AN EVALUATION OF SOCIO-ECONOMIC DEVELOPMENT AT THE VILLAGE LEVEL IN BANDUNG REGENCY, INDONESIA: A METHODOLOGICAL EXPLORATION

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ABSTRACT

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AN EVALUATION OF SOCIO-ECONOMIC DEVELOPMENT AT THE VILLAGE LEVEL IN BANDUNG REGENCY, INDONESIA: A METHODOLOGICAL EXPLORATION

By

Arie Lastario Kusumadewa

At the present Indonesia is trying to increase the gross national product to enhance the quality of life of the people. Since most of the people live in the rural region and the dominant sector is still agriculture, rural community resource development strategies and programs are becoming important. However, there has not been much quantitative research-work done at the village level that deals with variables which influence income. Hence, one of the reasons for this research is to fulfill the need for research results in this field. In addition, it is hoped that this study will contribute many possible ways by which to evaluate plans and programs and also to formulate development strategies.

In order to make this contribution, factor analysis was applied to identify the influencial variables and to screen out the trivial variables in different levels of data sources--household level, village level and district level. Conceptual variables were condensed from the familial variables, community variables and environmental variables. The combined variables that were analyzed multi-level-wise were then used to construct hypothetical statements that explained the condition of a region. Such a multi-level approach in data analysis is a way to conserve the holistic nature of variables in an existing socioeconomic system.

The application of multi-level analysis was demonstrated in the regency of Bandung, West Java, Indonesia. By including variables from different levels for analysis, a "vertical" and "horizontal" profile of the region can be examined. When oblique rotation technique was used in the factor analysis, a higher order factorization for Bandung data aggregated the hypothetical statements from ten to two groups of statements.

For the Bandung Regency the prominent influential hypothetical statement with regards to family income is: <u>demographic composition will influence intensive agri-</u> <u>culture</u>. In other words, this study indicated that in those villages where there was an appropriate balance of children to total population and balance in kinds of professions within the population, the agricultural production intensity will be greater and therefore family income will be higher.

Policy implications that stem from these analyses suggest that these variables should be considered when new rural development program formulated. For instance this study indicates that high priority should be given to road improvement, to stimulate the development of cooperative organizations, and primary and vocational education. Fortunately these variables indicate kinds of programs that can be carried out simultaneously because they can be implemented by different levels of government. However, before embarking on any projects, a careful benefit cost analysis should be made of all alternatives strategies emphasizing these variables.

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INDONESIA: A METHODOLOGICAL

EXPLORATION

By

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ii

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iii

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iv

TABLE OF CONTENTS

| Chapter | | Page |
|---------|--------------------------------------|------|
| I. | INTRODUCTION | 1 |
| | The Framework | 1 |
| | Stage of Development | 3 |
| | The Role of Villages | 11 |
| | The Role of Upper Government | 13 |
| | The Objectives and Hypotheses | 14 |
| | The Degearch | 17 |
| | | 17 |
| II. | METHODOLOGY | 20 |
| | Selection of Study Areas | 20 |
| | Data Collection | 26 |
| | Data Analygig | 20 |
| | | 20 |
| | | 30 |
| III. | THE IDENTIFICATION OF VARIABLES | 38 |
| | Intensive Data, Household Level | 38 |
| | Familial Variables. | 38 |
| | Pattern of Familial Variables | 45 |
| | | |
| | Extensive Data, Village Level | 49 |
| | Community Variables | 49 |
| | Pattern of Community Variables. | 50 |
| | | |
| | Secondary Data, District Level | 59 |
| | Environmental Variables | 60 |
| | Dettern of Devicemental Manishler | 60 |
| | Pattern of Environmental variables . | 00 |
| | Aggregate Data, Multi-Level | 65 |
| | Combined Variables | 66 |
| | | 00 |
| | Pattern of Complined Variables | 00 |
| | Conclusion | 73 |

Chapter

| IV. | THE APPLICATION OF MULTI-LEVEL ANALYSIS | • | • | 75 |
|-----|---|------|----|-------|
| | Description of Bandung Regency | • | • | 75 |
| | Physical Characteristics | • | • | 76 |
| | Demographic Characteristics | • | • | 77 |
| | Technology | • | • | 78 |
| | Economics | • | | 82 |
| | Government Activity | • | • | 83 |
| | The Pattern of Conceptual Variables. | • | • | 90 |
| | Higher Order Factor Analysis | • | • | 94 |
| | Strategic Pattern for Development . | • | • | 102 |
| | Strategic Variables Which Influence | | | |
| | Family Income | • | • | 103 |
| | Food Cost as a Proportion of Consum | ptic | on | |
| | Expenditures | • | • | 112 |
| | Distance to Larger City | • | • | 112 |
| | Membership in Cooperative Organizat | ion | | 113 |
| | Education Cost as a Proportion of C | 0n- | • | |
| | sumption Expenditures | 011 | | 114 |
| | Sumption Expenditures | • | • | 114 |
| | Asphalted Roads | • | • | 114 |
| | Conclusion | • | • | 117 |
| V. | SUMMARY, CONCLUSIONS, POLICY IMPLICATIO | NS. | | |
| •• | AND DECENDED DECOMMENDATIONS | , | | 120 |
| | AND RESEARCH RECOMMENDATIONS | • | • | 120 |
| | Summary | • | • | 120 |
| | Conclusions | • | • | 124 |
| | Policy Implications | • | • | 126 |
| | Additional Degearch Degearmendations | • | • | 120 |
| | Additional Research Recommendations. | • | • | 120 |
| | Extended Analysis Based on Present | | | |
| | Available Data | • | • | 130 |
| | | | | |
| | Household Data | • | • | 130 |
| | Village Data | • | • | 131 |
| | District Data | • | • | 133 |
| | Multi-Level Aggregate Data | • | • | 133 |
| | Cianjur Regency Data | • | • | 133 |
| | Further Pesearch | | | 124 |
| | Pogoargh Moghnigue and Analysis | • | • | 124 |
| | Research rechnique and Analysis . | • | • | T 3 4 |

Page

APPENDICES

Appendix

| A. TI | HE DISTI | RIBUTI | ON OI | F DIS | STRIC | CT TY | PES | IN | REG | EN- | • | |
|-------------|---------------------|------------------|--|----------------|----------------|----------------|--------------|--------------|-------------|-----|---|-------|
| | CIES OF | F WEST | JAVA | Α. | • • | • | • | • | • | • | • | 137 |
| B. TI | HE SCATT | TERING E SAMP | OF I | DISTI ARE I | RICT LOCAT | TYPE CED (| S WH West | IERE : Ja | E TH IVa | IE | | 1 2 0 |
| | Provinc | ce). | • • | • | • • | • | • | • | • | • | • | T 20 |
| C. II | DENTIFIC AND THE | CATION E TYPE | IOFI AND | DISTI NUMI | RICT/ BER C | VILL OF VI | AGE | san Se | IPLE | S | | |
| | SAMPLES | 5: EX | PECTI | ED AI | ND AC | TUAL | • | • | • | • | • | 139 |
| D. 01 | RIGINAL | RESUI | TS OI | F HOU | JSEHC | DLD L | EVEI | J FA | CTC | R | | |
| | ANALYSI | LS. | • • | • | • • | • | • | • | • | • | • | 145 |
| E. 01 | RIGINAL | RESUI | TS OI | r VII | LLAGE | E LEV | EL F | PAC | OR | | | 147 |
| | ANALISI | 15. | • • | • | • • | • | • | • | • | • | • | 74/ |
| F. O | RIGINAL ANALYSI | RESUI | TS OI | F DIS | STRIC | CT LE | VEL | FAC | TOF | 2 | • | 149 |
| | | | | | | | | | | • | - | |
| G. 0 | RIGINAL ANALYSI | RESUL IS . | .TS 01 | • MUI | •••• | PEAET | • FAC | | • | • | • | 150 |
| н. О | RIGINAL | RESUI | TS OI | F FAG | CTORI | ZATI | ON, | MUI | LTI- | - | | |
| | LEVEL A | ANALYS | SIS ON | N BAI | NDUNG | G REG | ENCY | ζ. | • | • | • | 152 |
| I. 0 | RIGINAL | RESUI | TS OI | F SEC | COND | ORDE | RFA | CTC | RI- | • | | |
| | ZATION | , MULI K . | 'I-LE\ •••• | VEL A • | ANALY | | OF E | • | • | • | • | 154 |
| .T A(| ርጥ፣ነልተ. ልኑ | אם דפי | ידאמידי | T V | AT.IIF | 0F 7 | ነባጥል ፣ | . FZ | MTT | .v | | |
| U. A | INCOME | (Y), | AND ! | THE I | RESI | UALS | FRC | | THE | | | |
| | LINEAR rupiah | MULTI | $\begin{array}{rcr} \mathbf{PLE} & \mathbf{I} \\ 0 & = & \mathbf{I} \end{array}$ | REGRI | ESSIC 415.0 | DN AN DD) C | ALYS F BA | SIS ANDU | (in JNG | 1 | | |
| | REGENCY | Y (197 | 3). | • | • • | • • | • | • | • | • | • | 155 |
| SELECTED | BIBLIO | GRAPHY | | • | • • | • • | • | • | • | • | • | 156 |

LIST OF TABLES

| Table | | 1 | Page |
|-------|---|---|------------|
| ŀ. | FAMILIAL VARIABLES OF CIANJUR AND BANDUNG REGENCIES (1973) | • | 4 0 |
| 2. | HOUSEHOLD LEVEL FACTOR ANALYSIS | • | 4 6 |
| 3. | COMMUNITY VARIABLES OF 300 VILLAGES (1973) | • | 51 |
| 4. | VILLAGE LEVEL FACTOR ANALYSIS | • | 57 |
| 5. | ENVIRONMENTAL VARIABLES OF CIANJUR AND BANDUNG REGENCIES (1973) | • | 61 |
| 6. | DISTRICT LEVEL FACTOR ANALYSIS | • | 64 |
| 7. | COMBINED VARIABLES OF CIANJUR AND BANDUNG REGENCIES (1973) | • | 67 |
| 8. | MULTI-LEVEL FACTOR ANALYSIS | • | 72 |
| 9. | THE DISTRIBUTION OF INCOME AND AMOUNT OF EXPENDITURES, BASED ON KIND OF PRO- FESSIONS (BANDUNG REGENCY, 1973) | | 84 |
| 10. | THE AVERAGE CONSUMPTION EXPENDITURES PATTERN (BANDUNG REGENCY, 1973) | • | 84 |
| 11. | THE CONTRIBUTION OF SECTORS TO TOTAL NET REGENCY PRODUCTS (NRP) OF BANDUNG REGENCY (1973). | • | 85 |
| 12. | THE GOVERNMENT EXPENDITURES OF 1973/1974 IN BANDUNG REGENCY | • | 87 |
| 13. | LAND TAXES AND OTHER TAXES, IN PERCENT OF GROSS PRODUCT (BANDUNG REGENCY, 1973) . | • | 89 |
| 14. | PER CAPITA TAXES, IN PERCENT OF INCOME (BANDUNG REGENCY, 1973) | • | 89 |
| 15. | FACTORIZING OF MULTI-LEVEL ANALYSIS OF BANDUNG REGENCY (1973) | • | 92 |

Table

| 16. | FACTOR CORRELATION MATRIX, MULTI-LEVEL ANALYSIS OF BANDUNG REGENCY (1973) | 95 |
|------|--|-----|
| 17. | SECOND ORDER FACTORIZATION OF MULTI-LEVEL ANALYSIS OF BANDUNG REGENCY (1973) | 97 |
| 18. | SECOND ORDER FACTOR CORRELATION MATRIX, MULTI-LEVEL ANALYSIS OF BANDUNG REGENCY (1973) | 99 |
| 19. | THIRD ORDER FACTORIZATION, MULTI-LEVEL ANALYSIS OF BANDUNG REGENCY (1973) | 101 |
| 20. | SOURCES FOR REGRESSION MODEL OF BANDUNG REGENCY (1973) | 105 |
| 21. | SIMPLE CORRELATION MATRIX BETWEEN VARIABLE OF TOTAL FAMILY INCOME AND OTHER VARIABLES (BANDUNG REGENCY, 1973) | 107 |
| 22. | PRODUCT MOMENT CORRELATION MATRIX OF NINE- TEEN VARIABLES, MULTI-LEVEL ANALYSIS OF BANDUNG REGENCY (1973) | 108 |
| 23. | THE REGRESSION COEFFICIENT AND ITS STANDARD ERROR IN MULTI-LEVEL ANALYSIS OF BANDUNG REGENCY (1973) | 110 |
| 24. | THE CONTRIBUTION OF VARIABLES TO THE COEF- FICIENT OF DETERMINATION (R ²) IN MULTI- LEVEL ANALYSIS OF BANDUNG REGENCY (1973) . | 111 |
| 25. | THE CONTRIBUTION OF VARIABLES TO THE COEF- FICIENT OF DETERMINATION (R ²) IN THE POLYNOMIAL EQUATION, MULTI-LEVEL ANALYSIS | |
| 26. | OF BANDUNG REGENCY (1973) | 110 |
| | LEVEL ANALYSIS OF BANDUNG REGENCY (1973) . | 118 |
| A-1. | THE DISTRIBUTION OF DISTRICT TYPES IN REGENCIES OF WEST JAVA | 137 |
| B-1. | THE SCATTERING OF DISTRICT TYPES WHERE THE VILLAGE SAMPLES ARE LOCATED (West Java Province) | 138 |

Table

| C-1. | IDENTIFICATION OF DISTRICT/VILLAGE SAMPLES | 139 |
|-------------|---|-----|
| | | 137 |
| C-2. | THE TYPE AND NUMBER OF VILLAGE SAMPLES: | |
| | EXPECTED AND ACTUAL. | 144 |
| D-1. | ORIGINAL RESULTS OF HOUSEHOLD LEVEL FACTOR | |
| | ANALYSIS | 145 |
| E-1. | ORIGINAL RESULTS OF VILLAGE FACTOR ANALYSIS . | 147 |
| F _1 | OPICINAL DESULTS OF DISTRUCT LEVEL FACTOR | |
| F - T • | ANALYSIS | 149 |
| | | |
| G-1. | ORIGINAL RESULTS OF MULTI-LEVEL FACTOR | 150 |
| | | 130 |
| H-1. | ORIGINAL RESULTS OF FACTORIZATION, MULTI- | 150 |
| | LEVEL ANALYSIS ON BANDUNG REGENCY (1973) | 152 |
| I-1. | ORIGINAL RESULTS OF SECOND ORDER FACTORI- | |
| | ZATION, MULTI-LEVEL ANALYSIS OF BANDUNG | |
| | $REGENCY (1973) \dots \dots \dots \dots \dots \dots \dots$ | 154 |
| J-1. | ACTUAL AND ESTIMATED VALUE OF TOTAL FAMILY | |
| | INCOME (Y), AND THE RESIDUALS FROM THE | |
| | LINEAR MULTIPLE REGRESSION ANALYSIS (in | |
| | ruplan, $\$1.00 = \text{Kp. 415.00}$ OF BANDUNG PECENCY (1973) | 155 |
| | | |

LIST OF FIGURES

| Figure | e | Page |
|--------|--|------------|
| 1. | Map of West Java | 18 |
| 2. | Generalized Land Use in West Java | 22 |
| 3. | The Location of District Samples | 25 |
| 4. | Intensive Observation Region in West Java | 3 9 |
| 5. | The Location of Village Samples in Regency of Bandung | 79 |

CHAPTER I

INTRODUCTION

The Framework

It is quite obvious that a nation or a community is always trying to raise its standard of living, especially since doing so promotes easier communication between countries and helps remove meaningful barricades between them. Most of the time, the steps in that development process within a country are not in harmony, however, which causes the income gaps between people to become wider. The wider the gap, the more potential for conflict, since people want to be treated as equals.

The success of any national development program depends on local natural endowments, human skills, favorable funds, technology and institutions. Moreover, the particular kind of development program cannot merely be the same as that for any other place, but must be fitted to local capabilities. Development projects should not be imitations, but should be designed specifically according to the local situation.

Among the development planners in developing countries, especially in southeast Asia, one question always arises: "Where should the development be started; should we start in the big cities to build industries by which we can create an economic pull, or should we start in the villages to raise the standard of living of most of the people?"

If the first alternative is chosen, too much time will be spent discovering what kind of industry will fit the needs of the people; what kind of raw materials are available: what kind of skilled labor there is. Some disadvantages of this alternative are consequences of urbanization, concentration of settlements, pollution problems and urban unemployment and unrest. On the other hand, it must be recognized that this approach will probably make it possible for some people with special skills or advantageous associations to become relatively wealthy in the short-run. Sometimes these kinds of people in developing countries become the new entrepreneurs in the expanding economy. And, this alternative will also require a great amount of capital which will lead to dependency on other countries.

If the second alternative is chosen, development beginning in the village, more time will be needed because of the large number of villages. Also, a comprehensive preparation will be necessary so that the

development plans will suit local conditions and fulfill the greatest number of local needs. Nevertheless, this second alternative will insure the expansion of development activity and, by the same token, will widen the opportunity to increase the per capita income in rural regions so that the economic gap between the haves and the have nots can be lessened.

In gearing a development program to the village level, there are innumerable variables that need to be considered. Those variables should be derived from different levels, since considering variables from only one level will result in an incomplete analysis. In fact, policy considerations for development strategy are better if based on complete variables, which are reflected in the conceptual variables resulting from factor analysis.

Stage of Development

Up to the year 1945, Indonesia was under foreign domination through colonization by the Dutch, the British for a while, and then the Dutch again, and later, during the second world war, by Japanese occupation. When the second world war ended, the Indonesians began a struggle with the Dutch for the right to control the country. The revolution stage lasted until 1949 when the Netherlands withdrew its armies and conceded sovereignty over the East Indies, excluding West Irian, to the Indonesians.

Since then, the Indonesians, as a new nation, have started building a government and have tried to promote national development through an "urgency program" beginning in 1951 and lasting to 1956.

The first national plan was implemented during the period, 1956 to 1960, but its development was unsuccessful. In evaluating this first national plan, Higgins stated, in 1957:

Now, however, Indonesia cannot afford further depletion of her reserves. Continued budget deficits, combined with continued import restrictions, could lead to a cumulative wageprice-currency-depreciation spiral, ending in the collapse of the monetary system. In a cumulative inflation, foreign capital is unlikely to flow in; such investments as take place will be for speculative rather than productive purposes; and imports of materials and equipment may fall even below levels needed merely to maintain current output. Given the economic instability of this order, political instability will aggravate economic instability and so on. If the young Republic is to maintain its economic and political independence, it must resolutely pursue policies which will bring financial equilibrium. . . . In some respects, however, it would appear that the planning authorities have lacked the time, information, assured financing, and general directives needed to produce a truly comprehensive and effective plan.¹

The second national plan was the eight-year plan, started in 1961 and continuing to 1968. However, again, the eight-year development plan also failed. According

¹Benjamin Higgins, <u>Indonesia's Economic Stabili-</u> zation and Development (New York: Institute of Pacific Relation, 1957), pp. 121-22.

to the United States' economic team, sent to Indonesia to evaluate the long-term plan:

The job of the National Planning Council was to weigh the relative merits of the many thousands of proposals submitted and to select those items which they felt should receive the highest priority. Priorities were not always based on the immediate and direct contribution a project might make to economic development. In addition to the aim of fostering more rapid economic growth, the Council obviously had other (and sometimes conflicting) objectives in mind. For example, selfsufficiency in food and clothing was a paramount goal, even though in some degree it conflicts with an efficient use of resources and with development: cultural values were to be stressed . . . the military's roughly 50 percent share of the regular government budgets, reflecting nationalistic concern over West Irian.²

Later, in April 1969, Indonesia initiated a new five-year national development plan which ended in March 1974. During the first five-year plan, Indonesia's development goal was primarily to increase the output of agricultural products, especially food crops, and also to increase the export capability in raw materials. What happened within this period? Was the country facing unsuccessful development again?

