. Likewise, the numbers of owners for each communal block range from merely 19 to a high of 86. Therefore, the mean size of land contributed by each participant/owner ranged from a low of 1.71 to 8.7 hectares. Batu Besai communal block has the lowest mean size of land per participant or owner (1.71 hectares), and the highest (8.7 hectares) is Pakit communal block.

Table 2. 1: Profile of Phase I Pakit-Undop Oil Palm Scheme

Locality		No. of Administrative Blocks	No. of Participants/ Owner	Communal Block Size (Hectare)	Mean Size /Owner (Hectare)	Date of Planting
Communal Block	Participating Longhouses					
Pakit	R. Briku & R. Ayok	14	86	748.29	8.70	1982
Bayai	R. Anek & R. Sali	1	25	65.37	2.61	
Sutong	R. Jimi	1	22	56.40	2.56	
Entulang	R. Kendawang	1	19	59.30	2.42	
Panggau	R. Jepin	2	21	96.57	4.60	
Batu Besai	R. Muyoh, R. Untol & R. Riang	3	58	99.39	1.71	
	Total	**22**	**232**	**1,111.97**	**4.79**	

Source of Data: SALCRA's Pakit-Undop Oil Palm Scheme Site Office.
Note: This Table is obtained from Table A 2.2, Appendix 2.2.
The communal block size indicates the actual plantable area in hectares.

Size of Individual Lots in the Paku-Layar Cocoa Scheme

As evident in Table 2.2, the development of Paku-Layar CS was carried out by SALCRA in five consecutive phases and the date of planting for the first phase started in 1984 while the last phase begun in 1987. The total perimeter size of this scheme is 1,326.57 hectares. Each scheme's phase is located within the vicinity of the participating longhouse or longhouses. The shape and the size of scheme perimeter for each phase vary from one to the other and their locations are shown in Map 2.2.

The type of landholding within Paku-Layar CS perimeter differs markedly from the one we have observed in the first phase of Pakit-Undop OPS. All the landholdings in Paku-Layar CS are individual lots while those in the Phase I of the Pakit-Undop OPS are mainly communal blocks. They are individually owned with variable shapes and sizes and are mostly scattered all over–typical of the Ibans NCR land. Thus, the mean size of holding varies considerably from 1.85 hectares (the mean for Plawa) to 6.02 hectares (the mean for Samu).

Table 2. 2: Profile of Paku-Layar Cocoa Scheme

Phase	Location	Size of Scheme (Ha)	No. of Participants	Mean Size of Holding	Date of Planting
One	Matop	232.74	36	6.47	1984
Two	Serudit	107.21	50	2.14	1985
	Samu	114.41	19	6.02	
	Sub-total	**221.62**	**69**	**3.21**	
Three	Tanjong	113.42	25	4.54	1985
	Gensurai*/Engkraji	141.64	36	3.93	
	Sub-total	**255.06**	**61**	**4.18**	
Four	Plandok	121.57	45	2.70	1986
	Penom	97.38	20	4.87	
	Bangkit**	92.08	37	2.49	
	Teberu*	32.54	15	2.17	
	Plawa	49.86	27	1.85	
	Beduru*	16.51	8	2.06	
	Lot 127*	1.41	1	1.41	
	Lot 506*	4.52	1	4.52	
	Sub-total	**415.87**	**154**	**2.70**	
Five	Ng. Bong	80.94	18	4.50	1987
	Jukun*	58.66	16	3.67	
	Spuna*	39.31	10	3.93	
	Danau*	22.27	10	2.22	
	Sub-total	**201.18**	**54**	**3.73**	
	Grand-total	***1,326.47***	***370***	***3.59***	

Source of Data: SALCRA's Paku-Layar Cocoa Scheme Site Office.

Note: * = Longhouses excluded from the survey. ** = Comprises of two longhouses namely: Bangkit Rambai (24 households), and Bangkit Kemantan (29 households). Bangkit Rambai was not selected for the survey.

Individual lot landholdings necessitate a different formula for the payment of dividend on any profit made from the participants' individual lots. The formula the scheme management uses is the pro rata basis of the factor. First, a factor is obtained by multiplying the total sale of dry cocoa bean (in kg) by RM0.30, and the product is then divided by the total planted hectarage. To compute the amount of dividend a participant receives, his or her individual lot size (in hectare) is then multiplied by the factor.

