DAL DISCUSSION PAPER 87/4

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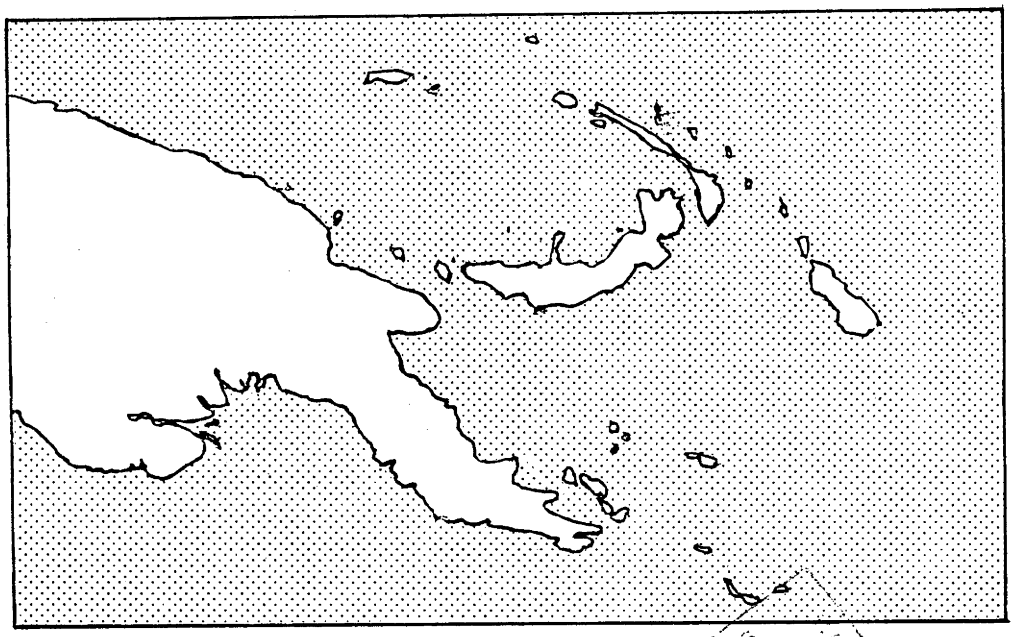

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The opinions expressed in this Discussion Paper are those of the author and do not necessarily reflect the views of D.A.L as a whole.

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1. INTRODUCTION

Reports of food shortages are becoming more frequent in Papua New Guinea. In 1985, the National Disaster Committee in Port Moresby received many requests for assistance in the form of suplementary food.

The increasing awareness of food shortages is probably due largely to improved communications with remote areas, and to the increasing realisation at Provincial and District levels that the National Government has the necessary machinery to provide assistance in cases of need. There is no indication that the overall food supply in Papua New Guinea is deteriorating, although this may be the case locally in areas of high population density.

Food shortages can result from a number of causes, including (1) frost, as experienced in parts of Southern Highlands, Enga, and Western Highlands during 1980 (Wohlt et al. 1982) (ii) drought as seen for example in Rabaraba district during 1983 when the irrigation system for taro production at Boianai failed (see King and Fooks 1985), (iii) flooding, as experienced in Central Province in the early part of 1986 (A.M. Bernabe, pers comm.) and (iv) unknown causes, as observed in the Highlands in 1980 (Wohlt et al. 1982), and in Kaintiba District of Gulf Province in 1984 - 85 (Levett 1984).

Some events cause immediate food shortages, as for example severe flooding where low-lying gardens may be completely washed away. However, other causes such as frost may not affect mature root crops which can still be harvested several weeks or months after the initial stress on the gardening system. There are also less dramatic stresses which are not so easy to identify. For example, increased cloud cover or rainfall may cause significant reductions in yield of sweet potato, yet the cause of the low yield can pass undetected.

In the past, reports of food shortages have rarely been objectively investigated. Early reports are sometimes emotive and often reports reach main centres a considerable time after the food shortage has become acute. Food shortages are commonly in remote areas, and by the time reports reach the Provincial or National capital there is a need for

urgent action. Assessments made at the national level are often cursory, relatively expensive and not very cost-effective in terms of the information gained (Davies 1985, Levett 1984, Gunther 1985a, 1985b).