Mangkusuwondo stated:

On the whole, the first four years of Repelita I (first five-year plan since the new regime) were quite successful. Gross domestic production increased at the average of 5.3 percent per year between 1966 and 1971. Under the first five-year plan, between 1969 and 1971, the rate of growth

²Indonesia: Perspective and Proposals for United States Economic Aid (New Haven: Yale University Southeast Asia Studies, 1963), pp. 84-85.

was significantly higher at 7.0 percent per year. This is a respectable rate of growth by normal standards.³

During the same period, the rate of growth of population was about 2.6 percent per year. The success of development in that period is shown by high rates of growth in mining (11.3%), manufacturing industries and construction (21.3%), trade (11.8%) and banking (23.5%). The rate of growth in the agricultural sector was 1.4 percent per year; this growth occurred mainly in forestry and rice production. Since the share of the agricultural sector is 50 percent of the total GDP, its role in the rural regions is still important.

At the present, Indonesia is in the period of the second five-year plan (1974 to 1978), in which the emphasis is on the processing of agricultural products leading to industrialization and also the fulfillment of food stuffs for the people. In the meantime, the export of minerals (especially oil) and timber is continuously on the increase, and concordance with grant aid and loans from other countries will cause the development programs to move faster. The current consequence of such development is the broadening of the income gap between groups of people, a disparity

³Suhadi Mangkusuwondo, "Dilemnas in Indonesian Economic Development," <u>Bulletin of Indonesian Economic</u> Studies, 9 (July 1973): 30-31.

which is due to the fact that the changes in the role of the sectors are occurring faster than the shift in professions. The declining average of agricultural employment to nonagricultural professions is one percent per year,⁴ but the contribution of the nonagricultural sector to the GDP is increasing--4 percent between 1968 to 1970,⁵ or 2 percent per year.

Since the profession of the majority of Indonesians is farming (more than 70% are peasant farmers) and most of them live in the villages, the greatest number of the people who need to be helped are in this group.⁶ The Indonesian government has been taking steps to spread the increase in per capita income to the rural regions by undertaking programs that are oriented to the rural regions. Examples of these programs are:

- (1) Village subsidy
- (2) Regency subsidy
- (3) Intensive labor work system

⁵H. W. Arndt, "Survey of Recent Development," Bulletin of Indonesian Economic Studies, 7 (July 1971): 3.

⁶Mubyarto, <u>Pengantar Ilmu Pertanian</u> (Jakarta: Lembaga Penelitian, Pendidikan dan Penerangan Ekonomi & Sosial, 1973), p. 37.

⁴Dwight Y. King, <u>Social Development in Indonesia</u> (Jakarta: Biro Pusat Statistik, 1973), p. 4.

- (4) Resettlement program
- (5) Farm credit program
- (6) Public elementary school program
- (7) Public health and family planning
- (8) Other sector-oriented programs, such as intensive guidance systems in paddy ricefields, nutrition programs, informal education and rural radio programming.

The purpose of the village subsidy program is primarily to stimulate the village government in mobilizing local funds for local development. The subsidy is as much as 200,000.00 rupiah, or about \$500.00 for each village. Together with local funds (usually up to four times as much as the subsidy), mutual activities and collective actions, the village subsidy funds should be used for the development of village public projects, such as building a small earth dam for irrigation or a water reservoir and simple, small bridges on village roads, and extending school buildings. In this way, the village headman and the staff will learn, by experience, how to prepare sound and appropriate plans, to mobilize funds and to manage the operation of programs. The subsidy is given by the central government to every village once a year.

⁷Hariri Hady, "Pembangunan Daerah Dalam Repelita II," <u>Prisma</u>, 3 (April 1974): 69.

The <u>regency subsidy</u> is given by the central government to the regency government, based on the size of the regency population. This subsidy is also provided only once a year, and the amount is 300 rupiah or \$.75 per person.

The objective of the program is to step up the rehabilitation and expansion of the economic infrastructure, to create larger employment opportunities and to enlarge the participation of regions and sub-regions in the planning and execution of development projects.⁸

Most of the regency subsidy funds have been used for rehabilitation of inter-district and inter-village (intraregency) infrastructure such as irrigation systems, roads and bridges. The difference in development procedure between the village subsidy and the regency subsidy is the size and the way of executing the project. The regency subsidy program is for financing a project in a business way and does not include mutual activity. But the purpose is the same as that of the village subsidy, building construction for public use.

The <u>intensive labor work system</u> is the same program as the food for work system. The government gives wheat and a certain amount of money (three kilograms wheat plus thirty-five rupiah for a day of work per person) to critical regions which annually suffer a

⁸ Atar Sibero, "Program Bantuan Pembangunan Kabupaten/Kotamadya," Ekonomi dan Keuangan Indonesia, 21 (Juni 1973): 95-112.

lack of food and concentration of unemployment. In these critical regions, the surplus labor force is organized into a working group which is then employed in public construction and is paid with wheat and money according to the number of days worked.⁹

The <u>resettlement program</u>, as well as the socalled transmigration program, involve the arrangement of moving people out of the densely populated regions to less populated areas. The government drafts the people (voluntarily) who want to be transferred. Preparation of the new region is also done by the government. Then, during the first two years' stay in the new region, the government gives subsidies in the form of food, farm tools, petroleum, and other needed items to the new settlers. In the new region the government also provides arable land for cultivation (two hectares or five acres per family), a temporary house, an elementary public school and a public health centre.¹⁰

The <u>farm credit program</u> is a program by which the government, which is very concerned about the

⁹Arie L. Kusumadewa et al., <u>Laporan Penelitian</u> <u>Padat Karya di Jawa dan Madura</u> (Jakarta: Team Penelitian Padat Karya, 1972), pp. 38-41.

¹⁰Subroto, "Kebijaksanaan di Bidang Kesempatan Kerja & Transmigrasi dalam Repelita II," <u>Prisma</u>, 3 (April 1974): 18-29.

availability of food for the people, gives soft loans (credit) to farmers who need funds to bring the "new input" to their crops. This soft loan is limited only to paddy rice production, but will be extended to animal husbandry as well as production for export commodities. If the yield fails, the payment can be delayed to the next harvest time.

The public elementary school building and public health and family planning programs are both new programs. Every regency is assigned a quota of a number of buildings that can be constructed each year. The regency level decides the region/village that gets the new building for a certain year. In this way, within five years all districts will have public health and family planning centers, and all villages will also have school buildings.

Several other sector-oriented programs are also conducted at the rural level, such as intensive guidance systems in the paddy ricefields (since 1963), nutrition programs, adult education and evening schools, technical vocational education, and rural radio broadcasting system.

The Role of Villages

The government body nearest the people is located in the village where the community lives together with its formal institutions and within the boundaries of the region. The people who live in the same village feel that they are bound together and need to work

hand in hand to solve their problems.¹¹ The village life attitude is completely opposite to that of the urban life where the people are more individualistic.

The "desa" is seen as the "third order" autonomy level of government, but in Java, generally, it is doing the job without any legislative body. The village headman's status is that of an elected leader by popular election; he is appointed to this post by the regency head on behalf of the "government." The staff of a village head is appointed by the village head himself. Being no government employee, these village officials have no salaries.¹²

The village people are easier to organize since most of them want to follow the local leaders, who have a big role in directing development activities. At the present, the formal local leaders are the village headman and his staff, who run the village government. There is also a group of village people who join in a formal organization called The Self-Defense Group. Most of the time, this group has been also a pioneer in development activities.

School teachers also act as innovators in the villages. They bring new ideas from the "outside world" and introduce them to the community. In many cases, the

¹¹Arthur F. Wileden, <u>Community Development</u> (Totawa, N.J.: The Bedmister Press, 1970), pp. 4-10.

¹²Sajogyo, "Modernization Without Development in Rural Java" (Bogor, Indonesia: Bogor Agricultural University, 1973), p. 65. A mimeograph paper contributed to the study on changes in agrarian structure, organized by F.A.O. of the U.N., 1972-1973. A "desa" is a village.

teachers have the role as key persons in motivating development programs; later the village assembly decides what kind of program and project needs to be undertaken every year.

The Role of Upper Government

The central government has to decide the policy guidelines for the development programs in the rural regions, the unit of which is the villages. After all, the village is the only place where the developmental department can conduct its program and activities. For that reason, development guidelines are very important in order to avoid conflict and overlap of activities which would confuse the local people.

The province government is responsible for the planning coordination among developmental department offices within the province to meet the central government policy guidelines for development programs. The province government also has the responsibility of inspecting whether the programs and projects are conducted according to the regulations that have been designed uniformly for the entire province.

The regency government has to decide the priority of development projects for a certain region/district. They have to look to whether or not the projects can work in harmony or need to be cancelled. The coordination

of project and program execution is directed by the regency government according to the availability of project funds.

The district supervisor is the lowest central government employee who has the responsibility of reporting to the higher level that all programs of development in his region have been conducted as they are supposed to be. He also has the right to postpone or to channel the development proposals from the village level to the regency government. And the district supervisor has the coordination function among the technicians who are stationed in the same district.

The Objectives and Hypotheses

There are several research studies that have been done on the village level with anthropological as well as sociological approaches. However, those studies were a qualitative foundation for further findings. As Koentjaraningrat stated:

A more intensive knowledge of these phenomena, in specific sociocultural settings, will enable us to formulate with greater accuracy the problem and hypothesis on the social system of villages in Indonesia in general . . . the validity of which has to be tested by more sophisticated quantitative methods.¹³

¹³Koentjaraningrat, ed., <u>Villages in Indonesia</u> (Ithaca, N.Y.: Cornell University Press, 1967), p. 386.

As a matter of fact, the research in this dissertation represents a quantitative approach and an exploration in multi-level analysis which needs further intensive observation for special cases.

There are many variables that influence the increase and decrease of the per capita income in a community. Those variables could be familial variables that vary in relation to the daily life style of the people; they could also be community variables that can be changed by the society members who live together; or they could be environmental variables that the people as well as the society cannot change since they are given variables.

These three distinct levels of variables will influence the per capita income of the society differently. Yet, in reality, all three levels of variables will not influence the per capita income separately, but will combine and be interrelated to each other in inducing the level of per capita income.

Identification of so many variables in every level can be simplified by grouping those variables which are of about the same nature in a certain group separate from another group of variables which are not similar. Such a categorization of variables is made just to simplify the location of those variables which are the most influential with regards to the per capita

income according to the hierarchy of responsible levels of group variables. By analyzing multi-level-wise, group variables can be found which correlate with each other vertically.

To accomplish the objectives of the research, the hypotheses of the study have been set as follows:

Hypothesis I:

There are certain variables and group variables that influence per capita income generation. The knowledge of these variables can be used to determine investment priorities in development programs designed to raise the income level of the society.

- A. Some of these variables reside at the household level, i.e., sources of income, expenditure pattern, membership in organizations, participation in development programs, and variables for food crop production.
- B. Other variables originate at the village level, i.e., physical condition of the village, the economic situation, demographic variables, public construction and the institutional variables.
- C. Several variables can be found at the district level, i.e., soil types, land use classes, transportation system, population and professionals variables.

Hypothesis II:

The three levels of variables can be analyzed and some can be discarded from further analysis. Those that remain can be grouped into what can be called conceptual variables at each level as described in A, B, and C.

Hypothesis III:

If the three different levels of variables are aggregated, the combined variables can be built into extended conceptual variables and hypothetical statements. These hypothetical statements explain the development process and development stage of the region.

The Research

The research was conducted in West Java province, Indonesia. The pre-test of village questionnaires was done in 1972, and later, in 1973, extensive research in 300 villages was undertaken. The pre-test of household questionnaires was done in 1973 in the regency of Sumedang. Later, in 1974, intensive observation was made of 699 households, 88 villages, and 44 districts, as well as regency data collected in the regencies of Cianjur and Bandung (see Figure 1).

This extensive research was undertaken with the cooperation of the Directorate of Land Use, Agrarian Affairs and the Department of Home Affairs. The intensive observation research was done with the cooperation of the regency governments of Cianjur and Bandung (a special report has been delivered to both regencies). Funds were provided by the Directorate of Land Use, as well as the regency government of Cianjur and Bandung.

The research was also beneficial for training purposes in the preparation of questionnaires, collection of data, data handling and the analysis of data recorded





by the technicians of the Directorate of Land Use, as well as regency employees. Since the nature of this research is rather comprehensive, a maximum advantage has been taken while doing the research fieldwork in the use of interdisciplinary survey, cross-sectoral and regional analysis.
CHAPTER II

METHODOLOGY

Selection of Study Areas

The province of West Java consists of twenty regencies, 364 districts, and 3,835 villages. The whole region is heterogeneous in topography and can be divided into three different major groups, with regards to distance above sea level:

- (1) 0 to 100 meters above sea level (asl)
- (2) 100 to 500 meters asl
- (3) More than 500 meters asl

The land use pattern can also be grouped into three different categories:

- (1) Majority in paddy rice field
- (2) Majority in dryland farm
- (3) Majority in forest and plantation 14

Based on the above classification, there are nine groups of regions which represent the various

¹⁴The meaning of majority in this study refers to a region comprising at least 40 percent and more of a certain elevation and land use type.

combinations of elevation types as well as land use types. Since there is no available village boundary map, the region to be examined is the district.

The technique used for delineation of a region is the super impose system. The first layer is the land use map, the second layer is the elevation map, and the third layer is boundary map of the district. By examining the majority classification of elevation and land use types for an area along with the location of the district boundary, we can decide in which strata a district is to be included. The nine strata are:

- (1) Paddy rice field at 0 to 100 meters above sealevel (asl)
- (2) Paddy rice field at 100 to 500 meters asl
- (3) Paddy rice field at more than 500 meters asl
- (4) Dry land farm at 0 to 100 meters asl
- (5) Dry land farm at 100 to 500 meters asl
- (6) Dry land farm at more than 500 meters asl
- (7) Forest and plantation at 0 to 100 meters asl
- (8) Forest and plantation at 100 to 500 meters asl

(9) Forest and plantation at more than 500 meters asl For better explanation see Figure 2.

For the village-extensive research, purposive random sampling of the district was taken based on a





diagonal line running from the northwest to the southeast of West Java and on the distribution of district types in the regencies of West Java. The distribution of district types can be found in Appendix A and the scattering of district samples in Appendix B.

Since employing a district as a research unit would be impractical due to the large size of a district and the low reliability of available data at the district level, two villages were selected from every district to represent the district sample. In every district, a list of villages in rank order based on their development stage was made. Then, the listed villages were categorized into five groups. The first group represented the most developed villages in the district and the fifth group, the least developed villages. The third group contained the medium developed villages. Two village samples for the districts were taken, one village each from the second and fourth groups. In other words, from every district there were two village samples, one representing above medium development and another one representing below medium development. When the two villages are averaged, a median village of the district is obtained.

From the whole of West Java, 150 districts were taken (out of 361 districts, 41.5%), and in every district two villages were taken or 300 villages from the

whole province (out of 3,835 villages, 7.8%). The location of the district samples can be seen in Figure 3, and the list of the district village samples can be found in Appendix C-1 and C-2.

The intensive observation research was conducted in Cianjur and Bandung regencies. Both regencies have only seven strata out of the nine strata that were identified. The absent categories are: (1) Paddy rice field at 0 to 100 meters asl. and (2) Forest and plantation at 0 to 100 meters asl. See Appendix B.

Two villages in all of the districts of the Cianjur and Bandung regencies were selected as village samples. The procedure for drawing these village samples was the same as that for the extensive research, one village representing above medium development and one village representing below medium development.

In every village, seven to eight households were chosen randomly. In drawing sixteen household samples in every district, an attempt was made to include different kinds of existing professions such as, food crop farmer, animal husbandryman, fisherman, merchant/trader, home industryman, excavation worker, and service employee. In the district in which intensive observation at the household level was made, secondary data at the district level were also gathered. These data were checked against and augmented by data available at higher levels (regency, province, and national).





Data Collection

When the enumerator visited the districts that were selected at random, the district supervisor was asked to list the villages in the district in rank order according to level of development. The enumerator then checked the list with several local key persons to make sure that the rank order was accurate. According to the list, the villages were divided into five groups, and one village was selected randomly from every group numbered two and four. This meant two village samples for every district; one above and one below average development. An inventory of the kinds of professions within the district was also made.

For the purpose of village-extensive research, a questionnaire had been made up beforehand. The first group of questions concerned such items as village name, majority of land use and elevation type, size of population, and other general attributes of the village. The second group of questions concerned variables found in five sub-groups: physical variables, human variables, fund variables, technological variables, and institutional variables. Finally, the third set of questions was addressed to the nine major village sectors: food crop sector, plantations sector, forestry sector, animal husbandry sector, fishery sector, industrial sector, trade sector, transport and communication sector, and

services sector. The value of production in these sectors can be summed up as Village Gross Product (VGP).

In every village, there are neighborhood associations (in Indonesia called "rukun tetangga," or RT, and "rukun kampung," or RK). In the regencies of Cianjur and Bandung where the intensive research was conducted, the village headman was asked for a list of the neighborhood associations from which a random sample of households was made. From every household association one sample was taken (out of about twenty to forty households). The kinds of samples in each village consisted of several types of professions for the purpose of meeting the representativeness of professions according to the prior list that was collected at the district level. The maximum number was seven to eight household samples for each village, and thus a fourteen to sixteen household sample for each district.

A prepared questionnaire was also used at the household level. Questions were again grouped into five major categories regarding:

- (1) The household income (sources and amounts);
- (2) The production function (inputs and outputs);
- (3) The expenditure pattern (consumption, production, and investment);

- (4) Membership in any organization that exists in the village; and
- (5) The attitude of the sample family toward development issues.

In the regencies of Cianjur and Bandung, at the district level, secondary data concerning different kinds of sectors were gathered from several sources in order to attain a general idea as to what kind of sector dominates the region and defines the environmental situation of the two villages. At the regency level, secondary data were obtained about budgetary allocations which were also considered as environmental conditions.

Data Analysis

There were numerous variables that were collected from each level, and an even greater number if all the variables that came originally from the three different levels are combined. To approach this problem, factor analysis was used.

The single most distinctive characteristic of factor analysis is its data reduction capability. Given an array of correlation coefficients for sets of variables, factor analytic techniques enable us to see whether some underlying pattern of relationship exists such that the data may be "arranged" or "reduced" to a smaller number of factors or components that may be taken as source variables accounting for the observed interrelation in the data.¹⁵

¹⁵Norman Nie, ed., SPSS: Statistical Package for the Social Science (New York: McGraw-Hill Inc., 1970), p. 209.

Factor analysis, then, is a technique by means of which a large number of variables may be clustered on the basis of their intercorrelations, each set of which is presumed to reflect a single dimension which is causing the association within the set of variables.¹⁶

Factor analysis is both a hypothesis creating and a hypothesis testing method. It can be applied across different facets of the basic data relation matrix in a variety of techniques, with and without time sequence arrangement, or manipulative control of variables.¹⁷

The technique of factor analysis is still being improved, especially with the advancement of the computing system. However, it is not the purpose of this dissertation to argue the technique of factor analysis; rather factorization is merely treated as a tool for the data analysis. After the variables had been reduced by using this technique, multiple regression analysis was employed to ascertain the role of significant variables and factors which could explain the income variable, which was the dependent variable.