Size of Pepper Holdings in the Begunan Area

The size of pepper holding owned by a household can be presented either with absolute number of pepper vines owned or the actual acreage cultivated by a household. The comparison of size of pepper holdings owned by Begunan independent pepper farmers for boom and slump periods are given in Table 2.3 below.

Table 2. 3: Comparison of Number of Pepper Vines and Farm Size Owned by Independent Pepper Smallholders in the Begunan PS sample for Boom and Slump Periods

Number of Pepper Vines and Size of Farm	At Boom Time (1985-1989) Total No. of Vines	Present Slump (1990-1993) Matured Vines	Immature Vines
Number of Vines Planted (grouped)			
None	21[a]	83	169
	9.7[b]	38.4	78.2
<200	4	7	4
	1.8	3.2	1.8
201-350	81	60	38
	37.5	27.8	17.7
351-500	44	34	4
	20.4	15.8	1.8
500-650	26	9	1
	12.0	4.2	.5
651-800	11	10	-
	5.2	5.1	-
801-950	4	1	-
	1.9	.5	-
951-1,500	21	10	-
	9.8	4.7	-
> 1,500	4	2	-
	2.0	1.0	-
Number of Vines Planted (ungrouped)			
Mean No. of Vines	518.6	450	226.7
Standard Deviation	353.7	366.6	84.6
Minimum No. of Vines	100	100	100
Maximum No. of Vines	2000	3000	600
Farm Size (in Acres)			
Mean Acreage of Pepper farm	.648	.559	.282
Standard Deviation	.442	.444	.106
Minimum Acreage	.13	.13	.13
Maximum Acreage	2.5	3.75	.75

Note: [a] = frequency, [b] = Percentage.

Pepper farming in Begunan is characterized by smallholdings that range from 100 to 2,000 vines. On the average, each household has about 518.6 vines of pepper during the boom period (1985-1989). More than half (57.9%) of Begunan pepper farmers owned between 200 to 500 vines while less than two tenths (17.2%) had between 501 to 800 vines. A small percentage (1.8%) had less than 200 vines. Slightly more than one tenth (13.7%) possessed between 800 to 2,000 vines. Less than a tenth (9.8%) or 21 households did not have any pepper farm during the boom period since they are newly established nuclear families. Overall, the mean acreage of pepper holdings during the boom period was 0.685 acre per household. The minimum acreage was 0.13 while the maximum was 2.5 acres. This finding is consistent with earlier works which also revealed that pepper farms are small (see for example: Chua & Wong, 1981: 5; Cramb & Dian, 1979: 53; Dimbab, Jegak, Peter & Spencer, 1989: 5-6; and Noorzakiah, Alias & Shazali, 1993: 300-302).

During the recent pepper price slump (1990-1993) a significantly high number of households (38.4%) had no matured pepper vines. This suggests that many households had abandoned their farms during the price slump. Among households with matured pepper vines in the Begunan area during the slump, less than half (43.6%) owned between 201 to 500 vines. In comparison, a higher percentage (57.9%) of the households owned between 201 to 500 vines during the boom. Less than one-fifth (15.5%) owned between 501 to 3,000 vines during slump. By contrast, the figure was close to one third (30.9%) for the same class interval (501 to 3,000 vines) during boom.

Judging from the size of farmholdings, it can be concluded that the size of the farms owned by independent pepper producers and managed farmers are small. Therefore, it is very appropriate to describe these producers or farmers as smallholders.

The price slump serves as a disincentive to new planting of pepper. This is portrayed by a large percentage (78.2%) of Begunan farmers who did not have any immature vines during the slump. During the slump, the mean number of vines owned by the pepper smallholders also dropped to 450 vines per household. By comparison, the mean was 518 vines per household during the boom.

Demographic Profile

Age Composition

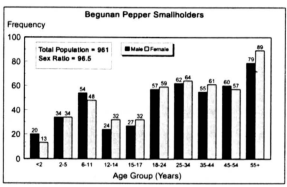
One of the most important characteristics of a population is its age composition. A population with a high proportion in the 17 to 65 category has a large labor force; hence, its dependency burdens are light. On the other hand, a population with a large proportion below 17 years in age and above 65 years, has a heavy dependency ratio, that is, a large number of nonproductive individuals compared to the productive population.