The resultant response in terms of supplementary food being sent into the area is often a case of "too little too late" or occasionally "too early", especially where frost damage has occurred (Wohlt et al. (1982). Because of the lack of reliable data on areas affected, food distribution tends to be indiscriminate, often with some relatively unaffected villages receiving supplies while other more needy cases are not assisted.

Although district staff, including patrol officers, and Division of Primary Industry, and Division of Health officers are commonly well aware of the situation (Wohlt et al. 1982) they are often frustrated in their efforts to obtain emergency relief services. This is due partly to the fact that they are not adequately consulted and relied upon and partly because their reports are often not written in a convincing or objective manner.

This paper presents a systematic and reasonably objective method for the assessment of reported food shortages. The method is designed as a compromise between the need for a rapid assessment of the situation, and the need for reliable objective data. it can be used directly by Provincial or District staff, however it is suggested that wherever possible an agronomist and a nutritionist should be invited to join the survey team.

The method given here requires a short period of sustained effort in the field to obtain adequate survey data. Depending on the extent of the affected area the survey could involve one or more teams each of 2-3 personnel in the field for 2 weeks or longer. Thus there is a need for rapid mobilisation of resources for the survey once the initial reports have been received. If this is achieved, the data obtained will be far less costly and more useful to planners of relief operations, than a last-minute visit to the area by nutritionists, agronomists, pathologists, politicians, and others.

The following chapters give details of the survey methods, data analysis, and assessment of the options available to avert a food shortage. A list of the necessary equipment for the survey is given in Appendix I. The manpower resources needed are considered in Appendix II.

2 OBJECTIVES

The objectives of the survey and assessment should be clearly stated so that time is not wasted on low priority work.

The most common objectives are as follows:

2.1 Determine whether or not the early reports of a food shortage warrant a thorough investigation (i.e. establish the existance of a food shortage). Once the need for a survey is established then:

2.2 Determine the geographical extent of the affected area;

2.3 Establish the probable duration of the food shortage, i.e. its starting and finishing time;

2.4 Identify possible means of averting the problem; and

2.5 Assess the medium and long term effects of the possible means of overcoming the food shortage.

A useful secondary objective is:

2.6 Identify the cause or causes of the food shortage.

3. OPERATIONAL STRATEGY

Once it has been decided that a food shortage probably exists and there is a need for further detailed information on the situation, then a survey should be carried out as soon as possible, preferably before suplementary food has been sent into the area.

The following strategy focuses directly on the problem area and leads directly to a course of remedial action.

3.1 Identify the area to be surveyed.

3.2 Carry out the survey.

3.3 Analyse the results.

3.4 List the possible options available to avert the food shortage.

3.5 Detail the short and long term implications of implementing each option given in 3.4 above.

3.6 Recommend a suitable course of action.

4. IDENTIFICATION OF THE AFFECTED AREA TO BE SURVEYED

All available information should be used to make an initial choice of the area to be surveyed. The procedure given in the paragraphs below leads to the selection of the survey area.

4.1 Collect and analyse (1) reports from villagers, councellors and elders to patrol officers, and to officers from the divisions of primary industry and health, and (2) verbal reports from school children to community or high school teachers. This may entail a preliminary brief visit to the area.

4.2 Consult written reports by patrol officers and other provincial government officers including aid post orderlies and school teachers together with reports from mission stations.

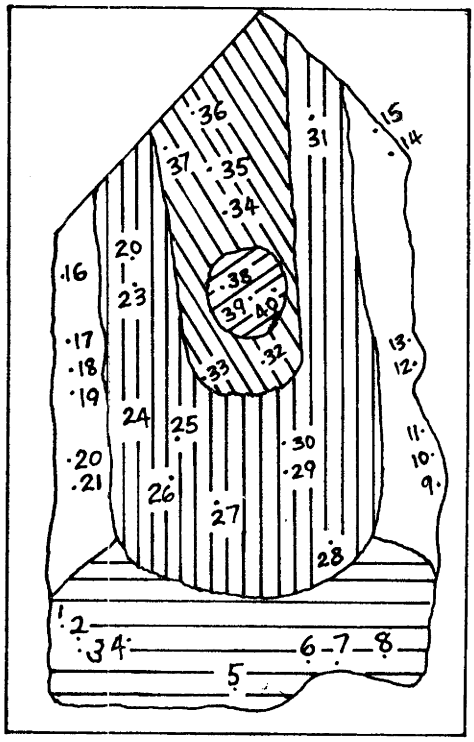
4.3 The area finally selected for survey must include all villages reported to be affected, together with some villages just outside the apparently affected area which are included for comparative purposes and as a check.