In employing factor analysis and regression analysis, a package program called SPSS (Statistical

¹⁶Phillip M. Gregg and Arthur S. Banks, "Dimension of Political System: Factor Analysis of a Gross Polity Survey," <u>American Political Science Review</u>, 59 (September 1965): 602-14.

¹⁷Raymond B. Cattel, "Factor Analysis: An Introduction to Essentials. II. The Role of Factor Analysis in Research," <u>Biometrics</u>, 21 (June 1965): 405-35.

Package for the Social Sciences) prepared by Norman Nie, et al. was used. This package program was developed at Northwestern University, and available in the Computer Center at Michigan State University in East Lansing, Michigan.

Most of the variables in this study were parametric variables; even part of the household data which originally was nonparametric data was converted to parametric data. R-factoring was used for the preparation of the correlation matrix, that is, correlation between variables.¹⁸ The extraction of the initial factor employed principal factoring without iteration (in SPSS this is called the PAl technique). In the rotation to terminal factors the oblique factors were used because, as Nie mentioned, " . . . the oblique factors are empirically more realistic."¹⁹

The first step was to construct a product moment correlation coefficient matrix of the variables and the next step was to factor analyze. The matrix of correlation coefficients was then collapsed into the smallest possible number of columns; each column represented a reference factor or component which contained

¹⁸Benjamin Fructer, <u>Introduction to Factor</u> Analysis (Princeton, N.J.: D. Van Nostrand, Co., Inc., 1954), p. 202.

¹⁹Nie, <u>SPSS</u>, p. 212.

cell values across factors. These factor loadings, which make up the cell values of the reference factors, can be interpreted as partial correlation coefficients that partition the variation associated with any one variable among the factors.

The basic factor postulates:

 $Z_{j} = a_{j1} F_{1} + a_{j2} F_{2} + ... + a_{jm} F_{m} + d_{j} U_{j}$

where:

Z = variable in standardized form, known data
F_i = hypothetical common factors
j = 1, 2 . . . n, are variables
i = 1, 2 . . . m, are common factors
a_{ji} = standardized multiple-regression coefficient of
variable j on factor i, and is called factor
loading
U_j = the unique factor for variable j
d_j = the standardized regression coefficient of
variable j on unique factor j

The basic problem of factor analysis is to determine common factor loading, that is the a_{im}'s.

The a^2_{jm} is the proportion of variance of variables explained by factor m. The total amount of variance accounted for by a factor is calculated by adding the square of the loadings in each column: Variance accounted for by Factor 1 = $\sum_{j=1}^{n} a^{2}_{j1}$ (j = 1, 2, ... n)

The respective value is also called eigenvalue.

The proportion of total variance explained by a factor is:

Proportion of total variance accounted for by

Factor
$$l = \sum_{j=1}^{n} a_{j1}^{2} \div n$$

The total variance of variables accounted for by the combination of all common factors, designated h_j^2 , is usually referred to as the communality of the variables:

 $h_{j}^{2} = a_{j1}^{2} + a_{j2}^{2} + ... + a_{jm}^{2}$

Only loadings of the common factors are utilized in computing communality.

The proportion of common variance (the variance accounted for by all the common factors) accounted for by each factor is calculated as:

Proportion of common variance accounted for by

Factor 1 =
$$\sum_{j=1}^{n} a_{j1}^{2} \div \sum_{j=1}^{n} h_{j}^{2}$$

Common factors involve more than one variable; general factors involve almost all variables which load highly on one factor; and group factors involve more than one variable, but not all variables are loaded on the factor. Unique factors involve a single variable. Common factors account for the intercorrelation of variables, and unique factors represent that portion of a variable not accounted for by its correlations with other variables in the set.

As has been mentioned before, oblique rotation was used. The idea was to minimize the cross products of the factor loadings on reference axes in order to simplify the primary factor loadings. The generic name of the rotational method based on this idea is indirect "oblimin," and can be expressed as:²⁰

where:

- p < q = common factors
 - a's = factor pattern loadings
 - d = an arbitrary value which can be used to control the obliqueness of the solution. This analysis used d = 0, that is a fairly oblique (correlated) solution.

²⁰Ibid., p. 225.

By using oblique rotation, a factor pattern matrix and a factor structure matrix can be derived. The difference between both matrices is that the pattern loadings distinctly display the patterns. The structure loadings, however, do not display them well; instead, they measure the correlation of variables with the patterns.²¹

Factor scores of component variables and set of variables that originated from the product moment correlation matrix were analyzed by using multiple regression analysis. Those factors and variables were then treated as independent variables and correlated to income as the dependent variable. A stepwise method was practiced.

. . . the partial F criterion for each variable in the regression at any stage of calculation is evaluated and compared with a preselected percentage point of the appropriate F distribution. This provides a judgment on the contribution made by each variable as though it had been the most recent variable entered, irrespective of its actual point of entry into the model. Any variable which provides a nonsignificant contribution is removed from the model. This process is continued until no more variables will be admitted to the equation and no more are rejected.²²

²¹R. J. Rummel, "Understanding Factor Analysis," Conflict Resolution, 11 (December 1967): 444-80.

²²N. R. Draper and H. Smith, <u>Applied Regression</u> <u>Analysis</u> (New York: John Wiley & Sons, Inc., 1966), p. 171.

The classical model of multiple regression is:

$$Y = a + b_1 X_1 + b_2 X_2 + ... + b_n X_n$$

where:

- Y = the dependent variable
- X = independent variables
- a = the constant
- b = coefficients which explain the individual variables
- n = the number of variables: 1, 2 . . . n.

By having the b coefficient, the dependent variable (Y) can be predicted.

Based on the factor loadings of each factor, the factors can be translated to conceptual variables. In the multi-level analysis these can then be translated to hypothetical statements. The oblique factorization will produce factor correlation matrix, and this correlation matrix can be analyzed further for higher order factorization.

Bandung Regency will be used as the region where the application of multi-level analysis will be demonstrated: first, the factor analysis to construct hypothetical statements; later, the multiple regression analysis to find out strategic variables for development.

Conclusions

The province of West Java in Indonesia was selected as the location of the research. The whole region is divided by nine strata: paddy rice fields at 0 to 100 meters asl, paddy rice fields at 100 to 500 meters asl, paddy rice fields at more than 500 meters asl, dry land farming at 0 to 100 meters asl, dry land farming at 100 to 500 meters asl, dry land farming at more than 500 meters asl, forest/plantations at 0 to 100 meters asl, forest/plantations at 100 to 500 meters asl, and forest/plantations at more than 500 meters asl.

Extensive village data were collected in the whole region representing the nine strata. For the purpose of multi-level analysis, intensive household data and secondary data at the district level were also collected in the regencies of Cianjur and Bandung.

For the household level, the village level, and the district level, a number of variables were identified through factor analysis in order to get the component variables or conceptual variables. In the multi-level analysis, this leads to the construction of hypothetical statements.

The application of multi-level analysis, by which the holistic nature of variables in certain regions

will be conserved, will be demonstrated in Bandung
Regency as will higher order factorization and multiple
regression analysis.

CHAPTER III

THE IDENTIFICATION OF VARIABLES

Intensive Data, Household Level

Intensive data for the household level were collected in two regencies, the regency of Cianjur and the regency of Bandung, both in West Java. Information regarding household conditions in 1973 was collected in 1974 and comprised 699 families. For a clearer idea of the location of the regencies, see Figure 4.

Familial Variables

The variables for the household level are called familial variables. Most of the data dealt with sources of income, expenditure patterns, memberships in organizations, participation in development programs, variables for food crops production, and other household activities. A complete list of these variables can be found in Table 1. There are ninety-one familial variables that were originally selected and manipulated from more than 110 raw variables on the questionnaire sheets. However, not all of those ninety-one variables were analyzed due to the capacity of the package program





TABLE 1

FAMILIAL VARIABLES OF CIANJUR AND BANDUNG REGENCIES (1973)

S-1 *Primary profession of the head of family S-2 *Secondary profession of the head of family S-3 Number of family dependents, in persons S-4 Land ownership, in hectares S-5 Land operation, in hectares S-6 Total family income, in rupiah S-7 *Food expenditures, in rupiah S-8 *Clothing expenditures, in rupiah *Medicine expenditures, in rupiah S-9 S-10 *Education expenditures, in rupiah **S-11** *Durable goods expenditures, in rupiah S-12 *Gift expenditures, in rupiah S-13 *Recreational expenditures, in rupiah S-14 *Other expenditures, in rupiah S-15 Total consumption expenditures, in rupiah S-16 Total house construction expenditures, in rupiah *Land investment expenditures, in rupiah S-17 S-18 *Farm tool expenditures, in rupiah S-19 *Vehicle investment expenditures, in rupiah S-20 *Building investment expenditures, in rupiah S-21 *Miscellaneous expenditures, in rupiah S-22 Total production investment expenditures, in rupiah S-23 Total money savings, in rupiah

TABLE 1--Continued

| s-24 | Total expenditures, in rupiah |
|--------------|---|
| S-25 | Membership in a religious organization |
| S-26 | Membership in a Boy Scout organization |
| S-27 | Membership in a self-defense organization |
| S-28 | Membership in cooperative organizations |
| S-29 | Membership in sport organizations |
| S-30 | Membership in cultural organizations |
| s-31 | Membership in a professional organization |
| S-32 | Membership in <u>loan unions</u> |
| S-33 | Number of organizations to which head of family belongs |
| s-34 | Number of organizations to which members of family belong |
| S-35 | Presence during the most recent election day |
| S-36 | Election participation of head of family |
| S-37 | Intensive guidance system understanding |
| S-38 | Intensive guidance system participation |
| S-39 | Family planning understanding |
| S-40 | Family planning participation |
| S-41 | Multi-cooperative program understanding |
| S-42 | Multi-cooperative program participation |
| S-43 | Source of information about the recent programs |
| S-44 | Reading newspaper frequency |
| S-4 5 | Radio listening frequency |
| S-4 6 | Kinds of radio programs listened to |

S-47 Memory of last decade's land reform program

TABLE 1--Continued

- S-48 Involvement in last land reform program
- S-49 Stage of involvement in last land reform program
- S-50 Total food crop production, in rupiah
- S-51 *Seed cost, in rupiah
- S-52 *Fertilizer cost, in rupiah
- S-53 *Insecticide cost, in rupiah
- S-54 *Real labor cost, in rupiah
- S-55 *Farm tool cost, in rupiah
- S-56 *Land rent cost, in rupiah
- S-57 *Land taxes, in rupiah
- S-58 *Miscellaneous cost, in rupiah
- S-59 Total production cost, in rupiah
- S-60 Per capita incomé, in rupiah
- S-61 <u>Consumption</u> expenditures as a proportion of income, in percent
- S-62 House construction expenditures as a proportion of income, in percent
- S-63 <u>Production investment</u> as a proportion of income, in percent
- S-64 Money savings as a proportion of income, in percent
- S-65 Per capita expenditures, in rupiah
- S-66 Food crop production cost per hectare, in rupiah
- S-67 <u>Seed cost</u> as a proportion of production cost, in percent
- S-68 <u>Fertilizer cost</u> as a proportion of production cost, in percent
- S-69 <u>Insecticide cost</u> as a proportion of production cost, in percent

TABLE 1--Continued

- S-70 Labor cost as proportion of production cost, in percent
- S-71 Farm tool cost as a proportion of production cost, in percent
- S-72 Land rent as a proportion of production cost, in percent
- S-73 Land taxes as a proportion of production cost, in percent
- S-74 <u>Miscellaneous cost</u> as a proportion of production cost, in percent
- S-75 Value of food crop production per hectare, in rupiah
- S-76 Income from nonagricultural sources, in rupiah
- S-77 *Per capita income from nonagricultural sources, in rupiah
- S-78 *Per capita income from agricultural sources, in rupiah
- S-79 Food cost as a proportion of consumption expenditures, in percent
- S-80 <u>Clothing cost</u> as a proportion of consumption expenditures, in percent
- S-81 <u>Medical cost</u> as a proportion of consumption expenditures, in percent
- S-82 Education cost as a proportion of consumption expenditures, in percent
- S-83 Durable goods purchases as a proportion of consumption expenditures, in percent
- S-84 <u>Gifts</u> as a proportion of consumption expenditures, in percent
- S-85 <u>Recreational spending</u> as a proportion of consumption expenditures, in percent
- S-86 Other expenses as a proportion of consumption expenditures, in percent

- S-87 Production investment in land as a proportion of total investment, in percent
- S-88 Production investment in farm tools as a proportion of total investment, in percent
- S-89 Production investment in vehicles as a proportion of total investment, in percent
- S-90 Production investment in buildings as a proportion of total investment, in percent
- S-91 Production investment in miscellaneous items as a proportion of total investment, in percent

NOTE: S is hou"S"ehold variable code number

Variables excluded from factor analysis

and the limitation of the computing system. Those variables having about the same nature were excluded.

Pattern of Familial Variables

Sixty-six selected variables were analyzed by using factor analysis. From the unrotated matrix, the result found by free factoring with a minimum eigenvalue of 1.0 was in twenty-two factors with a cumulative total variance of 66.6 percent.

By reducing the number of factors to thirteen, there was still a cumulative total variance of 51.0 percent and a minimum eigenvalue of 1.4. The original results of the rotated matrix of the household factor analysis can be found in Appendix D.

The main result of this factorization was an aggregation of sixty-six variables in thirteen patterns. If all variables with factor loadings lower than .40 are eliminated, forty-nine variables remain. If the patterns and variables are arrayed in rank order, the final results can be identified as those found in Table 2.

By observing the data in Table 2, the household patterns can be named:

Pattern One: Organizational Participation

Out of the ten organizational variables that were analyzed, seven emerged with high factor loadings and came out together in the same pattern. This first

| | Variables | Factor Number | | | | | | | | | | | | |
|--------------|---------------------------|---------------|------|------|------|------|------|------|-----|------|------|-------------|------|------|
| | Variadies | 7 | 3 | 5 | 4 | 9 | 6 | 1 | 10 | 2 | 8 | 13 | 12 | 11 |
| S-64 | Money savings | .95 | | | _, | | | | | | | | | |
| 8-23 | Total money savings | . 94 | 02 | | | | | | | | | | | |
| 8-01 6-70 | East cost | | . 74 | | | | | | | | | | | |
| 6-92 | Education cost | | 67 | | | | | | | | | | | |
| S-82 S-80 | Clothing cost | | .64 | | | | | | | | | | | |
| 8-22 | Total prod. investment | | | . 91 | | | | | | | | | | |
| 8-63 | Production investment | | | .87 | | | | | | | | | | |
| 8-87 | Investments in land | | | .75 | | | | | | | | | | |
| 8-62 | House construction | | | | . 90 | | | | | | | | | |
| 8-16 | Total house construction | | | | .87 | | | | | | | | | |
| 8-65 | Per capita expenditures | | | | . 71 | | | | | | | | | |
| 8-24 | Total expenditures | | | | .57 | | | | | .57 | | | | |
| 8-81 | Medical cost | | | | .51 | | | | | | | | | |
| 8-5 | Land operation | | | | | . 90 | | | | | | | | |
| 8-4 | Land ownership | | | | | .90 | | | | | | | | |
| 8-59 | Total prod. cost | | | | | .45 | | | | .45 | | | | |
| 8-76 | Income from nonagric. | | | | | | . 89 | | | | | | | |
| 8-75 | Value of food crop | | | | | | . 87 | | | | | | | |
| S-50 | Total food crop prod. | | | | | | . 85 | | | | | | | |
| 8-33 | Org. head of family | | | | | | | .86 | | | | | | |
| 8-34 | Org. members of family | | | | | | | .83 | | | | | | |
| 8-29 | Sport org. | | | | | | | .72 | | | | | | |
| S-30 | Cultural org. | | | | | | | . 69 | | | | | | |
| 8-26 | Boy Scout org. | | | | | | | .61 | | | | | | |
| S-28 | Cooperative org. | | | | | | | . 59 | | | | | | |
| 8-32 | Loan union | | | | | | | . 57 | | | | | | |
| 8-48 | Involvement land reform | | | | | | | | .81 | | | | | |
| 8-47 | Land reform program | | | | | | | | .66 | | | | | |
| 6-49 | Stage involvement | | | | | | | | .58 | | | | | |
| S-6 | Total family income | | | | | | | | | .79 | | | | |
| S-15 | Total consumption | | | | | | | | | .79 | | | | |
| 8-3 | Family dependents | | | | | | | | | - 49 | | | | |
| 8-60 | Per capita income | | | | | | | | | .4/ | ~ ~ | | | |
| 8-38 | Intensive guidance part. | | | | | | | | | | .00 | | | |
| 8-37 | Intensive guidance under. | | | | | | | | | | .04 | | | |
| 5-68 | Fertilizer cost | | | | | | | | | | .51 | | | |
| 8-41 | Multi-coop. under. | | | | | | | | | | . 50 | | | |
| 8-70 | Lador COSt | | | | | | | | | | . 40 | 67 | | |
| 8-45 | Radio listening | | | | | | | | | | | . 04 Ef | | |
| 5-46 | Radio programs | | | | | | | | | | | - JJ E 4 | | |
| 8-39 | Fam. planning under. | | | | | | | | | | | - 59 KA | | |
| 0-43 | Source of information | | | | | | | | | | | . 50 | | |
| 0-44 | Reading newspaper | | | | | | | | | | | . 43 | | |
| 0-14 | Lang rent | | | | | | | | | | | | | |
| 0-00 0-71 | Productop producest | | | | | | | | | | | | | |
| 0-/1 | raim tool cost | | | | | | | | | | | | . 40 | 42 |
| 8-85 8-3f | Pleasion nerticipation | | | | | | | | | | | | | .42 |
| 0-30 | Election participation | | | | | | | | | | | | | . 44 |

HOUSEHOLD LEVEL FACTOR ANALYSIS

pattern has the highest total variance compared to the other patterns; variation among all the variables involved in Pattern One is 6.35 percent.

Pattern Two: Family Income and Expenses

Four variables emerged in this pattern, variables which were related to each other. Those variables were total family income, total consumption expenditures, family dependents and per capita income.

Pattern Three: "Primary" Expenditures

Variables for consumption expenditures for food, clothing, and education emerged in Pattern Three. These expenditures can be considered the most essential expenditures for daily life.

Pattern Four: "Secondary" Expenditures

Expenditure variables for house construction and medical cost came together with per capita expenditures. These kinds of expenditures rank second in importance after the essentials expenditures.

Pattern Five: Basic Investment

Production investments, especially investments in land property, are considered basic investments for rural people who depend mainly on agricultural production. Pattern Six: Sources of Income

In this pattern the only two variables that emerged show the sources of income: Sources from food crop production and nonagricultural income.

Pattern Seven: Savings

Variables for total money savings and saving as a proportion of income emerged in Pattern Seven with the highest factor loadings in this analysis.

Pattern Eight: Agricultural Modernization

Variables for intensive guidance system, multicooperative understanding, and fertilizer and labor used for food crop production all emerged in the same pattern. These variables can be considered the basis for transferring peasant farming to agricultural modernization. Pattern Nine: Land Tenure

Variables for land ownership, land operation, and total production cost intercorrelated with each other and emerged in the same pattern.

Pattern Ten: Last Decade Program (in Land Reform)

It seems that most of the household respondents still remembered their involvement in the last decade's land reform program as either the land owners or the land receivers.