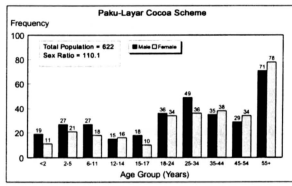
Sex Composition

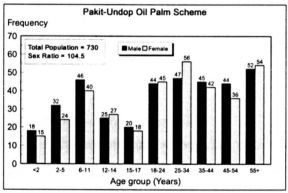
The sex composition of a population is measured by the sex ratio–the number of males per 100 females. Thus, a population with a ratio value of less than 100 indicates that they are fewer males then females in the population, or in other words, there are more females. Between the survey populations of this study, the Paku-Layar Cocoa Scheme has the highest sex ratio (110.1), followed by the Pakit-Undop OPS (104.5), while Begunan pepper smallholders have the lowest (96.5). This means that, of the three survey

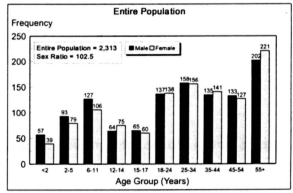
populations, only Begunan has a population with more females. On the whole, the entire survey population has a sex ratio of 102.5. We can gain a clearer picture of the age and sex composition of the survey populations by displaying them graphically as shown in Figure 2.1.

Figure 2. 1: Population, Age Composition and Sex Ratio of Survey Populations, 1992, Based upon Absolute Numbers









Dependency Ratio

The dependency ratio gives the proportion of the household classed as dependents, including those under 17 and those who cannot work because of schooling, illness, or old age. It is measured by the number of nonproductive population per 100 productive population. Dependency ratio is a function of both the rate of population growth and the rate of outmigration of economically active people from the household (in both cases the higher the rate the higher the dependency ratio). Before examining the dependency ratio of the three samples, it is prudent to have a quick glance at the nonproductive and

productive populations of the samples–the two main factors used in the computation of a dependent ratio.

Table 2. 4: Summary of One-way ANOVA of the Survey Populations Mean on Selected Demographic Characteristics

Demographic Characteristics	Survey Populations			Sub-total	One-way ANOVA			
	Begunan PS	Paku-Layar CS	Pakit-Undop OPS		F-Ratio	F-Probability	Levene Test [c] (statistic)	Levene Test (2-tail Sign.)
Household size	4.7 [a]	5.3	5.1	4.9	2.87	0.0578	15.04	0.000
	1.9 [b]	2.9	2.1	2.3				
Nonproductive population								
Currently	1.6	1.6	1.9	1.7	3.06	0.0480	2.05	0.130
	1.3	1.6	1.5	1.5				
1985	1.4	1.6	1.6	1.5	1.37	0.2554	6.29	0.002
	1.3	1.6	1.4	1.4				
Productive population								
Currently	2.9	3.6	3.1	3.2	8.98	0.0001	16.53	0.000
	1.2	1.9	1.4	1.5				
1985	2.9	3.1	2.5	2.8	9.12	0.0001	4.15	0.016
	1.2	1.4	0.982	1.2				
Dependency ratio								
Currently	60.1	45.6	79.8	62.3	11.86	0.0000	14.21	0.000
	56.2	46.6	74.9	61.7				
1985	56.7	55.9	67.1	59.6	1.71	0.1815	1.52	0.220
	57.8	60.6	63.0	60.3				

Note: [a] = Mean, [b] = Standard Deviation. [c] The Levene test is used to test the null hypothesis that the groups come from population with the same variance, which can be obtained with the one-way ANOVA procedure (Norusis, 1992a: 262). If the observed significance level (2-tail sign.) is small (less than 0.05), you can reject the null hypothesis that all variances are equal.

Nonproductive Population

The nonproductive population or inactive member of a household in this study is defined as those under 16 years of age, and includes those who cannot work because of schooling, illness, or old age. In other words, they are dependents, are not part of the family labor force or not gainfully employed. The average number of nonproductive population for the entire sample is 1.7 compared to 1.4 for 1985. Pakit-Undop OPS has the largest number of nonproductive population (1.9) compared to 1.6 for both the Begunan PS and Paku-Layar CS. One-way ANOVA from Table 2.4 shows that there is a significant difference between the means number of nonproductive population among the three samples (F=3.06, P=0.048) but not significantly different for the three samples in 1985 (F=1.37, P=0.2554). Bonferroni Multiple Comparison Test indicates that there is a significant difference between Begunan PS and Pakit-Undop OPS (1.6 versus 1.9).