5. SELECTION OF SURVEY UNITS

The basic unit for survey is the household. It is necessary to obtain a reasonably representative sample of households from within the survey area. There may need to be compromise between attempts to select a representative sample, and the urgency of the situation.

5.1 Where possible, divide the area into broad agro-ecological zones using factors such as altitude, topography, soil type, major staple crop etc.

5.2 If agro-ecological zones have been identified, select randomly two or more (depending on the size of each zone) villages from each zone (see Fig.1).



ZONE	SELECTED VILLAGES FOR SURVERY
1	3,8
2	12, 16, 20
3	23, 29
4	32, 35
5	38

Figure 1. Schematic diagram of the division of a survey area into five agro-ecological zones, and the selection of survey villages.

If the survey area has not been divided into zones, select villages randomly throughout the area, or use two transects, at right angles to each other, across the area. In total, select at least 10-15 percent of the villages. If the affected area is relatively small, a larger proportion of villages can be surveyed.

5.2.1 Some concessions may be made to ease of access, but remote villages must not be ignored.

5.2.2 Average-sized villages are the most suitable for survey purposes. The sample should not contain too many very small hamlets. Census data is useful during the selection of survey villages.

5.2.3 A typical villages must be avoided. For example villages recovering from tribal fighting, or villages with a tradestore, school or aid post may not be typical of other villages in the area.

5.2.4 Ensure that some of the villages selected for survey are those near the boundary of the survey area, included for checking purposes, and for which there have been no reports of food shortages.

5.3 Selection of villages for the survey can often be carried out from suitable maps of the area. The selection of households for survey within the village usually can only be done at the time of the survey, when the village is visited.

5.4 Within each village select two or more average households (up to a maximum of 5 for a large village). Choose typical, middle-aged parents with an average number of children.

6 DATA COLLECTION

In each village to be surveyed, the required data are collected (1) by interviews and (2) by direct counting and measuring. For data collected by interviews, the use of the "Group Interview" in which a group of people are interviewed together can sometimes help to obtain a balanced picture. Another useful technique is to interview several households separately and then compare the results for consistency.

For each household selected for the survey, data are collected as given in the following sections 6.1 to 6.3.

6.1 Historical data

These data are collected by interview questions as given below.

6.1.1 What is the history of food shortages in the village? What have been their duration and severity?

6.1.2 What have been the main factors causing food shortages in the past?

6.1.3 What have been the traditional methods of coping with food shortages?

6.1.4 What are the recent methods of coping with food shortages?

6.1.5 What are the current proposals, if any, for coping with the present food shortage?

6.1.6 What factors are attributed to causing the present food shortage?

6.1.7 Have there been recent feasts or food exchanges in the village?

6.1.8 Have there been any recent disputes or tribal fighting which may have damaged gardens?

6.2 Social data

These data are collected partly by counting and partly by interview.

6.2.1 Count the number of adults (male and female separately) and the number of children to feed in each household.

6.2.2 Count the number of livestock (mainly pigs usually) which are fed by the household. This information may be obtained by interview but try to actually see the livestock, if possible.

6.2.3 Determine the amount of food needed each day by the household based on either (1) reported daily intake by each member of the household, or (2) standard dietary requirement tables, plus reasonable livestock requirements.

6.2.4 List the sources of food available to the household (eg. own gardens, relatives gardens, tradestore goods, food debts to be repaid etc).

6.2.5 Determine whether or not there are any current committments to feasts or food exchanges.

6.2.6 Record any food debts owed to the household or owed by the household.

6.3 Resources available to the household

The resources recorded in this section are those which relate directly or indirectly to the ability of the household to obtain food.

6.3.1 Labour. Count the number of adults (male and female) who are available to work in the gardens, and record the number of days per week that are allocated to gardening activities.