Pattern Eleven: "Luxury" Needs

This pattern is peculiar. Variables for durable goods consumption and election participation emerged in the same pattern, though with small pattern loadings. It seems, then, that election participation can be considered a luxury need.

Pattern Twelve: Production "Tools"

Production costs for food crops, percent production costs for land rent and farm tools existed in the same pattern. Those variables are very important for agricultural production.

Pattern Thirteen: Access to Development Program

Several variables that can be considered as communication media emerged in the last pattern. Those were variables for knowledge about recent programs, such as family planning, through the media of radio and newspaper. This final pattern had only a total variance of 5.43 percent.

Pattern One was the most common factor most influenced by the shared determinant. The larger the number of the pattern, the less common the factor, which had a smaller total variance percentage. Pattern Thirteen, then, was the least common factor.

Extensive Data, Village Level

Extensive data for the village level were collected in West Java, among eighteen regencies. Information regarding village conditions for 1972 was collected in 1973 and comprised 300 villages. See Figure 3.

Community Variables

The variables for the village level are called community variables and these variables are more easily

changed compared to the familial variables for the household level. Most of the data concerned the physical conditions of the village, the economic situation, the human variables, public construction and the institutional variables. A complete list of these variables can be found in Table 3. There are 87 dynamic variables that were originally manipulated from 107 raw variables from the village questionnaire sheets. However, not all of those 87 variables were analyzed. Those variables having about the same nature were excluded.

Pattern of Community Variables

Sixty-six selected and combined variables were analyzed by using factor analysis. From the unrotated matrix, the result found by free factoring with a minimum eigenvalue of 1.0 was twenty-three factors with a cumulative total variance of 69.3 percent.

By reducing the number of factors to thirteen, there was still a cumulative total variance of 50.7 percent and a minimum eigenvalue of 1.5. The original results of the rotated matrix of the village factor analysis can be found in Appendix E.

The main result of this factorization was an aggregation of sixty-six variables in thirteen patterns. If all variables with factor loading lower than .40 are

TABLE 3

COMMUNITY VARIABLES OF 300 VILLAGES (1973)

L-1 Per capita income, in rupiah Irrigated ricefield, as a percent of total village L-2 land L-3 Eroded and flooded land, as a percent of total village land L-4 Ricefield intensity index, maximum 200 percent Dryland intensity index, maximum 200 percent L-5 Ricefield hectarage with intensive guidance system, L-6 as a percent of total village ricefield land L-7 *Land for food crops, as a percent of total village land *Rainfed ricefield hectarage as a proportion of L-8 total village dryland, in percent L-9 Rainfed ricefield hectarage as a proportion of total village ricefield, in percent Forest and plantation hectarage, as a percent of total village land L-10 Land for dryland farming, as a percent of total L-11 village land L-12 Average hectarage of cultivated land per household *Productive people as a percent of all adults L-13 Adult portion of total population, in percent L-14 L-15 Portion of adults with elementary education, in percent Portion of adults with more than elementary edu-L-16 cation, in percent L-17 Portion of adults with vocational education, in percent

- L-18 Pupil/teacher ratio
- L-19 Pupil/children ratio
- L-20 Farmers using credit, as a percent of all farmers
- L-21 *Children/household, in percent
- L-22 Number of people in the family, in persons
- L-23 *Male/female ratio
- L-24 Population density, in persons per hectare
- L-25 <u>Credit used</u>/total irrigated land, in rupiah per hectare
- L-26 Production cost of principal crop, in rupiah per hectare
- L-27 *Draft animals used per hectare of ricefield, in horsepower
- L-28 *Draft animals used per hectare of dryland, in horsepower
- L-29 Tractor(s) used per hectare of cultivated land, in horsepower
- L-30 <u>Outside labor used</u> per hectare of cultivated land in man days
- L-31 Large animal(s) per household
- L-32 *Large animal density, in animals per hectare of total land
- L-33 Village funds for development per household, in ruplah
- L-34 Local contributions for development per household, in rupiah
- L-35 <u>Government subsidies</u> for development per household, in rupiah
- L-36 Credit used on each farm, in rupiah

- L-37 *Asphalted (paved) road density, in kilometers per hectare of total village land
- L-38 *Graveled road density, in kilometers per hectare of total village land
- L-39 *Soft (dirt) road density, in kilometers per hectare of total village land
- L-40 Permanent houses/family, ratio
- L-41 Temporary houses/family, ratio
- L-42 *Motorable transportation tonnage capacity/bulk product sales tonnage, ratio
- L-43 *Nonmotorable transportation tonnage capacity/bulk product sales tonnage, ratio
- L-44 Fertilizer used for food crops, in quintals per hectare
- L-45 Insecticide used for food crops, in liters per hectare
- L-46 High yielding variety <u>seed used</u>, in quintals per hectare
- L-47 <u>New inputs</u> (fertilizers, insecticide, high yielding variety seed) for rice production, in rupiah per hectare
- L-48 <u>New inputs</u> (fertilizers, insecticide, high yielding variety seed) for rice production under <u>intensive</u> guidance system ricefield, in rupiah per hectare
- L-49 *Television/household, ratio
- L-50 *Radio/household, ratio
- L-51 Distance from district city to larger city, in kilometers
- L-52 Distance from district city to regency capital, in kilometers
- L-53 Number of mutual activities, in events per year

- L-54 Mutual activity participants/household per year
- L-55 Number of cooperatives
- L-56 Cooperative members/household
- L-57 Village staff/household
- L-58 *Village staff/population
- L-59 Households/neighborhood association
- L-60 Village defense member/population
- L-61 *Agriculture products trader/population
- L-62 Value of agriculture products per trader, in rupiah per hectare
- L-63 *Industrial product retailers/population
- L-64 Value of industrial and agriculture products per merchant, in rupiah per person
- L-65 Food crop sector product, as a percent of gross village product
- L-66 Animal husbandry sector product, as a percent of gross village product
- L-67 Fishery sector product, as a percent of gross village product
- L-68 Forest and plantation sector product, as a percent of gross village product
- L-69 Excavation sector product, as a percent of gross village product
- L-70 Home industry sector product, as a percent of gross village product
- L-71 Transportation sector, as a percent of gross village product
- L-72 Credit sector, as a percent of gross village product

TABLE 3--Continued

- L-73 *Trade activity volume, as a percent of gross village product
- L-74 *Retail activity volume, as a percent of gross village product
- L-75 Trade sector volume, as a percent of gross village product
- L-76 Labor salaries and wages, as a percent of gross village product
- L-77 Public service sector salaries and wages, as a percent of gross village product
- L-78 Public construction, as a percent of gross village product
- L-79 Private construction, as a percent of gross village product
- L-80 <u>Housing sector</u>, as a percent of gross village product
- L-81 *Bicycles/household
- L-82 Draft animals used per hectare of cultivated land, in horse power
- L-83 Motorable road density, in kilometers per hectare
- L-84 Radio and television set/household
- L-85 Traders and retailers/population
- L-86 Bulk product/transportation capacity, ratio
- L-87 Land productivity: total gross village product/ total village land, in rupiah per hectare

NOTE: L is vil"L"age variable code number

Variables excluded from factor analysis
eliminated, forty-five variables remain. If the patterns and variables are constructed in rank order, the final results can be identified as those found in Table 4.

By observing the data in Table 4, the village patterns can be named:

Pattern One: Development Activity

Variables for village staff, mutual activity, local contributions and government subsidies for development, and public construction emerged in the same pattern. These variables intercorrelated with each other and indicated the development activity within the village.

Pattern Two: Agricultural Development

Activities of farmers using credit facilities for new inputs, such as fertilizer and insecticides for ricefields under the intensive guidance system program, indicated the development of agriculture. Those variables above correlated with each other.

Pattern Three: Development Facility

Motorable road density is part of the public service sector and eases the provision of new input for the intensive guidance system in the ricefield. This condition intercorrelated with population density and permanent-house family ratio.

Pattern Four: Industrial Activity

Variables for high yielding variety seed, land productivity, and per capita income intercorrelated

| TABLE | 4 |
|-------|---|
|-------|---|

VILLAGE LEVEL FACTOR ANALYSIS

| | Variables | | Factor Numbers | | | | | | | | | | | |
|------|---------------------------------------|------|----------------|------|------|------|-----|-----|------|------|------|------|-------|----|
| | | 8 | 6 | 4 | 5 | 2 | 1 | 12 | 9 | 3 | 11 | 7 | 13 | 10 |
| L-4 | Ricefield intensity | . 87 | | | | | | | | | | | | |
| L-3 | Outside-labor used | .86 | | | | | | | | | | | | |
| L-17 | Adults vocat. educ. | .66 | | | | | | | | | | | | |
| L-65 | Food crop sector | | .83 | | | | | | | | | | | |
| L-75 | Trade sector | | . 54 | | | | | | | | | | | |
| L-87 | Land productivity | | | .83 | | | | | | | | | | |
| L-64 | Indust. and agric. pro- ducts | | | . 80 | | | | | | | | | | |
| L-1 | Per capita income | | | .77 | | | | | | | | | | |
| L-46 | Seed used | | | .65 | | | | | | | | | | |
| L-70 | Home industry sector | | | .47 | | | | | | | | | | |
| L-82 | Draft animals used for cultivation | | | | . 82 | | | | | | | | | |
| L-41 | Temporary house | | | | .76 | | | | | | | | | |
| L-31 | Large animals | | | | .75 | | | | | | | | | |
| L-6 | Ricefield int. guid. syst. | | | | | .78 | | | | | | | | |
| L-20 | Farmers using credit | | | | | . 57 | | | | | | | | |
| L-44 | Fertilizer used | | | | | . 52 | | | | | | | | |
| L-45 | Insecticide used | | | | | .47 | | | | | | | | |
| L-47 | New input | | | | | .45 | | | | .52 | | | | |
| L-57 | Village staff | | | | | | .75 | | | | | | | |
| L-54 | Mutual act. participant | | | | | | .66 | | | | | | | |
| L-34 | Local contributions | | | | | | .65 | | | | | | | |
| L-35 | Government subsidies | | | | | | .65 | | | | | | | |
| L-78 | Public construction | | | | | | .63 | | | | | | | |
| L-14 | Adult | | | | | | | .74 | | | | | | |
| L-19 | Pupil/children ratio | | | | | | | .71 | | | | | | |
| L-67 | Fishery sector | | | | | | | .43 | ~~ | | | | | |
| L-5 | Dryland intensity | | | | | | | | . 68 | | | | | |
| L-71 | Transportation sector | | | | | | | | .45 | | | | | |
| T-83 | Motorable road density | | | | | | | | | . 53 | | | | |
| L-48 | New inputs for int. guid. syst. | | | | | | | | | . 59 | | | | |
| L-77 | Public service sector | | | | | | | | | .52 | | | | |
| L-40 | Permanent house | | | | | | | | | . 49 | | | | |
| L-24 | Population density | | | | | | | | | . 49 | | | | |
| L-51 | Distance to larger city | | | | | | | | | | .58 | | | |
| L-60 | Village defense | | | | | | | | | | - 49 | | | |
| L-69 | Excavation sector | | | | | | | | | | .47 | | | |
| L-55 | Cooperatives | | | | | | | | | | | .57 | | |
| L-56 | Cooperative members | | | | | | | | | | | .51 | | |
| L-22 | People in the family | | | | | | | | | | | .48 | | |
| L-84 | Radio and television | | | | | | | | | | | . 46 |) | |
| L-66 | Animal husbandry sector | | | | | | | | | | | | .56 | 2 |
| L-18 | Pupil/teacher ratio | | | | | | | | | | | | . 50 | |
| L-3 | Eroded and flooded land | | | | | | | | | | | | . 43 | · |
| L-36 | Credit used on each farm | | | | | | | | | | | | | 7 |
| L-25 | Crealt used | | | | | | | | | | | | | |

with each other, and together with industrial sector and industrial and agricultural product merchant ratio variables, indicated the stage of intermediate industrial development.

Pattern Five: Extensive Farming

Variables for large animals, draft animals used for cultivation and temporary-house family ratio were intercorrelated and emerged in the same pattern. This situation indicated the stage of extensive farming.

Pattern Six: Trade Activity

Variables for the agricultural sector and the trade sector intercorrelated with each other. Agricultural sector preceded trade activity.

Pattern Seven: Collective Action

Size of family related to radio and television/ household ratio. This also intercorrelated with the cooperative and cooperative member/household ratio. Hence, this pattern was called collective action.

Pattern Eight: Intensive Agriculture

Adults having vocational education and outside labor used for cultivation intercorrelated with ricefield intensity. This preceded intensive agriculture.

Pattern Nine: Dryland Intensity

Only two variables emerged in this pattern with factor loadings of more than .40, showing that transportation sector intercorrelated with dryland intensity.

Pattern Ten: Farm Credit

Credit used on each farm and credit used/irrigated land ratio correlated with each other and emerged in this pattern with low factor loadings.

Pattern Eleven: Public Security

Excavation sector, distance to larger city and village defense member/population ratio were intercorrelated. Excavation activities, in fact, usually occur away from the cities.

Pattern Twelve: Human Progress

Variables for adult people, pupil/children ratio and fishery sector emerged in the same pattern.

Pattern Thirteen: Degradation

Pupil/teacher ratio, animal husbandry sector and eroded-flooded land existed in the same pattern. Animal husbandry sector is usually highly correlated with eroded land.

From the rotated matrix it is known that Pattern One was the most common factor most influenced by the shared determinant. Pattern One had a total variance of 4.7 percent and Pattern Thirteen had the least total variance of 3.0 percent.

Secondary Data, District Level

Secondary data for the district level were collected in two regencies, the regency of Cianjur and the regency of Bandung, both in West Java. District data for 1973 were collected in 1974 and comprised forty-four districts. See Figure 4.

Environmental Variables

Since the variables for the district level existed as "given" variables and had to be accepted by the village as well as by the household level, these district data are called environmental variables. Most of the data concerned soil types, current land use, population size, and transportation system. A complete list of these variables can be found in Table 5. There are thirty-three environmental variables.

Thirty-three district level variables were analyzed by using factor analysis. From the unrotated matrix, the result found by free factoring with a minimum eigenvalue of 1.0 was eleven factors with cumulative total variance of 81.3 percent.

Pattern of Environmental Variables

By reducing the number of factors to five, there was still a cumulative total variance of 57.9 percent and a minimum eigenvalue of 2.2. The original results of the rotated matrix of the district factor analysis can be found in Appendix F.

The main result of this factorization was an aggregation of thirty-three variables in five patterns.

TABLE 5

ENVIRONMENTAL VARIABLES OF CIANJUR AND BANDUNG REGENCIES (1973)

- T-1 Alluvial, grumusol and gleyhumus soils, as a percent of total district land T-2 Latosol, red yellow podsolic, litosol and regosol, as a percent of total district land T-3 Andosol and regosol association soils, as a percent of total district land T-4 Settlements, as a percent of total district land T-5 Ricefield cropped once a year, as a percent of total district land т-6 Ricefield cropped twice a year, as a percent of total district land Miscellaneous crop garden hectarage, as a percent of total district land T-7 T-8 Dryland farm hectarage, as a percent of total district land T-9 Forest and shrubs hectarage, as a percent of total district land T-10 Plantations hectarage, as a percent of total district land T-11 Range and low productive land, as a percent of total district land т-12 Swamp and marsh land, as a percent of total district land T-13 Eroded land, as a percent of total district land T-14 Per capita income, in rupiah T-15 Number of children in family, in persons T-16 Children/population, in percent T-17 Adult/population, in percent
- T-18 Farmers/population, in percent

TABLE 5--Continued

- T-19 Businessmen/population, in percent
- T-20 Government staff/population, in percent
- T-21 Village staff/population, in percent
- T-22 Total workers/population, in percent
- T-23 Asphalted (paved) roads/total district land, in kilometers per hectare
- T-24 Graveled roads/total district land, in kilometers per hectare
- T-25 <u>Dirt</u> (soft) <u>roads</u>/total district land, in kilometers per hectare
- T-26 Bicycle owners/total household, in percent
- T-27 <u>Nonmotorized transportation owners</u>/total household, in percent
- T-28 Motorcycle owners/total household, in percent
- T-29 <u>Motorized transportation owners/total household</u>, in percent
- T-30 Ricefield hectarage per ton of transportation capacity
- T-31 Ricefield as a percent of total district land
- T-32 Value of agricultural products per hectare of total cultivated land, in rupiah
- T-33 Production cost of principle crop per hectare of total cultivated land, in rupiah

NOTE: T is dis"T"rict variable code number.

If all variables with factor loading lower than .40 are eliminated, twenty-eight variables remain. If the patterns and variables are constructed in rank order, the final results can be identified as those found in Table 6.

By observing the data in Table 6, the district patterns can be named:

Pattern One: Land Use

Physical variables such as ricefields, settlements, forests and shrubs, plantations, and soil types were intercorrelated in one pattern which reflected the land use classification of the region.

Pattern Two: Demographic

Demographic variables such as number of adult people, children, farmers, government staff, businessmen, and bicycle owners emerged in the same pattern. There were also two land use variables that showed up in this pattern: swamp and marsh land, and miscellaneous crop gardens.

Pattern Three: Infra Structure

Three variables emerged in this pattern: Graveled roads, paved roads, and nonmotorized transportation ownership. These variables are intercorrelated, and the pattern can be called infra structure.

| TABLE (| 6 |
|---------|---|
|---------|---|

| | | | Facto | r Num | bers | |
|--|---|-------------------|--|--|---|--------------------------|
| | Variables | 3 | 2 | 1 | 4 | 5 |
| T-24 T-23 T-27 T-17 T-12 T-16 T-18 T-20 T-26 T-31 T-31 T-32 T-30 T-33 T-329 T-30 T-33 T-329 T-30 T-33 T-329 T-30 T-33 T-329 T-30 T-33 T-329 T-33 T-329 T-33 T-33 T-329 T-33 T-33 T-329 T-33 T-33 T-329 T-33 T-3 | Graveled roads Asphalted roads Nonmot. trans. owners Adult Swamp and marsh Children Farmers Government staff Businessmen Miscellaneous gardens Bicycle owners Ricefield Alluvial soils Settlements Forest and shrubs Ricefield once a year Andosol Plantations Prod. cost principal crop Value agric. products Motorized trans. owner Transportation capacity Latosol Per cap. income Dryland farm Dirt roads Ricefield twice a year Eroded land | .96 .96 .92 | .90 .85 .84 .68 .61 .58 .49 .49 | .59 .86 .83 .74 .71 .64 .63 .58 | .58 .79 .77 .58 .58 .57 .54 | .74 .56 .52 .46 |

DISTRICT LEVEL FACTOR ANALYSIS

Pattern Four: Economics

Variables for production cost of principal crops, value of agricultural products, per capita income and motorized transportation ownership are intercorrelated in this economics pattern. In this pattern there are also two other variables, transportation capacity and soil type.

Pattern Five: Technology

The variables for dryland farming, dirt roads, ricefield twice a year and eroded land reflected the technological condition of the region. These variables are intercorrelated and emerged in one pattern.

All five patterns had a total variance ranging from 14.8 to 7.1 percent.

Aggregate Data, Multi-Level

The data for variables used for the purpose of multi-level analysis were the same data for the household level (1973), different data for the village level (1973), and the same data for the district level (1973). In short, the multi-level analysis used the 1973 data from the Cianjur and Bandung regencies of West Java.

Variables were selected from those three levels of previous analysis which had factor loading higher than .55. There were seventy-five combined variables from the household and village as well as the district levels.

The village level was used as a data unit; hence, the necessity to average the household data for every village. The district data were duplicated because for every district there were two villages as data units. For the two regencies there were eighty-eight village data units.