Productive Population

On the other hand, the productive population or active members of a household excludes those under 17 years of age, and those who cannot work because of schooling, illness, or old age. Therefore, they include those household members who are part of the family labor force or are gainfully employed. The overall average number of the productive population among the sample is 3.2. Begunan PS has the smallest mean number of productive population per household (2.9), the same registered for 1985. The highest is recorded by the Paku-Layar CS (3.6) and the picture was similar in 1985, although a smaller size was observed (3.1). Pakit-Undop OPS has an intermediary size of 3.1. It had a similar position in 1985 but at a much smaller size of 2.5. One-way ANOVA from Table 2.4 indicates that the mean size of productive population between the three samples is significantly different (F=8.89, P=0.0001). Bonferroni Test indicates that there are significant differences between the mean size for (a) the Begunan PS and the Paku-Layar CS, and (b) the Paku-Layar CS and the Pakit-Undop OPS. Similarly, the mean size of productive population in these communities was also significantly different. However, Bonferroni Multiple Comparison Test reveals that significant differences occur between the following mean pairs: (a) Begunan PS and Pakit-Undop, and (b) Pakit-Undop OPS and Paku-Layar CS (see Table 2.4).

The dependency ratio for the entire sample is relatively high, that is, at 62.3 and the figure was at 60.3 for 1985. Pakit-Undop OPS has the largest dependency ratio of 79.8; followed by Begunan PS (60.1) and the smallest being Paku-Layar CS (45.6). The mean dependency ratio for the three samples are found to be significantly different (F = 11.86, P = 0.0000). According to the Bonferroni Test the pairs of means that are different from each other are: (a) the Pakit-Undop OPS and the Paku-Layar CS, and (b) the Begunan PS and the Pakit-Undop OPS. On the contrary, the means dependency ratios for the three samples were not significantly different in 1985 (F = 1.71, P = 0.1815).

Household Size

The number of persons and workers per household is a direct function of the patterns of residence after marriage and of the dominant household types. The overall household size in the sample is 4.9, with Begunan pepper smallholders having the smallest mean household size (4.7). The mean household size in Paku-Layar CS is the

largest (5.3), with Pakit-Undop in the middle (5.1). The result of one-way ANOVA reveals that the means of the household size for the survey populations are insignificantly different from each other (F=2.87, P=0.0578). This means that the mean household size is about equal, that is, about 5 per household (see Table 2.4).

Household Types

It is common for the Iban to establish new households soon after marriage and this accounts for the predominance of the nuclear family among them, and resulting in a relatively small household size.

As expected, the nuclear or conjugal family is the most common (49.8%) compared to the extended or stem family (34.8%) and other household types. Upon closer inspection of the data, the Pakit-Undop OPS has the highest proportion of nuclear family (57.4%) followed by Begunan PS (52.8%). By contrast, the Paku-Layar Cocoa Scheme has a much lower proportion of nuclear or conjugal family (36.3%), but has the highest proportion of extended or stem family (41.5%). This implies that there is a low incidence of new households being established after marriage in this sample. This also accounts for a slightly larger average family size for Paku-Layar CS (5.3) compared to Begunan PS (4.7) and Pakit-Undop OPS (5.1) as observed in Table 2.4 earlier.

Table 2. 5: A Test of Homogeneity for the Distribution of Household Types Among the Survey Populations

Household Types	Survey Populations			Sub-total
	Begunan PS	Paku-Layar CS	Pakit-Undop OPS	
Solitaries	7	8	2	17
	3.2	5.9	1.3	3.4
No family (unmaried)	1	-	-	1
	0.5	-	-	0.2
Household head & grandchildren	5	-	4	9
	2.3	-	2.6	1.8
Husband & Wife (one generation)	12	16	11	39
	5.6	11.9	7.1	7.7
Married couple & grandchildren	1	-	-	1
	0.5	-	-	0.2
Nuclear family (two generations)	114	49	89	252
	52.8	36.3	57.4	49.8
Extended/Stem family (three generations)	72	56	48	176
	33.3	41.5	31.0	34.8
Four generations	4	6	1	11
	1.9	4.4	0.6	2.2
Total	**216**	**135**	**155**	**506**
%	**42.7**	**26.7**	**30.6**	**100.0**

Chi-square = 29.63 DF = 14 Significance = 0.00857

A complete range of household types for the survey populations is depicted in Table 2.5. The Test of Homogeneity results in Table 2.5 shows that the proportion of household types across the three samples studied are significant (chi-square = 29.63, P = 0.00857) or the pattern observed in the data set is real.