6.3.2 Gardens. Number the gardens belonging to the household. Ensure that all gardens are counted, including distant ones. Where a garden has several areas of different ages or maturity give each area a separate garden number. For each garden number record the following:

6.3.2.1 Size in square meters (measure the garden size with a tape measure).

6.3.2.2 Age in years and/or months.

6.3.2.3 The main crops planted in the garden, and the approximate area planted to each crop. For crops like sugarcane, yams, and bananas which are intercropped with taro or sweet potato it may be easier to estimate the number of plants in the garden.

6.3.2.4 Yield. Measure yield in mature gardens only. For each of the main crop species, harvest small plots within the garden. A suitable approach is to select randomly 3 or more plots of 4 m^2 in each mature garden. For each plot, harvest the produce and weigh it.

6.3.3 Estimate the availability of "bush food" which can be obtained by fishing, hunting and gathering. A group interview may be useful for this.

6.3.4 Determine whether cash is available to buy store goods, and if so, how much. Consider the cash crops in the area and funds repatriated to the village by absentee wage-earners.

6.3.5 Estimate the area of fallow land available to the household.

6.4 Data Checks

The data in sections 6.1 to 6.3 is collected for each household which is surveyed in the village. When the data are complete, make some quick checks as follows (some preliminary calculations as given in Section 7 may be necessary for this).

6.4.1 If the data suggest that a food shortage exists, ensure that it is due directly to the present food shortage and not to some other atypical cause specifically related to the household surveyed. If the latter is the case, discard the data for

this household and survey another household.

6.4.2 Check that the results for each of the surveyed households are in agreement. This is especially important where only two households in a village are surveyed. If there is disagreement between the results, then select a further household to be surveyed.

7 ANALYSIS OF THE DATA

When all the data have been collected, the results are calculated and analysed to determine whether there is a current food shortage and its severity and likely duration. The possibility of a future food shortage in the subsequent months is also determined.

For each household follow through the steps 7.1 to 7.5.

7.1 Calculate yields from mature gardens for each main crop, for each garden as follows: Crop yield (kg) = $\frac{\text{average yield (kg) 4 m}^2 \text{ plot}}{4} \times \text{garden area (m}^2\text{)}$

7.2 Using the daily household food requirement as determined in Section 6.2.3, project how long the mature gardens, "bush food" (as estimated in Section 6.3.3) and any store goods (from Sections 6.2.4 and 6.3.4) can meet these needs.

$$\text{No. of days for which sufficient food will be available} = \frac{\text{Total yield of all mature gardens + bush food + store goods}}{\text{average daily household food requirement (from section 6.2.3)}^*}$$

In some cases this formula may need to be modified to take into account the fact that crops have a limited storage life both in the ground and in the house.

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* For a more detailed analysis the units used should be calories

7.3 Project future food availability using immature garden areas, and other sources of food. Use the same formulas as for mature gardens, except that the average 4 m^2 plot yields from the mature gardens may need to be adjusted to take account of the following factors:

7.3.1 Early harvest of immature crops, due to shortage of food.

7.3.2 Effects of past stress on the crop production system.

7.3.3 Continuation of the stress.

7.3.4 Seasonality.

7.3.5 Planting material requirements to be taken from the immature gardens.

7.3.6 Other differences between the mature and immature gardens, including soil and site productivity.

7.4 Project future daily household food requirements, taking into account any changes which may occur in the household and changes in livestock numbers.

7.5 Using the same formula as given in section 7.2, calculate the number of days in the future for which sufficient food will be available from immature gardens and other sources.

7.6 Plot on a graph the food requirements and the food availability for the household against time. A hypothetical example in Figure 2.

For the periods of food deficit, determine whether the deficit can be overcome by storage of food from periods of surplus, or by sale of surplus food and purchase of food in times of deficit.

For example, in Figure 2 the slight food deficit shown for August and September 1987 may possibly be overcome by (1) sale of the food surpluses in June and July, (2) use of the cash to buy store goods in August, and (3) early harvesting (in August) of the two new gardens which are due to mature at the end of September. In this case, the only period for which food will be in short supply is from the end of March to the end of the first week in June.