Combined Variables

The variables in the multi-level analysis are called combined variables and were actually extracted from their original levels (lower levels). There are no new variables. A complete list of these variables can be found in Table 7.

Pattern of Combined Variables

Seventy-five combined variables were analyzed by using factor analysis. From the unrotated matrix, the result found by free factoring with a minimum eigenvalue of 1.0 was twenty-one factors with a cumulative total variance of 79.6 percent.

By reducing the number of factors to ten there was still a cumulative total variance of 55.5 percent and a minimum eigenvalue of 2.1. The original results of the rotated matrix of the multi-level factor analysis can be found in Appendix G.

The main result of this factorization was an aggregation of seventy-five variables in ten patterns.

TABLE 7

COMBINED VARIABLES OF CIANJUR AND BANDUNG REGENCIES (1973)

- S-4 Land ownership, in hectares
- S-5 Land operation, in hectares
- S-6 Total family income, in rupiah
- S-15 Total consumption expenditures, in rupiah
- S-22 Total production investment expenditures, in rupiah
- S-26 Membership in Boy Scout organization
- S-28 Membership in cooperative organizations
- S-29 Membership in sport organizations
- S-30 Membership in cultural organizations
- S-32 Membership in loan unions
- S-33 Number of organizations to which head of family belongs
- S-34 Number of organizations to which members of family belong
- S-37 Intensive guidance system understanding
- S-38 Intensive guidance system participation
- S-45 Radio listening frequency
- S-46 Kinds of radio programs listened to
- S-47 Memory of last decade's land reform program
- S-48 Involvement in last land reform program
- S-49 Stage of involvement in last land reform program
- S-61 <u>Consumption</u> expenditures as a proportion of income, in percent
- S-62 House construction as a proportion of income, in percent

| S-64 | Money savings as a proportion of income, in percent |
|------|--|
| S-65 | Per capita expenditures, in rupiah |
| S-68 | Fertilizer cost as a proportion of production cost, in percent |
| S-72 | Land rent as a proportion of production cost, in percent |
| S-75 | Value of food crop production per hectare, in rupiah |
| S-76 | Income from nonagricultural sources, in rupiah |
| S-79 | Food cost as a proportion of consumption expendi- tures, in percent |
| S-80 | Clothing cost as a proportion of consumption expenditures, in percent |
| S-81 | Education cost as a proportion of consumption expenditures, in percent |
| S-87 | Production investment in land as a proportion of total investment, in percent |
| L-1 | Per capita income, in rupiah |
| L-4 | Ricefield intensity index, maximum 200 percent |
| L-5 | Dryland intensity index, maximum 200 percent |
| L-6 | Ricefield hectarage with intensive guidance system, as a percent of total village ricefield land |
| L-14 | Adult portion of total population, in percent |
| L-17 | Portion of <u>adults</u> with vocational education, in percent |
| L-19 | Pupil/children ratio |
| L-20 | Farmers using credit, as a percent of all farmers |
| L-30 | Outside labor used per hectare of cultivated land, in man days |
| L-31 | Large animal(s) per household |

- L-33 Village funds for development per household, in rupiah
- L-35 <u>Government subsidies</u> for development per household, in rupiah
- L-41 Temporary houses/family ratio
- L-46 High yielding variety <u>seed used</u>, in quintals per hectare
- L-51 Distance from district city to larger city, in kilometers
- L-54 Mutual activity participants/household per year
- L-55 Number of cooperatives
- L-57 Village staff/household
- L-64 Value of industrial and agriculture products per merchant, in rupiah per person
- L-65 Food crop sector product, as a percent of gross village product
- L-66 Animal husbandry sector product, as a percent of gross village product
- L-78 Public construction, as a percent of gross village product
- L-82 Draft animals used per hectare cultivated land, in horsepower
- L-83 Motorable road density, in kilometers per hectare
- L-87 Land productivity, in rupiah per hectare
- T-1 <u>Alluvial</u>, grumusol and gleyhumus <u>soils</u>, as a percent of total district land
- T-2 Latosol, red yellow podsolic, litosol and regosol, as a percent of total district land
- T-3 Andosol and regosol association soils, as a percent of total district land

TABLE 7--Continued

- T-4 Settlements, as a percent of total district land
- T-6 <u>Ricefield</u> cropped <u>once a year</u>, as a percent of total district land
- T-8 Dryland farm hectarage, as a percent of total district land
- T-9 Forest and shrubs hectarage as a percent of total district land
- T-10 Plantations hectarage, as a percent of total district land
- T-12 Swamp and marsh land, as a percent of total district land
- T-16 Children/population, in percent
- T-18 Farmers/population, in percent
- T-19 Businessmen/population, in percent
- T-20 Government staff/population, in percent
- T-23 Asphalted (paved) roads/total district land, in kilometers per hectare
- T-25 <u>Dirt</u> (soft) <u>roads</u>/total district land, in kilometers per hectare
- T-26 Bicycle owners/total household, in percent
- T-27 <u>Nonmotorized transportation owners</u>/total household, in percent
- T-29 <u>Motorized transportation owners</u>/total household, in percent
- T-30 Ricefield hectarage per ton of transportation capacity

NOTE: S is the original hou"S"ehold variable code number L is the original vil"L"age variable code number T is the original dis"T"rict variable code number If all variables with factor loading lower than .40 are eliminated, fifty-seven variables remain. If the patterns and variables are constructed in rank order, the final results can be identified as those found in Table 8.

By observing the data in Table 8, the multi-level patterns based on a combination of previous pattern names from different levels can be identified in such a way that eight "hypothetical" statements and two extended conceptual variables can be constructed as follows:

- Pattern One: Proper <u>land use</u> and provision of development facilities lead to dryland intensity and industrial activity.
- **Pattern Two:** Organizational participation
- Pattern Three: Extensive farming is determined by the <u>land tenure</u> system, public security and economic conditions.
- Pattern Four: Human progress is based on family income and primary expenditures.

Pattern Five: Development evolution

- Pattern Six: Demographic composition influences agricultural intensity.
- Pattern Seven: Industrial activity is caused by agricultural development activity that is based on <u>intensive agriculture and</u> modernization.

MULTI-LEVEL FACTOR ANALYSIS

| | Variables | OP | Factor Numbers | | | | | | | | | |
|--------------|---------------------------|------------|----------------|------|------|-----|------|------|-------|-----|------|-----|
| | Vallabie | 01 | 9 | 6 | 4 | 8 | 2 | 1 | 3 | 5 | 7 | 10 |
| S-76 | Income from nonagric. | (H6) | .86 | | | | | | | | | |
| 8-75 | Value of food crop | (H6) | 85 | | | | | | | | | |
| T-3 | Andosol | (D1) | 65 | | | | | | | | | |
| T-2 | Latosol | (D4) | .44 | | | | | 44 | | | | |
| 8-32 | Loan union | (H1) | 40 | ••• | | | . 55 | | | | | |
| T-12 | Swamp and marsh | (D2) | | . 84 | | | | | | | | |
| T-10 | Children/pop. | (DZ) | | . /9 | | | | | | | | |
| D-10 | Outside labor used | (00) | | .03 | | | | 43 | | | | |
| T-10 m_10 | Pueineers | (D2) | | .02 | | | | . 93 | | | | |
| 7-20 | Compresent staff | (D2) | | .00 | | 41 | | | | | | |
| 9-61 | Congumption | (02) | | | 93 | | | | | | | |
| 8-79 | Food cost | (#3) | | | .03 | | | | | | | |
| L-19 | Pupil/children ratio | (v_{12}) | | | .55 | | | | | | | |
| 8-80 | Clothing cost | (H3) | | | . 47 | | | | | | | |
| 8-6 | Total family income | (H2) | | | 45 | | | | | | | |
| T-23 | Asphalted roads | (D3) | | | | .83 | | | | | | |
| T-27 | Nonmot. trans. owners | (D3) | | | | .82 | | | | | | |
| L-35 | Government subsidies | (v1) | | | | .64 | | | | | | |
| T-29 | Motorized trans. owner | (D4) | | | | .51 | | | | | | |
| 8-33 | Org. head of family | (H1) | | | | | .82 | | | | | |
| 8-34 | Org. members of family | (H1) | | | | | .82 | | | | | |
| S-26 | Boy Scout org. | (H1) | | | | | .81 | | | | | |
| 8-28 | Cooperatives org. | (H1) | | | | | .67 | | | | | |
| 8-29 | Sport org. | (H1) | | | | | .67 | | | | | |
| 8-30 | Cultural org. | (H1) | | | | | .62 | | | | | |
| T-1 | Alluvial soils | (D1) | | | | | | .78 | | | | |
| T-9 | Forest and shrubs | (D1) | | | | | | 72 | | | | |
| т-4 | Settlements | (D1) | | | | | | .65 | | | | |
| т-6 | Ricefield once a year | (D1) | | | | | | .61 | | | | |
| T-10 | Plantations | (D1) | | | | | | 60 | | | | |
| T-26 | Bicycle owners | (D1) | | | | | | .58 | | | | |
| L-5 | Dryland intensity | (V9) | | | | | | 55 | | | | |
| L-83 | Motorable road density | (V3) | | | | | | .52 | | | | |
| L-87 | Land productivity | (V4) | | | | | | .40 | | | | .44 |
| 8-4 | Land ownership | (H9) | | | | | | | .77 | | | |
| 8-5 | Land operation | (H9) | | | | | | | . / / | | | |
| P-21 | Distance to larger city | (VII) | | | | | | | | | | |
| L-82 | Draft animals used | (V5) | | | | | | | .5/ | | | |
| D-30 | Large animals | (V5) | | | | | | | | | | |
| 1-30 | Transportation capacity | (14) | | | | | | | ••/ | 75 | | |
| 1-41 | Read used | (V3) | | | | | | | | .75 | | |
| 1-54 | Mutual act. participants | | | | | | | | | .55 | | |
| 8-62 | House construction | (H4) | | | | | | | | .46 | | |
| 8-87 | Investment in land | (H5) | | | | | | | | .40 | | |
| 8-38 | Intensive guidance part. | (H8) | | | | | | | | | 62 | |
| L-6 | Ricefield int. guid. svs. | (V2) | | | | | | | | | .61 | |
| 8-34 | Intensive guidance under. | (H8) | | | | | | | | | .60 | |
| L-4 | Ricefield intensity | (V8) | | | | | | | | | . 57 | |
| L-1 | Per capita income | (V4) | | | | | | | | | .45 | |
| 8-68 | Pertilizer cost | (H8) | | | | | | | | | .42 | |
| L-78 | Public construction | (V1) | | | | | | | | | .41 | |
| T-25 | Dirt roads | (D5) | | | | | | | | | | 62 |
| L-20 | Farmers using credit | (V2) | | | | | | | | | | 47 |
| L-65 | Food crop sector | (V6) | | | | | | | | | | 43 |
| L-64 | Indust. and agric. | | | | | | | | | | | |
| | product | (V4) | | | | | | | | | | .43 |
| | | | | | | | | | | | | |

NOTE: OF is original pattern number H is household pattern V is village pattern D is district pattern

Pattern Eight: Infra structure influences economic development activity.

Pattern Nine: Sources of income are influenced by economic organization of land use.

Pattern Ten: <u>Technology</u> makes possible agricultural development and trade activity and affects the level of industrial activity.

After the patterns of combined variables were analyzed, only one pattern remained that retained the original pattern name from its lower level analysis: that is, Pattern Two, <u>Organizational Participation</u>, is, as Pattern One, at the household level. The other nine patterns are an aggregation of variables that originally came from different levels. The dominant previous pattern names are underlined.

Pattern One to Pattern Ten of this multi-level analysis each has a total variance range from 7.6 to 3.8 percent.

Conclusion

By using a limit value of .40 factor loading, the trivial variables were screened out and the outstanding variables retained. Out of the sixty-six familial variables, forty-nine variables (74%) were retained; from the sixty-six community variables, fortyfive variables (68%) were retained; and out of the thirty-three environmental variables, twenty-eight variables (84%) were retained.

In addition, thirteen patterns of familial variables, thirteen patterns of community variables, and five patterns of environmental variables were found. Those patterns showed the grouping of characteristics of variables which were highly correlated. Factor analysis caused the emerging variation of characteristics between patterns and divided the regularity in the data into its distinct patterns.

In the multi-level analysis, seventy-five combined variables were screened and were reduced to fiftyseven variables (76%). However, if a calculation is based on the original set of selected variables at the lower level (167 variables), it can be noted that this number was reduced to 35 percent (57 variables).

A screening technique to condense the high number of variables was demonstrated without losing the objectivity in the analysis processing system. The multilevel analysis yielded a set of hypothetical statements based on the lower level analysis, which meant that the holistic milieu/ecology was conserved.

CHAPTER IV

THE APPLICATION OF MULTI-LEVEL ANALYSIS

Description of Bandung Regency

As has been mentioned before, the regency of Bandung is located in West Java, Indonesia, and encircles the municipality of Bandung in which is located the West Java Province administration office, the Bandung Regency office and the Bandung Mayor's office. The Regency of Bandung which will be used here for a pilot observation, with detailed explanations of the region for the application of multi-level analysis, consists of twenty-seven districts and 284 villages in which are 435,483 households. Complete observation was made at the regency and district level. There are fifty-four village samples (21.8%) and 431 household samples (0.1%) taken. The household samples consisted of 231 farmers, 39 traders, 24 entrepreneurs, 41 laborers, 73 public servants, 8 village staff members, and 15 other professions. See Figure 4.

The government level above the regency level is comprised of the residency level (coordination function), the province level and the national level. The lower

government consists of the sub-regency level (coordination function), the district level, and the village level. Based on the autonomous status, the regency level is the second autonomous government; the first, higher autonomous government is the provincial level, and the lower autonomous government, the third, is assigned to the district level.²³ Regency government apparatus consists of the legislative body where the people's representatives work together; the administration office which executes the daily activity of public services; and the judicial body which has the power of law enforcement. The administration office is assisted by the regency planning unit.

Physical Characteristics

The regency of Bandung is a bowl-shaped region with a radial drainage pattern. Most of the settlements are in the center, scattered in the paddy ricefield region. This paddy ricefield is encircled by dryland farms, and the outer ring is forest and plantation. The whole region is about 311,045 hectares with a varying altitude range from 350 to more than 10,000 meters above sea level, a condition which enables various crops to grow in this region. The topography of the area varies, from a gently sloping (30.5%),

²³This latter assignment is still being reviewed, an appropriate law will be forthcoming soon.

rolling area (33.8%) to mountainous region (35.7%). Annual rainfall averages about 2,250 millimeters. Humidity is about 70 to 78 percent, and the temperature ranges from 3° to 18° Celcius, according to the season and altitude.

The mountainous region is covered by Andosol and Regosol soils (35.5%), while in the middle of the region from the western to the eastern part is found Alluvial soil (18.6%), and a mixture of Alluvial with Gley Humus (18.6%) and Grumusol (.1%) soils. In most of the western parts of the region there are Red Yellow Podsolic (16.8%), Latosol (27.1%) and Litosol (1.9%) soils. The average depth of the top-soil is about thirty to sixty centimeters with various textures ranging from fine to coarse.

A southern highway from the country capital (Jakarta) to central Java crosses about fifty-five kilometers of the region. Bandung Regency has 2,805 kilometers of motorable roads, with about 15 percent paved (asphalted) roads, 50 percent graveled (hardened) roads and the rest, soft (dirt) roads. The road density is about .9 kilometer per square kilometer.

Demographic Characteristics

Bandung Regency has a population of 2,031,209 people with the number of females 1.5 percent higher than the number of males. Out of the total number, 18 percent are infants, 25 percent are school age

children (five to fourteen years old), 45 percent are labor force age (fifteen to forty-four years old), and 12 percent are considered as elderly people (fifty-five years old and above). The population density ranges from 612 to 968 persons per square kilometer and several districts have more than 1,000 people per square kilometer. The average household consists of 4.7 persons.

The distribution of professions is: 43 percent farmers, 30 percent laborers, 3 percent entrepreneurs, 9 percent traders, 9 percent public servants, 1 percent village staff members, and 5 percent other professions. About 8 percent of the labor force is unemployed. The population growth average is 2.5 percent; in some districts the average is 3.3 percent which might be caused by local in-migration. In every village there are one to three elementary schools though about 54 percent of the school age children do not benefit from education yet.

Technology

In an established developing region such as Bandung, the land use pattern can be considered as a reflection of the stage of technology, at least in the agricultural sector. About 27 percent of the region is production and reserve forest, 16 percent is plantations, mostly tea plantations. This amount of land use in these categories is thought to have a very positive





effect on the hydrologic balance of the entire area which in turn permits the other land uses. Further, dryland farm (annual crops) is 7 percent, mixed garden (perennial crops) is 18 percent, paddy ricefield is 26 percent crops, 4 percent is settlements, and 2 percent is other land uses. Out of the total land, 17 percent is categorized as eroded/damaged land that needs to be restored; 1.2 percent in forest land, .5 percent in plantations and 14.3 percent in dryland region.

In every district city there are daily outdoormarkets where people can sell their agricultural products and purchase their subsistence needs. Most of the agricultural production flows into the Bandung municipal city, later to a farther region. The total transportation capacity is 10,429 metric tons, out of which 69 percent is nonmotorized and 31 percent is motorized. According to the usage, 74 percent is passenger transportation and 26 percent is cargo. A post office is available in every district city; some cities have two post offices. Telephones and radio-telephones connect the district offices to the regency office. Every 5.5 families own one radio set, and television sets can be found in every district, although they are considered a luxury. The newspaper to household ratio is 1:1,456; however, local magazines (using the local language) enjoy wide circulation.

Production costs for principal food crops (mainly rice) are about 65,491-rupiah²⁴ per hectare (\$157.81), or 40 percent of the total production value. On the average of 24 percent of production costs is financed under the supervised credit system, that is about Rp. 15,638.37 per hectare (\$37.68). Out of the above production costs, 60 percent is for manpower (labor), 17 percent for fertilizer, 7 percent for land rent, 3 percent for insecticides, 3 percent for high yielding variety seed, 15 percent for farm tools, and 1.5 percent for other expenses.

The application of the intensive guidance system program for food production is recommended, first, for the whole year fully irrigated rice field. This kind of ricefield in Bandung Regency makes up about 61 percent of the total ricefield hectarage. Out of that capacity, only six-tenths is under the intensive guidance system. In other words, the opportunity for food crop production has not been maximized yet.

There are several kinds of industries in Bandung Regency, such as textile, food processing, house furniture, paper, ceramics, chemical, hardware and small machinery.

²⁴Rupiah will be abbreviated as Rp.

Economics

Based on the calculation of the net regency product (NRP) and the size of population, the average annual per capita income of Bandung Regency citizens is Rp. 35,014.73 (\$84.37). According to the village level research, the results of which were adjusted to the standard regency data, the range of per capita income is from Rp. 14,455.60 (\$34.83) to Rp. 57,665.40 (\$138.95). If categorization is made according to the development stage of the villages, the average per capita income for villages above the medium level is Rp. 39,193.33 (\$94.44), and for villages below the medium level, Rp. 29,846.60 (\$71.92). If classification is made according to the majority of land use, then the average per capita income for villages with paddy ricefield is Rp. 36,326.34 (\$87.53), with dryland farming, Rp. 32,929.61 (\$79.35), and with forest and plantation, Rp. 33,802.55 (\$81.45). Further, if classification is made according to the elevation of the villages, the average per capita income for villages at an elevation of 100 to 500 meters above sea level is Rp. 35,052.21 (\$84.46), and at an elevation higher than 500 meters above sea level, Rp. 33,200.71 (\$80.00).

As a result of the household level research, the distribution of income and the amount of expenditures according to the profession of the head of the family,

the results of which were also adjusted to the standard regency data, can be seen as in Table 9.

The weighted average per capita consumption expenditure is 95.7 percent of the per capita income. A comparison of consumption expenditures between different kinds of professions reveals that food expenditures among family laborers were the highest (90.00%) and medicine expenditures the lowest (1.00%). The public servant spent more for education than others, the lowest amount being spent by village staff and laborers. Durable goods expenditures are the highest for traders. The average consumption expenditure pattern of the people in the Bandung Regency can be found in Table 10.

In the regency of Bandung, agricultural sectors are still dominant. The total contribution of general agriculture to the net regency product (NRP) is 58.08 percent. The contribution of all sectors to the net regency product in the Bandung Regency can be seen in Table 11.

Government Activity

The regency government is headed by a "Bupati"²⁵ that is elected by the people's representatives as well as appointed by the central government. The government

²⁵Indonesian term for the head of the regency government. The people's representatives elect three to five candidates and the central government then appoints one of the candidates.

TABLE 9

| Profession | Per Capita Income | Per Capita Consumption Expenditure |
|-----------------|--------------------------|--|
| Farmers | Rp. 37,369.11 \$90.05 | Rp. 35,626.19 \$85.85 |
| Traders | Rp. 37,558.01 \$90.50 | Rp. 30,309.70 \$73. |
| Entrepreneurs | Rp. 38,683.14 \$93.21 | Rp. 32,564.63 \$78.47 |
| Laborers | Rp. 22,595.98 \$54.45 | Rp. 21,780.50 \$52.48 |
| Public servants | Rp. 37,698.92 \$90.84 | Rp. 36,767.20 \$88.60 |
| Village staff | Rp. 34,288.38 \$82.62 | Rp. 25,025.99 \$60.30 |
| Others | Rp. 29,157.43 \$70.26 | Rp. 29,098.88 \$70.12 |

THE DISTRIBUTION OF INCOME AND AMOUNT OF EXPENDITURES, BASED ON KIND OF PROFESSIONS (BANDUNG REGENCY, 1973)

TABLE 10

THE AVERAGE CONSUMPTION EXPENDITURES PATTERN (BANDUNG REGENCY, 1973)

| Consumption for | Percent of Consumption Expenditure |
|----------------------|---------------------------------------|
| Food | 84.0 |
| Clothing | 6.9 |
| Medicine | 2.0 |
| Education | 2.6 |
| Durable Goods | 2.0 |
| Gifts | 1.4 |
| Recreation and feast | 0.6 |
| Other | 0.5 |
| Total | 100.00 |

TABLE 11

THE CONTRIBUTION OF SECTORS TO TOTAL NET REGENCY PRODUCTS (NRP) OF BANDUNG REGENCY (1973)

| Sectors | Percent of NRP |
|--------------------------------|----------------|
| Food crops production | 51.09 |
| Plantation | 4.14 |
| Forestry | 0.11 |
| Animal husbandry | 1.15 |
| Fishery | 1.58 |
| Industry and handcraft | 20.34 |
| Trade | 7.78 |
| Transportation | 4.43 |
| Excavation/quarry | 0.16 |
| Services | 0.24 |
| Construction | 0.76 |
| Housing | 5.59 |
| Electricity and drinking water | 0.97 |
| Bank and loan | 0.21 |
| Public servant | 1.45 |
| Total | 100.00 |

expenditures in the regency of Bandung for the last fiscal year, 1973/74, was Rp. 3,000,380,800--(\$7,229,833.25), 66.2 percent above expenditures for a year before and 85.9 percent above that for two years before. Fifty percent of that amount represents routine expenditures and the other 50 percent is for development. A breakdown of government levels paying the expenses reveals that 64 percent was central government expenses through vertical offices, 6 percent was province government expenses, and the rest, 30 percent, was regency government expenses. However, out of the amount that the regency government spent, half was central and province government subsidies and grants, and only 15 percent of the total government expenditures came from regency government funds that originated from taxes and revenues.

The government activity in various sectors is reflected by annual expenditures based on the annual budget, which can be seen in Table 12.

Routine expenditures are made for public services, while development expenditures can be considered as government investments. In 1972/73 the government spending for public services, per capita base, was 77 percent higher than government investments. However, in the 1973/74 fiscal year public services (Rp. 742.-or \$1.79 per capita) were about balanced with government

| TABLE | 12 |
|-------|----|
| TUDDO | |

THE GOVERNMENT EXPENDITURES OF 1973/1974 IN BANDUNG REGENCY

| | Percent Expenditure | | | | | |
|--|---------------------|-----------------|-----------------|--|--|--|
| Sectors/offices | Routine | Development | Total | | | |
| Food crop production | .86 | . 70 | . 78 | | | |
| Plantation | .05 | .05 | .05 | | | |
| Forestry | 1.86 | .66 | 1.26 | | | |
| Animal husbandry | .71 | | . 36 | | | |
| Fisheries | .33 | .35 | .34 | | | |
| Handcraft and industry | .20 | | .10 | | | |
| Trade | .05 | | .03 | | | |
| Public works (irrigation and roads) | 3.04 | 40.60 | 21.74 | | | |
| Public Health | 8.47 | 1.06 | 4.77 | | | |
| Education and culture | 17.37 | 24.25 | 20.79 | | | |
| Tourism | .08 | .85 | .46 | | | |
| Information | .79 | | .40 | | | |
| Religious affairs | 15.88 | | 7.98 | | | |
| Cooperatives | . 20 | | .10 | | | |
| Rural development | .09 | 3.32 | 1.70 | | | |
| Agrarian | . 39 | | .20 | | | |
| Logistic | .05 | | .03 | | | |
| Labor force/manpower | .10 | | .05 | | | |
| Welfare | .28 | | .14 | | | |
| Census/statistics | .15 | | .07 | | | |
| Security | 24.90 | | 12.50 | | | |
| Regency office Total | 24.15 100.00 | 28.16 100.00 | 26.15 100.00 | | | |

investments (Rp. 735,-- or \$1.77 per capita). If the increase in government investments from the fiscal year 1972/73 to the fiscal year 1973/74 is calculated, based on the constant value of 1973, the amount was 78 percent higher.

The net regency product (NRP) of 1973/74 was Rp. 71, 122,241,200.-- (\$171,378,894.46) and the government expenditures for the same year were Rp. 3,000,380,800.--(7,229,833.25). The three years data from 1971/72 to 1973/74 show that government expenses are about 4.3 percent of the gross regency product.

Of the 15 percent of total government expenditures which come from local taxes and revenue, about half is from land taxes and the other half from other taxes. Within the last five years, land taxes as well as other taxes have been increased as can be seen in Table 13.

Further, if the amount of taxes is compared to per capita income, it would appear that the regency government is making progress in collecting taxes over the last five years. However, taxes still represent less than 1 percent of the per capita income as can be seen in Table 14.

Household level data for 1973/74 show that private investments are about 3.5 percent of per capita income or Rp. 1,273.37 (\$3.07) per capita. This figure is higher than government investments per

| TUDDE T | ABLE 13 | |
|---------|---------|--|
|---------|---------|--|

LAND TAXES AND OTHER TAXES, IN PERCENT OF GROSS PRODUCT (BANDUNG REGENCY, 1973)

| Year | Land Taxes as a Percent of Gross Regency Agri- cultural Product | Other Taxes as a Per- cent of Gross Regency Nonagricultural Pro- duct |
|---------|---|--|
| 1969/70 | .21 | . 32 |
| 1970/71 | .24 | .29 |
| 1971/72 | .91 | .58 |
| 1972/73 | .70 | .68 |
| 1973/74 | .82 | .81 |

TABLE 14

PER CAPITA TAXES, IN PERCENT OF INCOME (BANDUNG REGENCY, 1973)

| Year | Per Capita Taxes as a Percent of Gross Income | |
|---------|---|--|
| 1969/70 | . 26 | |
| 1970/71 | .20 | |
| 1971/72 | .75 | |
| 1972/73 | . 69 | |
| 1973/74 | .82 | |
| | | |

capita, which is Rp. 735.-- (\$1.77). Private savings for the same year are about .39 percent of per capita income or Rp. 136.61 (\$.33).

The Pattern of Conceptual Variables

It was demonstrated in the previous chapter that multi-level analysis can be performed for analyzing a number of variables, that are originally from different levels, horizontally as well as vertically in an evaluation of the development stage of a region. The same technique was used to screen and identify variables such as those in the earlier chapter. Also, the variables that will be used here are the same variables that were used for aggregate data, multi-level analysis. The difference this time is that only Bandung Regency data will be analyzed. Name and code numbers of variables are the same as in the previous chapter.

Seventy-five variables from different levels were analyzed by using factor analysis. By setting the number of factors at ten there is a cumulative total variance of 60.1 percent and a minimum eigenvalue of 2.7. The original results of the unrotated factor analysis can be seen in Appendix H. The chief result of the factorization is the aggregation of seventy-five variables into ten patterns. Further, by eliminating all variables with factor loadings lower than .45, the outcome was sixty variables.

When the patterns and variables are constructed in rank order according to the factor loadings, the final results can be identified as those seen in Table 15. By analyzing the results in that table, hypothetical statements can be established. The dominant pattern that emerges in the lower level analysis is underlined.²⁶

Pattern One:

Proper <u>land use</u> (including dryland intensity), building infra structure and provision of development facilities, combined with demographic suitability, will precede industrial activity.

Pattern Two:

Organization participation and primary expenditures back up the development activity for human progress.

Pattern Three:

The <u>demographic</u> composition will influence intensive agriculture.

Pattern Four:

Land tenure system and basic investments precede technological advancement.

Pattern Five:

Last decade program (in land reform) influences family income/expenses and industrial activity.

²⁶In the previous lower level analysis, variable(s) with high loading(s) dominate the pattern and influence the pattern names. In the patterns of the present analysis, several variables will appear representing their original patterns.
| | Variat los | | | | | β u | actor N | umbers | | | | |
|--------------|-------------------------|------|-----|-----|-----|------------|---------|--------|---|---|-----|---|
| | A GL LGULGS | | m | 9 | - | - | 7 | 10 | ъ | 6 | 80 | 7 |
| T-16 | Children/non. | (00) | đ | | | | | | | | | |
| T-12 | Swamp and marsh | (D2) | | | | | | | | | | |
| T-18 | Farmers | (D2) | .72 | | | | | | | | | |
| T-19 | Businessmen | (D2) | .65 | | | | | | | | | |
| L-30 | Outside labor used | (87) | .62 | | | | | | | | .52 | |
| T-20 | Government staff | (D2) | .59 | | | | | | | | | |
| T-26 | Bicycle owners | (D2) | .49 | | .62 | | | | | | | |
| S-76 | Income from nonagric. | (9H) | | 86 | | | | | | | | |
| S-75 | Value of food crop | (H6) | | .82 | | | | | | | | |
| T-3 | Andosol | (10) | | .57 | 51 | | | | | | | |
| T-25 | Dirt roads | (DS) | | .54 | | .58 | | | | | | |
| T-29 | Motorized trans. owners | (D4) | | .51 | | | | | | | | |
| T-1 | Alluvial soils | (10) | | | .83 | | | | | | | |
| T-4 | Settlements | (10) | | | .80 | | | | | | | |
| T-9 | Forest and shrubs | (10) | | | 76 | | | | | | | |
| T-10 | Plantations | (10) | | | 73 | | | | | | | |
| T-6 | Ricefield once a year | (10) | | | .69 | | | | | | | |
| L-5 | Dryland intensity | (6A) | | | 65 | | | | | | | |
| T-27 | Nonmot. trans. owners | (D3) | | | .59 | | | | | | | |
| T-23 | Asphalted road | (D3) | | | .58 | | | | | | | |
| L-87 | Land productivity | (V4) | | | .55 | | | | | | | |
| L-83 | Motorable road density | (EA) | | | .49 | | | | | | | |
| 8-5 | Land operation | (H) | | | | .82 | | | | | | |
| S-4 | Land ownership | (6H) | | | | .72 | | | | | | |
| T-8 | Dryland farm | (DS) | | | | .56 | | | | | | |
| S-22 | Total prod. investment | (HS) | | | | .50 | | | | | | |
| S- 87 | Investments in land | (H2) | | | | .46 | | .58 | | | | |
| S-61 | Consumption | (H3) | | | | | .81 | | | | | |
| S-34 | Org. members of family | (HI) | | | | | .80 | | | | | |
| S-79 | Food cost | (H3) | | | | | .75 | | | | | |
| S-80 | Clothing cost | (H3) | | | | | .75 | | | | | |
| S- 29 | Sport org. | (HI) | | | | | .70 | | | | | |
| S-30 | Cultural org. | (HI) | | | | | .69 | | | | | |
| S-26 | Boy Scout org. | (H1) | | | | | . 65 | | | | | |
| S-33 | Org. head of family | (TH) | | | | | . 65 | | | | | |

FACTORIZING OF MULTI-LEVEL ANALYSIS OF BANDUNG REGENCY (1973)

TABLE 15

| | Variahlee | | | | | Ε. | actor Ni | mbers | | | | |
|--------------|---------------------------|-------|---|---|---|----|----------|-------|-----|----|-----|-----|
| | | | ù | 6 | ı | 4 | 2 | 10 | 5 | 6 | œ | 2 |
| S-81 | Education cost | (H3) | | | | | . 65 | | | | | |
| S-28 | Cooperative org. | (11) | | | | | .55 | | | | | .49 |
| S-32 | Loan unions | (HI) | | | | | .50 | | | | | |
| L-19 | Pupil/children ratio | (V12) | | | | | .46 | | | | | |
| L-41 | Temporary houses | (V5) | | | | | | .79 | | | | |
| L-57 | Village staff | (1) | | | | | | .74 | | | | |
| L-54 | Mutualact. participants | (11) | | | | | | 64. | | | | |
| L-46 | Seed used | (74) | | | | | .46 | | | | | |
| S-47 | Landreform program | (H10) | | | | | | | .71 | | | |
| S-49 | Stage involvement | (H10) | | | | | | | 71 | | | |
| S-48 | Involvement land reform | (H10) | | | | | | | .69 | | | |
| S-1 5 | Total consumption | (H2) | | | | | | | .46 | | | |
| [-] | Per capita income | (74) | | | | | | | .45 | | | |
| S-68 | Fertilizer cost | (H8) | | | | | | | | 69 | | |
| L-31 | Large animals | (V5) | | | | | | | | 54 | | |
| S-38 | Intensive guidance part. | (H8) | | | | | | | | 48 | | .50 |
| L-51 | Distance to larger city | (111) | | | | | | | | 47 | | |
| L-83 | Draft animals | (V5) | | | | | | | | 45 | | |
| L-55 | Cooperatives | (77) | | | | | | | | | .67 | |
| L-17 | Adults vocat. educ. | (N8) | | | | | | | | | .52 | |
| S-72 | Land rent | (H12) | | | | | | | | | | .59 |
| L-78 | Public construction | (IV) | | | | | | | | | | .53 |
| S-46 | Radio programs | (H13) | | | | | | | | | | .52 |
| S-45 | Radio listening | (H13) | | | | | | | | | | .50 |
| 5-32 | Intensive guidance under. | (H8) | | | | | | | | | | .45 |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

TABLE 15-- (Continued)

Pattern Six:

The sources of income are influenced by physical (land use) technology as well as the economic conditions.

Pattern Seven:

Access to development program and having proper production tools will stimulate development activity.

Pattern Eight:

Intensive agriculture and organization participation are the base for collective action.

Pattern Nine:

Agriculture modernization and extensive farming are related to public security.

Pattern Ten:

Development activity through extensive farming will lead to industrial activity.

Higher Order Factor Analysis

As was mentioned in the earlier chapter, the oblique rotation technique was utilized in factorization of variables to enable production of a factor correlation matrix. In oblique rotation the factors that emerged were correlated to each other, and the factor correlation matrix can be found in Table 16. An examination of the factor correlation matrix shows that there was some correlation between factors; however, in general, the correlation is small. The relationships between factor

FACTOR CORRELATION NATRIX, MULTI-LEVEL ANALYSIS OF BANDUNG RECENCY (1973)

| | Passing of a second | | | | | Factor | Number | | | | |
|----------|---|------|------|------|--------|---|--------|------|---------------------------------------|------|------|
| | REALIZATION OF FRACTORS | - | ~ | m | - | 'n | ø | - | • | 0 | 10 |
| н. | Proper land use, building infra structure and pro- vision of development facilities, combined with demographic suitability will precede industrial activity | 1.00 | | | | | | | | | |
| | Organisation participation and primary expenditures back up development activity for human progress. | . 06 | 1.00 | | | | | | | | |
| ň | The demographic composition will influence intensive agriculture | .07 | . 02 | 1.00 | | | | | | | |
| 4 | Land tenure system and basic investments precede tech- nological advancement | 03 | 05 | 05 | 1.00 | | | | | | |
| <u>.</u> | Lest decade program influ- ences family income/expenses and industrial activity | 60. | .03 | . 02 | 02 | 1.00 | | | | | |
| ý. | The sources of income are influenced by physical/land use as well as economic conditions | •0- | п. | .02 | 01 | 02 | 1.00 | | | | |
| | Access to development program and having proper production tools will stimulate develop- ment activity | 01 | 00. | 00. | - , 05 | .04 | .02 | 1.00 | | | |
| | Intensive agriculture and organization participation are the base for collective action | п. | .07 | 06 | •00 | .05 | . 05 | 00 | 1.00 | | |
| e. | Agriculture modernization and extensive farming are related to public security | . 05 | 03 | 01 | 08 | 02 | •0. | .01 | .02 | 1.00 | |
| | Development activity through extensive farming will lead to industrial activity | 12 | 01 | 06 | 00 | .03 | 04 | .07 | 03 | 03 | 1.00 |
| | | | | | | the second | | | · · · · · · · · · · · · · · · · · · · | | |

one and factor five and factor two and factor six both have positive correlations. Factor three and factor eight and also factor four and factor nine have negative correlations. Lastly, factor seven and factor ten have a positive correlation.

By using the above correlation matrix, a second order of factorization can be further analyzed. Running the factorization with a minimum eigenvalue of 1.0 resulted in five factors with a cumulative total variance of 56.3 percent. The original results of the second order factorization can be found in Appendix I. The main result of this second order factorization was an aggregation of ten patterns to five patterns of the second order. Patterns with factor loadings lower than .50 were eliminated. The patterns and the second order factors were constructed in rank order, and the result which was achieved can be found on Table 17. An aggregation of hypothetical statements can be structured, based on the first order pattern hypothetical statements. The aggregate hypothetical statements are as follows:

First Aggregate Hypothetical Statement:

Last decade program (in land reform) which influences family income also influences the "conditio sine qua non" of industrial activity.

| | Description of Pattorns | | Facto | or Numbe | rs | |
|-----|--|-------|-------|----------|-----|-----|
| | Description of Fatterns | 5 | 3 | 4 | 1 | 2 |
| 3. | The demographic compo- sition will influence intensive agriculture | .81 | | | | |
| 8. | Intensive agriculture and organizational partici- pation are the base for collective action. | 56 | | | | |
| 9. | Agriculture modernization and extensive farming are related to public security | | 79 | | | |
| 4. | Land tenure system and basic investments precede techno- logical advancement | | .57 | | | |
| 2. | Organization participation and primary expenditures back up the development activity for human pro- gress | | | 73 | | |
| 6. | The sources of income are influenced by physical and use as well as the economic conditions | | | 72 | | |
| 5. | Last decade program influ- ences family income/expense and industrial activity | | | | .72 | |
| 1. | Proper land use, building infra structure and provi- sion of development facil- ities, combined with demo- graphic suitability, will precede industrial activity | | | | .60 | |
| 10. | Development activity through extensive farming will lead to industrial activity | | | | | .68 |
| 7. | Access to development program and having proper production tools will stimulate develop- ment activity | m | | | | .61 |

SECOND ORDER FACTORIZATION OF MULTI-LEVEL ANALYSIS OF BANDUNG REGENCY (1973)

TABLE 17

Second Aggregate Hypothetical Statement:

Access to development program and having proper production tools will stimulate development activity. If the development leads to industrial activity, then some extensive farming may result because labor will go to industrial jobs and the hectarage of farm operation will also increase.