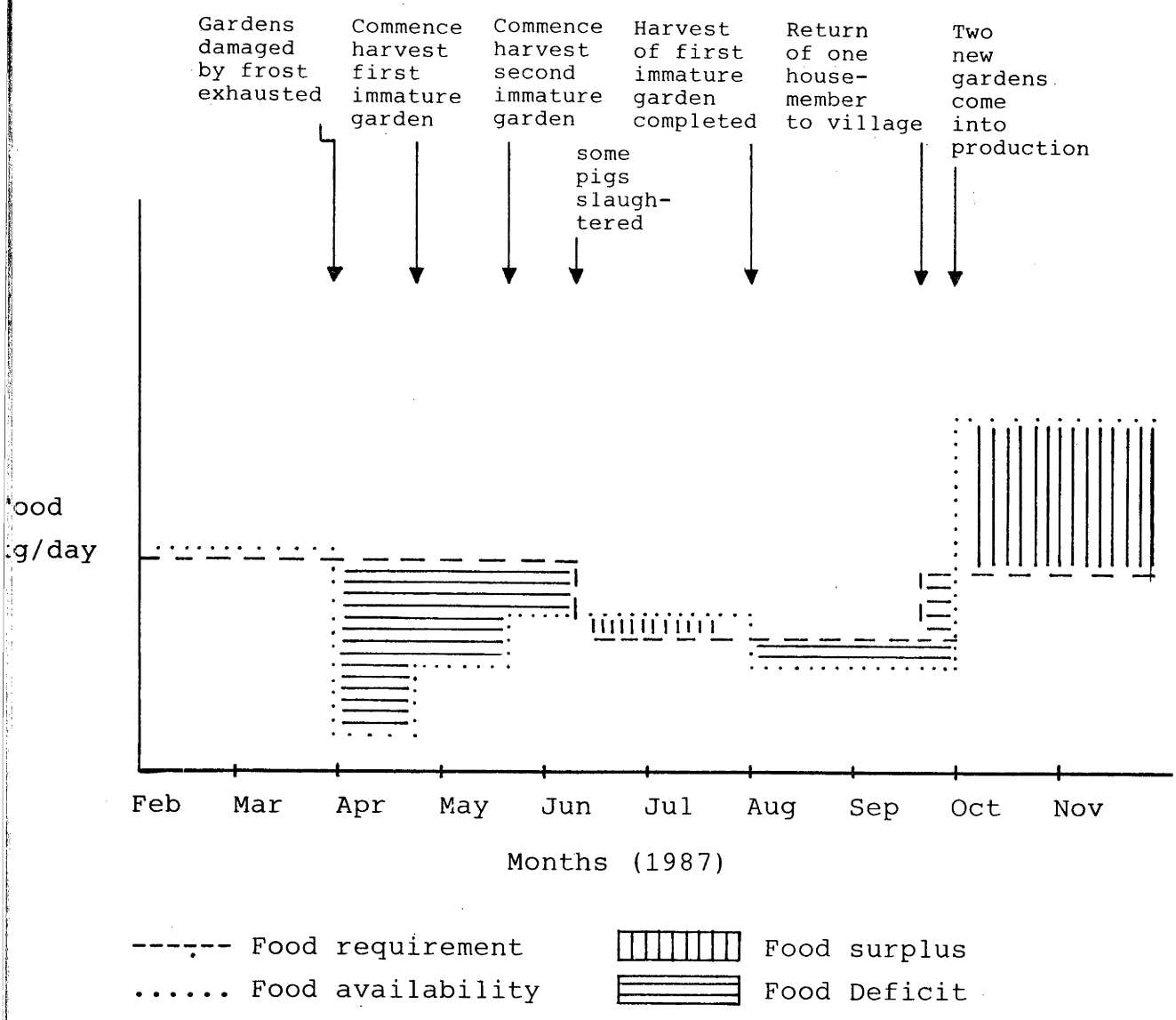

Figure 2. Graph of food requirements and food deficits for the household of Mr and Mrs X in village 14 for the period February to November 1987.

7.7 Complete the graphs and the analysis, as given in sections 7.1 to 7.6, for each household surveyed in the particular village, and compare results between households within each village.

7.8 For each village surveyed, for each month, classify the food shortage as severe (S), moderate (M), slight (S1), or nil (N) and plot these on maps. Examples of this are

given in Table 1. From the maps, attempt to classify areas according to their food deficit for each month.