Third Aggregate Hypothetical Statement:

Proper land tenure system and wise basic investments will stimulate technological advancement. However, if, conversely, there is improper land tenure system and unwise basic investment policies which do not stimulate technological advancement, then this situation will cause agricultural development of the extensive farming type which will require considerable public security.

Fourth Aggregate Hypothetical Statement:

The physical and technological as well as the economic conditions determine the sources of income, and together with organizational participation and wise primary expenditures, these elements precede development activity for human progress.

Fifth Aggregate Hypothetical Statement:

Imbalance in local demographic composition will negatively influence intensive agriculture. If this occurs, it will also influence the intensity of agricultural production and organization participation, both of which are the base for collective action.

Since the second order factorization of this multi-level analysis used oblique rotation techniques, a second order of factor correlation matrix was produced as in Table 18. Based on that 5 x 5 factor correlation matrix, a third order factorization was further analyzed. It resulted in two factors having a minimum eigenvalue

| | ANALIBIO | (1973 |) | GENCI | | |
|-----|--|--------------------------|-------|---------|-------|-------|
| Doe | aristics of Factors | | Fac | tor Num | ber | |
| Des | cription of factors | 1 | 2 | 3 | 4 | 5 |
| 1. | Last decade program (in land reform) whice influences family in- come also influences the "conditio sine que non" of industrial activity | 2h 1.000 | | | | |
| 2. | Access to develop- ment program and having proper pro- duction tools will stimulate develop- ment activity; if development leads to industrial activity, then intensive farming will be needed. | .006 | 1.000 | | | |
| 3. | Improper land tenure system and unwise basic invest- ment policy will not stimulate techno- logical advancement, but will cause agri- cultural development of the extensive farm ing type which will require considerable public security. | 072 | . 029 | 1.000 | | |
| 4. | The physical and technological as well as the economic con- ditions determine the sources of income, an together with organi- sational participatic and wise primary expe ditures, these element precede development activity for human progress. | 101 | .032 | .095 | 1.000 | |
| 5. | Imbalance in local demographic compo- sition will negativel influence intensive agriculture. This situation will also influence the intensi of agricultural produ- tion and organization participation, both of which are the base for collective action. | Lty ic- of .029 | .045 | 047 | 004 | 1.000 |

.

SECOND ORDER FACTOR CORRELATION MATRIX, MULTI-LEVEL

of 1.05 and a cumulative total variance of 44.9 percent. The results of the third order factorization can be found in Table 19.

The chief result of this third order factorization was an aggregation of five patterns to two patterns of third order. Patterns with factor loading lower than .50 were eliminated. An aggregation of hypothetical statements can be structured based on the second order pattern hypothetical statements as follows:

Final Aggregate Hypothetical Statement One:

It was understood that physical and technological as well as economic conditions determine the sources of income, and together with organizational participation and wise primary expenditures, these elements will precede development activity for human progress. It seems that the unjustified last decade program in land reform which influenced the family income also influences the "conditio sine qua non" of the industrial activity. Further, it should be noted that the improper land tenure system and unwise basic investment policy will not stimulate technological advancement, but will cause agricultural development of the extensive farming type which will require considerable public security.

Final Aggregate Hypothetical Statement Two:

Imbalance in local demographic composition will negatively influence intensive agriculture. This situation will also influence the intensity of agricultural production and organization participation, both of which are the base for collective action. Further, access to development programs and having proper production tools will stimulate development activity. Later, if development leads to industrial activity, extensive farming will be needed.

THIRD ORDER FACTORIZATION, MULTI-LEVEL ANALYSIS OF BANDUNG REGENCY (1973)

| | Description of Patterns | Fact Numl | tor ber |
|----|--|--------------|------------|
| | _ | 1 | 2 |
| 1. | Last decade program in land reform which influences the family income also influ- ences the "conditio sine qua non" of industrial activity. | 59 | .12 |
| 2. | Access to development program and having proper production tools will stimulate development activity; if development leads to industrial activity, then extensive farming will be needed. | .17 | .73 |
| 3. | Improper land tenure system and unwise investment policy will not stimulate technological advancement, but will cause agricultural development of the extensive farming type which will require considerable public security. | .61 | 04 |
| 4. | The physical and technological as well as the economic conditions determine the sources of income, and together with organizational participation and wise primary expenditures, these ele- ments precede development activity for human progress. | .65 | .15 |
| 5. | Imbalance in local demographic compo- sition will negatively influence intensive agriculture. This situation will also influence the intensity of agricultural production and organi- zation participation both of which are the base for collective action. | 18 | .69 |
| | Sum of squares | 1.20 | 1.05 |

Strategic Pattern for Development

The result from the first order factorization process of multi-level analysis is the aggregation of variables into ten factors/patterns. A question is then raised about the relation between the variable of family income from the original variables and the ten patterns. It should be remembered that the use of the oblique rotation method in factor analysis resulted in patterns that are related to each other, since oblique is nonorthogonal.

To make possible an analysis of the patterns together with the original variables, a factor score is needed which can determine the score for a case on each pattern/factor.

The factor scores are derived in the following way. Each variable is weighed proportionally to its involvement in a factor; the more involved a variable, the higher the weight. Variables not at all related to a factor would be weighted near zero. To determine the score for a case on a factor, then, the case's data on each variable is multiplied by the factor weight for that variable. The sum of these weight-times-dataproducts for all the variables yields the factor score. This weighted summation will give cases high (or low) scores if their values are high (or low) on the variables involved with a factor.²⁷

The factor score could be used for further analysis such as classification of cases (to arrange the cases according to their involvement in every

²⁷R. J. Rummel, <u>Applied Factor Analysis</u> (Evanston: Northwestern University Press, 1970), p. 150.

pattern) and multiple regression. In this analysis the patterns are examined by using linear multiple regression to find the relationship to family income. In this way the patterns that have the most influence on income generation can be found. To facilitate the analysis, data for ten patterns which explain cases (that is the factor score) were aggregated to the data of seventy-five variables of cases (which is the original data).

These new data set were run through multiple regression analysis wherein total family income was the dependent variable and the ten patterns were independent variables. The result shows that the computed F value indicated that only one pattern, Pattern Three, was significant at the $\alpha = .1$ level. The equation is:

 $Y = 2.27 - 5037.81 X_1$

The equation gave only a multiple correlation (R) of .34, and the coefficient of determination (R^2) was .11. The significance of the equation was .01, and the other nine patterns were deleted since their significance levels were .14 and higher. It seems that the patterns could not strongly explain total family income.

Strategic Variables Which Influence Family Income

The main result of factorization in each level in the previous chapter is the identification of outstanding variables in each level. This technique enables the construction of a data set of multi-level variables that is limited only to those variables that remain after screening by factor analysis.

The sources of data set that will be used to find out those strategic variables which influence to family income are:

- (1) Factors/patterns that have high factor loading of family income variable, that is Pattern One (.42), Pattern Five (.33), and Pattern Three (.28);
- (2) Simple correlation matrix of the original seventyfive variables (75 x 75 matrix) that has been formulated before the factor analysis of Bandung Regency was run.

The comparison of the four data sources to get the best equation model is as found in Table 20.

Since the equation from the simple correlation matrix yielded a regression model with the highest F level (13.82), highest coefficient of determination (.59) and lowest coefficient of variability, in this dissertation the equation for the regression model of Bandung Regency will use those variables that originally resulted from the simple correlation matrix data. The correlation between the variable of total family income

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| ЕË | |
| B | |
| Fi | |

SOURCES FOR REGRESSION MODEL OF BANDUNG REGENCY (1973)

| Coefficient C of Determina- V tion (R ²) V | .43 | .36 | .27 | .59 |
|---|-------------|---------------|--------------|---------------------------------|
| Multiple Correlation (R) | • 66 | .60 | .52 | 77. |
| Significance Level for the Equation | 0000 | 0.000 | 0.001 | 0.000 |
| Computed F for the Equation | 7.31 | 6.83 | 6.10 | 13.82 |
| Sources | Pattern One | Pattern Three | Pattern Five | Simple Correlation Matrix |

and other variables having a correlation coefficient (r) of more than .20 can be seen in Table 21.

Based on the above correlations found in Table 21, nineteen variables were run in <u>linear multiple regression</u> analysis. The dependent variable was total family income and eighteen variables were independent variables. The variable of total consumption expenditures was excluded because it has a very high correlation to total family income; if the variable of total consumption expenditures had been brought to the equation, it was understood that it would bring an unbeneficial effect to the total result. Hence, this variable's exclusion. The correlation matrix of the nineteen variables that had been run in the regression analysis can be found in Table 22.

By using the stepwise method, and with the significance level at the α = .10 (F 1,54 Table = 2.80) only five variables remained in the equation. The equation is:

$$x = -72921.7 - 1475.5 x_1 + 255.1 x_2 +$$

29014.1 $x_3 + 13736.1 x_4 + 19787475.0 x_5$

where:

Y = family income

SIMPLE CORRELATION MATRIX BETWEEN VARIABLE OF TOTAL FAMILY INCOME AND OTHER VARIABLES (BANDUNG REGENCY, 1973)

| Name of Variables | Correlation Coefficient (r) |
|--|--------------------------------|
| Total family | |
| income (1) to: Total consumption expendit | ures (20)88 |
| Per capita expenditures (7 |) |
| Land productivity (13) . | 35 |
| $\frac{\text{Adult portion of total pop}}{(11)}$ | ulation •••••33 |
| Membership in <u>Boy Scout</u> or zation (2) | gani- •••••33 |
| Plantations hectarage (17) | 32 |
| Membership in <u>cooperative</u> zations (3). | organi- ••••.31 |
| Settlements (15) | 31 |
| Membership in loan unions | (5) |
| Asphalted (paved) <u>roads</u> per (18) | r hectare • • • • •29 |
| Distance from district city larger city (12) | y to 27 |
| Food Cost as a proportion (sumption expenditures (8) | of con- 27 |
| Education Cost as a propor consumption expenditures (| tion of 9)25 |
| Nonmotorized transportation population (19) | <u>n owners/</u> 25 |
| Ricefield cropped once a y | ear (16)23 |
| Alluvial, grumusol and gle soils (14) | yhumus • • • • • |
| Per capita income (10) . | 21 |
| Memory of <u>last decade's</u> las program (6) | nd reform •••••••21 |
| Membership in <u>sport</u> organi (4) | zation •••••.20 |

| | PRODUCT MOMEN | T CORRE | LATION | MATR | IX OF | NINET | EEN V | ARIAB | LES, N | ULTI- | -LEVEI | ANAL | LYSIS | OF B | ANDUN | G REC | ENCY | (1973 | 2 | | |
|----------|-------------------------|---------|--------|--------------|--------|---------|--------|--------|--------|-------|---------|-------|-------|------|--------|-------|--------|-------|-----|-----|---|
| | Name of Variables | Ч | 7 | ۳ | • | 'n | v | - | œ | 6 | 0 | | 2 | 2 | 3 | 51 | 16 | 12 | 18 | 19 | 1 |
| . | Total family income | 1.00 | | | | | | | | | | | | | | | | | | | 1 |
| 4 | Boy Scout | | 1.00 | , | | | | | | | | | | | | | | | | | |
| ň | Cooperative | .31 | .51 | 1.00 | | | | | | | | | | | | | | | | | |
| 4 | Sport | .20 | .37 | .37 | ١.00 | | | | | | | | | | | | | | | | |
| ς. | Loan-union | 16. | .38 | E F . | .48 1 | | | | | | | | | | | | | | | | |
| 9 | Last decade's program | .21 | 03 | .14 | .39 | .07 1 | 00. | | | | | | | | | | | | | | |
| ٦. | Per capita expenditure. | в .36 | .12 | .10 | .08 | .21 | .03 1 | 00. | | | | | | | | | | | | | |
| | Food cost | 27 | .27 | .28 | .35 | 11. | . 23 - | .17 1 | 00. | | | | | | | | | | | | |
| °. | Education cost | .25 | .47 | 9 E. | .37 | .36 | . 23 - | 90 | .45 1. | 00 | | | | | | | | | | | |
| 5. | Per capita income | .21 | 15 | 11. | 6 | .03 | .25 | - 0E. | 1 | 07 1. | 00 | | | | | | | | | | |
| Ë. | Adult | 33 | 31 | - 90 - | - 03 - | - 119 - | .06 | 5 | .15 | . 91 | 01 1. | 00 | | | | | | | | | |
| ц. | Distance | .27 | .12 | 23 - | 04 | 11. | .19 | .12 - | .03 | - 10 | 17 | 03 1. | 00 | | | | | | | | |
| ц. | Productivity | .35 | .17 | .11 | 02 - | 60 | .01 | - 16 - | | . T6 | 32 | 15 - | .29 1 | 00. | | | | | | | |
| Ξ. | Soils | .22 | .37 | .10 | .04 | - 64 - | 60. | .23 | .03 | 31. | 07 | 18 - | .17 | 49 1 | .00 | | | | | | |
| 5. | Settlements | .31 | .01 | . 04 | 05 | - 10. | .12 | - 16 - | .18 . | . 60 | 1 80 | 21 - | .25 | .57 | .55 1 | .00 | | | | | |
| 16. | Ricefield | .23 | .22 | .10 | .03 | - 10 - | .15 | .18 - | .13 | 28 | 01 - | 24 - | 00 | 14 | .66 | .57 1 | .00 | | | | |
| 17. | Plantations | 32 | - 15 | 05 - | - 00 - | 01 | .05 | 0. | .21 | .07 | 02 | 02 | - 10. | 101 | - 49 - | .47 - | .38 1 | 00. | | | |
| 18. | Roads | .29 | 01 | .02 | - 04 - | 01 | -04 | 13 | .02 | .05 | 13 | 15 - | .23 | 69. | .49 | .66 | - 12 - | .35] | .00 | | |
| 19. | Transportation owners | .25 | .19 | .15 | - 60. | 10 | .13 | 60. | . 06 | . 19 | 14 | .06 - | .33 | .62 | .59 | .46 | - 16 - | .53 | .54 | .00 | |
| | 1 | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | 1 |

108

h

- X₂ = Distance from district city to larger city
 X₃ = Membership in cooperative organizations
 X₄ = Education cost as proportion of consumption
 expenditures
- X_5 = Asphalted (paved) roads density

The multiple correlation (R) is .768 and the normalized/standardized coefficient of determination (R^2) for this equation is .590. The standard deviation for the equation is 59832.461 with the significance level for the total equation being 0.000 (F computed = 13.821). The coefficient of variability is 25.790 percent. The intercept (constant) of the equation is -72921.7. The beta coefficient and other facts of data in the equation can be found in Table 23.

By analyzing the data in Table 23, it can be seen that the standard error is much smaller in magnitude than the regression coefficient; thus, the sign of the regression coefficient can be interpreted with some confidence. In Table 24, the contribution of the variables to the coefficient of determination (R^2) and to the total significance level can be found.

The importance of the independent variables to total family income is indicated by their respective regression coefficients. There are four variables that positively related and one that negatively related to

| | THE REGRESSION COEFFI(| CIENT AND ITS S BANDUNG I | STANDARD ERROR REGENCY (1973) | IN MULTI- | LEVEL ANALYS | IS OF |
|----------|--|------------------------------|----------------------------------|---|--------------|------------|
| | Numa of Users | Regression | Standard Evenv of | ן קייי קייי קייי קייי קיייי קיייי קיייי קיייי קיייי קיייי קייי קייי קייי קייי קייי קייי קייי קייי קייי קייי קייי קייי קייי קייי קייי קייי קייי קייי | Beta Coe | fficient |
| | NAME OF VALIANTES | Coefficient | Reg. Coef. | icance | Normalized | Elasticity |
| <u>г</u> | Food cost as a pro- portion of consumption expenditures | -1475.49 | 289.91 | 25.90 | 53 | - 53 |
| 2. | Distance from district city to larger city | 255.05 | 58.05 | 19.30 | .43 | .11 |
| °. | Membership in coopera- tive organizations | 29014.11 | 6854.64 | 17.92 | .44 | 1.43 |
| 4. | Education cost as a proportion of consump- tion expenditures | 13736.10 | 4421.54 | 9 .65 | .33 | .15 |
| ъ. | Asphalted roads density | 19787475.00 | 4701579.90 | 17.71 | .40 | .16 |
| | | | | | | |

| -LEVEL | .cance rel | Total | .051 | .022 | . 000 | 000. | .000 |
|--------------------------|-------------------|---------|---|--|---|---|-----------------|
| -ILTIN NI | Signifi Lev | Partial | .051 | .051 | . 000 | .014 | .000 |
| 'ION (R ²) | Over- | 4 110 | 3.998 | 4.118 | 9.570 | 9.580 | 13.821 |
| ETERMINAT (1973) | Simple Corre- | lation | 267 | .268 | .312 | .245 | .286 |
| LENT OF D | R Square | Change | .071 | .168 | .226 | .074 | .151 |
| LE COEFFIC OF BANDUN | R R C | aduate | .071 | .139 | .365 | .439 | .590 |
| IABLES TO TE ANALYSIS | Multiple | 4 | .267 | .373 | .604 | . 662 | .768 |
| THE CONTRIBUTION OF VAR | Name of Variables | | Food cost as a pro- portion of consump- tion expenditures | Distance from dis- trict city to larger city | Membership in co- operative organiza- tions | Education cost as a proportion of con- sumption expendi- tures | Asphalted roads |
| • | | | 1 . | 2. | | 4. | 5. |

the dependent variable. For a better understanding of these important variables, each will be described in the following section.

Food Cost as a Proportion of Consumption Expenditures

This variable is considered a familial variable and was originally extracted from the household level. The average food cost as a proportion of consumption expenditures is 83.2 percent; however, it actually varies according to the profession of the head of the family, ranging from 79.5 to 88.0 percent. This variable has a negative regression coefficient which is to be expected since the higher the income, the lower the food as a proportion of consumption expenditures. The lower the income, the higher the percentage food as a proportion of consumption expenditures.

Distance to Larger City

This variable is considered a community variable and was originally collected from the village level, although it can be also considered an environmental variable. The average distance of the village samples to the larger city is 95.7 kilometers. This variable has a positive regression coefficient to the dependent variable, that is, the further the location of the village, the higher the income of the family. This

also means that the rural regions in Bandung Regency still have the potential of absorbing employment opportunity, compared to the urban regions.

Membership in Cooperative Organization

This variable is one of the familial variables that originally was collected from the household level. Out of the 430 household samples, there were 216 villages in which the development stage was above average and the rest were villages in which the development stage was below average. The response distribution of the household samples in both levels reveals that there is no significant difference in cooperative membership between the villages of above average and the villages of below average development stage. There were 7.2 percent of the household samples which said that both the head and the members of the family join the cooperative organizations. About 13.8 percent of the samples mentioned that only the head of the family joins the cooperative organization, and 1.4 percent mentioned that only the members of the family join the cooperative organization. In other words, there were 77.6 percent who admitted that neither the head nor the members of the family join the cooperative organizations, or an average of 22.4 percent of the household population who join the cooperative organizations.