Village	Feb	Mar	Apr	May	Jun	Jly	Aug	Sept	Oct	Nov
1	N	S1	S	S1	S	M	M	S1	S1	N
3	N	S1	S	M	M	M	S1	N	N	N
6	N	N	S	M	M	S1	N	N	N	N
7	N	N	M	M	S	S	M	M	S1	N
11	N	N	M	M	S	S1	N	N	S1	N
14	N	N	S	M	M	N	N	N	S1	N
23	N	M	S	S1	N	N	N	N	N	N
30	N	M	S	S1	M	S1	S1	N	N	S1

S - severe; M - moderate; S1 - slight; N - nil

Table 1. Summary of food shortages for eight sample villages out of a population of 35 villages in Y District of Z Province, for the period February to November 1987.

8 INTERVENTION OPTIONS WHERE FOOD SHORTAGES OCCUR

In cases where the survey shows that a food shortage exists, it is necessary to examine the options available to avert the situation, and to determine the need for, and extent and timing of, Government intervention. Some of the main options are listed in the following sections.

8.1 Encourage traditional methods of overcoming the problem, as determined in sections 6.1.3 to 6.1.5.

8.2 Where cash is available, ensure that sufficient tradestore goods are available.

8.3 Supply supplementary food for the periods for which there is a food deficit, either free or in return for labour (eg. on road or school building or maintenance). If the food is paid for by work then care should be taken to ensure that the affected households have sufficient time and energy to restore their gardens to a normal level of productivity as soon as possible.

8.4 Where the stress has destroyed planting material, (for example by frost or flood damage), it may be necessary to supply new planting materials. As far as possible,

these should be obtained only from areas which have a similar climate and soil type.

8.5 It may be appropriate to encourage new crops which are resistant to the stress (eg. cassava in drought prone areas, and Irish potatoes within the frost zone), and also new farming methods (eg. for soil conservation, drainage, maintenance of soil fertility etc.).

9 IMPLICATIONS OF IMPLEMENTING VARIOUS INTERVENTION OPTIONS

The first two intervention options, as detailed in Sections 8.1 and 8.2 are basically self-help options. Encouraging and assisting these, allows the affected households to maintain their self-sufficiency, self-respect, and traditional culture (for Section 8.1 option). Where practicable they are highly desirable options.

In some situations it is necessary to implement the Section 8.3 option, i.e. to supply supplementary food during the food shortage. In this case it is important to determine exactly which villages are in need, and the extent and duration of the requirement for additional food. This option has a tendency to create a dependency on Government hand-outs, and to break down traditional methods of averting food shortages. It is sometimes desirable to ensure that payment is made for the food, usually in the form of work, but this can also interrupt the established life-style and delay gardening activities which are necessary to restore normal conditions in the village.

The Section 8.4 option, to supply new planting material, may be necessary to assist with the recovery of normal gardening practices. If the usual crop cultivars in the affected area are known, as far as possible these should be re-introduced. Introduction of new cultivars from other areas could result in lower yields or the loss of some traditions associated with "special" cultivars.

10 CONCLUSIONS AND RECOMMENDATIONS

From the results of the survey and analysis of the intervention options available, a report should be prepared for Provincial and National Governments.

The report should be prepared under the following main sections:

1. Introduction, and review of the reports consulted prior to the survey.

2. Survey methodology. This should be a brief summary and should include the area covered.

3. Results of the survey. As much data as possible should be summarised in tables, graphs and maps.

4. Intervention options available and implications for their implementation.

5. Recommendations. These should include a list of affected villages, the duration of the food deficit in each village, and appropriate means of averting the food shortage.

11. ACKNOWLEDGEMENTS

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APPENDIX I

EQUIPMENT REQUIRED FOR SURVEY

1. Tape measure 50 m
2. Scale: 10 kg spring balance with a precision of 50 g
3. Altimeter*
4. Slopemeter*
5. Compass*
6. Note book, clip board, pens, pencils
7. Sample bags
8. Camping equipment, including food
9. Maps
10. Calculator
11. Vehicle, if there is road access

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* optional, but useful item

APPENDIX II

MAN-POWER REQUIREMENTS FOR SURVEY

This analysis is based on a survey of 10 villages, 2 households per village.

A team of 2 officers can usually survey one household in one and a half days. Thus survey in any one village normally takes 2 officers 3 days allowing for walking, driving or flying time between villages. A team of 2 officers can complete 2 villages per week. Thus to survey 10 villages would require two teams each of two officers in the field for 2 1/2 weeks.

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