Education Cost as a Proportion of Consumption Expenditures

This fourth variable, which has a positive correlation with the dependent variable, is also a familial variable that originally was collected from the household level. The education cost as a proportion of consumption expenditures ranges from .3 to 4.7 percent or represents, on the average, 2.5 percent of the total consumption expenditures. As with the food expenditures, the education expenditures also depend on the profession of the head family. The education expenditures variable has a positive regression coefficient which means that the higher the income, the higher the education expenditures, and vice versa.

Asphalted Roads

This variable concerns the length of asphalted/ paved roads within one hectare. The average is 0.0019 kilometer per hectare, or 1.9 meters per 10,000 square meters of land. The standard deviation is 1.8 meters. Paved roads make transportation easier and raise the mobility of the rural people so that the village products can reach the consumer easier and faster. An increase in the length of paved roads in the region will also enable greater accessability of the product to the market which will, in turn, cause an increase in the income of the farmers in rural regions. By using the intercept and the regression coefficient and by applying the regression equation, total family income in other villages as well as in the same villages, but in different time series, can be estimated. The average difference in estimated value and actual value of total family income is 22.3 percent. Those values of the fifty-four village samples in Bandung Regency can be found in Appendix J.

The variables that are significant in the linear multiple regression were tested in <u>polynomial multiple</u> <u>regression</u>, and the equation is as follows:

$$Y = a + b_1 x_1 + b_2 x_1^2 + b_3 x_1^3 + b_4 x_2 + b_5 x_2^2 + b_6 x_2^3 + b_7 x_3$$

+ $b_8 x_3^2 + b_9 x_3^3 + b_{10} x_4 + b_{11} x_4^2 + b_{12} x_4^3 + b_{13} x_5$
+ $b_{14} x_5^2 + b_{15} x_5^3$

Y, X_1 , X_2 , X_3 , X_4 , and X_5 is the same as in the linear equation.

By running the equation through the polynomial multiple regression analysis, using the significance level of $\alpha = .1$, only five out of the fifteen variables still exist in the equation. The other ten variables were deleted due to the fact that the significance level of those variables is too large, ranging from .225 to .890. The contribution of those five variables to the coefficient of determination (R^2) can be seen in Table 25.

The polynomial equation has a multiple correlation (R) of .788, and the number of the standardized coefficient of determination (R^2) for the regression is .621. This means that the polynomial regression equation raises the coefficient of determination by .031. The standard deviation for the equation is 57575000, with a significance level for the whole equation of 0.000 (F computed = 15.694).

The coefficient of variability is 24.766 percent and the intercept of the equation is -108166820. The regression coefficient, the beta coefficient and other data in the equation can be found in Table 26.

Conclusion

The technique of multi-level analysis, using real life data from Bandung Regency, was demonstrated in this chapter. The variables identified in the previous chapter were used to construct hypothetical statements. In the first order of factorization, ten hypothetical statements were found. By further analysis with second order factorization, five aggregated hypothetical statements were constructed. And later, a third order factorization produced final aggregations of those five aggregated hypothetical statements. These statements can be used to evaluate the general condition and situation of the Bandung regency.

| D ITS STANDARD ERROR IN THE POLYNOMIAL EQUATION, ALYSIS OF BANDUNG REGENCY (1973) | Beta Coefficient | Elasticity | .04 | 1.41 | .08 | 47 | .14 |
|--|------------------------------------|------------|--|---|--|---|--|
| | | Normalized | .41 | .43 | .42 | 47 | .32 |
| | F Significance | | 19.48 | 19.21 | 21.55 | 21.81 | 9.61 |
| | Standard Error of Reg. Coef. | | 127688990 | 6531.56 | 579440.75 | 281.55 | 4284.93 |
| COEFFICIENT AN 4ULTI-LEVEL AN | Regression Coefficient | | 563557000 | 28626.16 | 2689958.20 | -1314.72 | 13285.73 |
| THE REGRESSION (| Name of Variables | | Cube of distance of district city to larger city | . Membership in cooperative organizations | . Square of asphalted road density | Food cost as a proportion of consumption expenditures | Education cost as a proportion of consumption expenditures |

Out of the ten patterns that resulted from the first order of factor analysis, only one pattern came out in the linear multiple regression equation which explains only 11 percent of the family income. The pattern/hypothetical statement is: <u>demographic compo-</u> sition will influence intensive agriculture.

Out of the nineteen independent variables that were analyzed using multiple regression, against total family income as the dependent variables, only five variables remained in the equation. Those are: food as a proportion of consumption expenditures, distance from district city to larger city, membership in cooperative organization, education cost as a proportion of consumption expenditures and asphalted road density. The five variables in the linear regression equation explained 59 percent of the family income, and, when these variables are brought to a polynomial regression equation, they explained 62 percent of the family income. The variables that remain in the polynomial equation are: food as a proportion of consumption expenditures, the cube of distance of district city to larger city, membership in cooperative organizations, education cost as a proportion of consumption expenditures and the square of asphalted road density.

CHAPTER V

SUMMARY, CONCLUSIONS, POLICY IMPLICATIONS, AND RESEARCH RECOMMENDATIONS

Summary

During the period of 1945 to 1949 the Indonesian people were involved in a struggle for their independence. For as long as eighteen years, 1950 to 1968, the Indonesian government was trying to develop the country by establishing several national plans, but none was successful. Since 1969 Indonesia has formulated two realistic five-year plans geared towards generating higher levels of income for the population. This research is an attempt to evaluate the village development process during the first five-year plan, and to find some strategic factors that can be used in future development efforts.

The West Java province of Indonesia was chosen as the area for the research. The region was divided into nine strata based on three different kinds of dominant land uses and three different levels of elevations above sea level. Three hundred villages, with two villages representing a district, were selected

randomly from the nine strata as samples for extensive research at the village level covering the whole province. Intensive research at the household level was conducted in the regencies of Cianjur and Bandung; 699 household samples were chosen randomly to represent each village in those two regencies. The household samples were also drawn from different kinds of professions. District as well as regency secondary data were also drawn from the Cianjur and Bandung regencies, data which were used as environmental variables at the district level.

This research was an exploration of the multilevel approach to conserve the holistic nature of the region's ecosystem. The variables were taken from three different original sources: the familial variables from the household level, the community variables from the village level, and the environmental variables from the district level. The identified variables from the three different levels were aggregated into sets of new combined variables and analyzed in multi-levels.

There were sixty-six familial variables on the household level, and factor analysis retained forty-nine of them. The community variables on the village level numbered sixty-six and after factorization forty-five remained. At the district level there were thirty-three environmental variables, and screening by factoring simplified the number to twenty-eight. The process of factor analysis for each level concluded with conceptual variables; the household level produced thirteen, the village level produced thirteen and the district level produced five conceptual variables. The thirty-one conceptual variables were given different names, names which will predominate in further analysis of multilevels.

Those variables that were screened in their respective levels were aggregated and named combined variables. Due to the limitation of available computer capability and programs, a second screening of the combined variables was made. Only those variables which had factor loadings of .55 and more, in the factorization at their original levels, were carried over for further processing in the multi-level analysis. Seventy-five combined variables were selected and sixty variables were identified as important variables which had outstanding influence, shown by the value of factor loadings of more than .40, on the construction of multi-level factors or patterns. These factors produced by multi-level analysis can be called hypothetical statements. In the multi-level analysis, one conceptual variable emerged, that is, the organizational participation conceptual variable which was

in the household level. The multi-level analysis also produced nine hypothetical statements which describe the condition of a region and can be used to evaluate the stage of development of the region.

The regency of Bandung was used to demonstrate the application of multi-level analysis by employing factorization and further analysis of multiple regression. Bandung represents the profile of most of the regencies on the densely populated island of Java, with its mountainous and plains regions, its different kinds of land uses and its different types of production activities which contribute to the gross domestic product. The total net regency product for 1973/74 was Rp. 71,122,241,200.00 (\$171,378,894.46); with a population of 2,031,209 people, then, the average per capita income was Rp. 35,014.73 (\$84.37).

The same variables that were used in the previous multi-level analysis were applied to the Bandung regency. The first order factorization produced ten hypothetical statements, the second order factorization, five aggregated hypothetical statements, and the third order factorization, two final aggregated hypothetical statements. These hypothetical statements describe clearly the condition of Bandung Regency and can be used for the formulation of development policy. By using linear multiple regression, out of the ten first order hypothetical statements only one remained in the equation with a significance level of 10 percent. That hypothetical statement is: <u>demographic</u> <u>composition will influence intensive agriculture</u>. This statement can only explain 11 percent of the total family income.

Nineteen selected variables were analyzed by using multiple regression to find appropriate variables that could be used to predict family income. Using linear multiple regression, only five variables retained significance at the 10 percent level and explained 59 percent of total family income; by applying polynomial multiple regression analysis, the same variables remained and increased the explanation of family income to 62 percent. These five variables are: food cost, distance to large city, membership in cooperatives, education cost, and asphalted road density.

Conclusions

Along with the process of identification of variables, by which the trivial variables were screened out and the influential variables kept, the variables from each level--the household level, the village level, and the district level--were analyzed separately by

using factor analysis. This method was employed in an attempt to assure objectivity in screening out variables for each level.

It has been demonstrated that the number of variables can be screened by setting the limit value of factor loadings in each factor; in this research the limit value of factor loadings was .40 which meant a variance of .16. Based on factor loadings for every factor, conceptual variables or patterns can be formed.

The identified variables for each level were combined and analyzed in a multi-level system. This analysis produced extended conceptual variables or hypothetical statements, which were then used to describe the condition of the respective region based on the existing data.

The application of multi-level analysis by using factorization was demonstrated for Bandung Regency, a demonstration which revealed the holistic nature of variables in the ecosystem. By the same token, out of the seventy-five combined variables, sixty variables were kept and fifteen variables were screened out objectively.

The data from Bandung Regency were processed by using factor analysis techniques. The factorization produced hypothetical statements, and by employing higher order factorization, aggregated hypothetical

statements were constructed. These hypothetical statements describe the condition of Bandung Regency and can be used to evaluate its development process and stage.

The ten hypothetical statements were analyzed through linear multiple regression to find their relation to family income. Only one has a significant relation which can explain 11 percent of the family income.

Multiple regression analysis was also used to find the most strategic variables that influence per capita income; first, linear multiple regression, later polynomial multiple regression analysis. The polynomial regression equation can increase the coefficient of determination (R^2) .

It therefore can be concluded that the hypotheses that were set forth in Chapter I can be "accepted." Acceptance is limited to the regencies of Cianjur and Bandung but no doubt quite appropriate for studies of other regencies in Indonesia.

Policy Implications

Some rural regions in developing countries suffer because of lack of food caused by over-population, long drought, unfertile land, and/or failure of harvest. Special attention in formulating specific development programs should be concentrated on these regions, since these kinds of regions have the potential to develop as nuclei for unrest and riot.

The research that has been done for this dissertation can be used to identify the specific predictor variables for certain types of regions so that the living level of the people can be estimated and evaluated. This method is important in locating the "critical" regions in which the limited funds can be spent for development. The predictor variables can be also used to designate the region(s) which may suffer in the future. In the design of development strategy to raise the level of income, the "strategic variables" can be used to formulate programs and projects since those variables are highly correlated to family income.

The two final aggregated hypothetical statements that describe and evaluate the conditions of Bandung Regency need to be examined and understood before a development program for the regency is formulated. Development plans should be in line with the hypothetical statements and using "strategic variables" for program and projects formulation should fulfil the conditions as needed by the region such as described by those hypothetical statements.

The demographic composition in the rural region tends to influence intensive agriculture, and this will further define the family income generation. Based on the R square change of the polynomial equation, in rank order are asphalted road density (square), membership
in cooperative organizations, distance of district city to larger city (cube), food cost as a proportion of total consumption expenditures and education cost as a proportion of total consumption expenditures.

The increase of one unit in asphalted road density will increase family income by .42 unit, or the increase of one meter asphalted road per hectare will increase 42 rupiah. Projects in increasing motorable road density are in line with the regency subsidy program which can be considered as basic investment and are needed to guarantee the public security.

The increase of one unit of membership in cooperative organization can increase family income by .43 unit. Production cooperatives in the rural regions are still needed and should be developed from the bottom and might be supervised by the village level government. These cooperatives are the foundations for collective action.

The distance variable is an indicator of income for the Regency of Bandung; it is not a strategic variable. It seems that rural life is much more prosperous than living in an urban region: the further from the cities one lives, the higher the family income.

The analysis indicates that as family income increases, the total amount spent, in percentage terms, on food will decrease. In order to make funds available for other family needs, programs in nutrition and home economics may be very helpful in reducing the food expenditures even more than the average relationship found in this study.

The education variable is also important because it is considered as primary expenditure and can change the demographic composition which will influence intensive agriculture. An increase of one unit of education cost will also increase family income by .32 unit. This education program is now extensively being operated by the Indonesian central government starting with public elementary school building projects and with vocational education a second priority.

The different kinds of programs can be operated simultaneously because projects can be initiated and supervised by different levels of government. This can have a multiplicative effect on family income if programs are properly formulated. However, before any programs are started a careful benefit cost analysis should be made of all alternative strategies in order to maximize the effect on family income from program expenditures which by necessity will no doubt be limited.

Finally, for future research policy, this study has evaluated, the author believes, that much useful research can be accomplished by using secondary data. This means that significant findings can result even

though large amounts of primary data were not collected and utilized in the analysis. This in turn means important savings in research expenditures can be made and perhaps equally as important the time of people who would have contributed the primary data is conserved. Those people too have many important things to do.

Additional Research Recommendations

Extended Analysis Based on Present Available Data

The data that were collected for this research were not fully used and analyzed due to the lack of time and funds available. However, this sub chapter will describe the possible further analysis which could maximize the benefits of the existing data. In this way, if the time and funds are provided later, an extended analysis can be employed to take the full advantage of the available data.

Household Data

A number of 699 household samples was collected in the regencies of Cianjur and Bandung. The samples were collected from the villages which represent development stages above and below average and which contain different kinds of professions. Factor analysis was employed and the results were reported. A type of extended analysis follows:

- A factor score can be employed to examine the behavior of different kinds of professions of the head of the family.
- Since the oblique was used in the rotation technique, a higher order factorization can be practiced to simplify the hypothetical statements.
- 3. By using a factor score in combination with the original variables, multiple regression can be employed to find out the relationship between factors and some original variables, and also the relationship between the original variables themselves, such as the relationship of outstanding variables to income.
- 4. Factorization and some further analysis can be conducted separately for every group of village samples--one group of villages above average and another group of villages below average.
- 5. Analysis of the regencies of Cianjur and Bandung can be conducted separately and later should be checked empirically.

Village Data

There are 300 village samples, or about 7.8 percent of the total villages in West Java. These village samples represent nine strata of the classified regions

in West Java. Extended analysis for the village level data can be employed as follows.

- Q-factor analysis (using data matrix of product moment correlation of cases by cases) can be employed to justify the classification of strata and to establish the typology of the region.
- 2. If the typology of the region is found, R-factor analysis can be run for every type of region. Different conceptual variables can be produced for each type of region. If necessary, different hypothetical statements can be constructed through higher order factorization.
- Factor score matrices can be constructed for each justified type of region for further analysis.
- 4. Multiple regression analysis can be used to see the relationship between factors and between original variables and to find out the outstanding variables and conceptual variables/factors that have the most influence on income for each type of region.
- 5. Since the number of village samples is quite large, the village data for the villages above average and the villages below average, with

regards to development stage, can be analyzed separately. In this way a development strategy for different development stages of villages can be formulated.

District Data

Complete district data for the regencies of Cianjur and Bandung were collected. These district data provide the natural conditions by which the holistic approach in conserving the total ecosystem can be reached. Since oblique was used as the rotation technique and produced a factor correlation matrix, a further analysis of higher order factoring can be employed to lessen the number of factors and to find out the aggregation mode of factors in this district level.

Multi-Level Aggregate Data

The aggregated data for multi-level analysis originated from the regencies of Cianjur and Bandung. These data can be further processed for higher order factor analysis in order to construct extended hypothetical statements for a better understanding of the nature of multi-level variables and factors.

Cianjur Regency Data

The data from Cianjur Regency can be analyzed as the data of Bandung Regency were analyzed. In this way useful results from the analysis can be presented to the Cianjur Regency government for further consideration in formulating development plans and programs.

Further Research

Periodical research using the same techniques can be applied in the same region. The results from different time series are very useful for evaluating development progress and defining development stage. Based on the knowledge provided by this research, a long-term development plan and a stage of development process can be described.

Using the results of this research and other findings, the variables for different levels can be regrouped according to the availability and reliability of the data in the field. Regrouping of variables and locating the data in their respective levels will simplify the research and shorten the time period of data collection in the field. From the experience of analysis, a knowledge of the nature of different kinds of variables should be arrived at.

Research Technique and Analysis

Comprehensive data collection can be run simultaneously, though the data originates from different levels. Based on the objectives of the research, a questionnaire should be prepared beforehand. In this way a redundant collection of data can be eliminated.

Before the data collection is undertaken, a method of sample design for drawing samples must be drawn up to insure that the samples represent the population of the subjects. The number of samples is also a criterion that one can rely upon in considering the conclusions and results of any research work.

Factor analysis can be used not only for data reduction and screening variables, but also for identification of the numerous variables which construct conceptual variables. Factor analysis can be also employed to simplify the number of variables objectively, so that further data processing to multilevel analysis can be executed.

Multi-level is an approach to data analysis which is aimed at attaining "vertical" as well as "horizontal" cross sections. By using multi-level analysis, the holistic nature of variables in an ecosystem can be conserved. Factor analysis of combined variables in multi-levels produces hypothetical statements, and higher order factorization reduces the number of hypothetical statements and makes them easier to interpret.

The reduction of variables makes easier the operation of multiple regression analysis to find out

the relationship of outstanding variables to certain dependent variables, or even the relationship of original variables and factors by using a factor score.

The results of the research can be reported by stages according to the priority needs in the objectives of the research work. A tentative outline of content can be set up to simplify the process of writing. APPENDICES

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APPENDIX A

THE DISTRIBUTION OF DISTRICT TYPES IN REGENCIES

OF WEST JAVA

APPENDIX A

TABLE A-1

THE DISTRIBUTION OF DISTRICT TYPES IN REGENCIES OF WEST JAVA

| | Beser |] Rj | rrigate ce Fiel | d d | Dry L | and Far | ming | Fo Pl | rest an antatio | d n | |
|-----|-----------------------|------------------|--------------------|-----------------------|------------------|--------------------|-----------------------|------------------|--------------------|-----------------------|-------|
| (| kagency kabupaten) | 0 to 100 m | 100 to 500 m | more than 500 m | 0 to 100 m | 100 to 500 m | more than 500 m | 0 to 100 m | 100 to 500 m | more than 500 m | TOTAL |
| 1. | Bandung | - | 1 | 12 | - | 1 | 4 | - | - | 9 | 27 |
| 2. | Bekasl | 13 | - | - | - | - | - | - | - | - | 13 |
| 3. | Bogor | 4 | 10 | 4 | 1 | 3 | - | - | 1 | 1 | 24 |
| 4. | Clamis | 4 | - | - | 2 | 11 | 1 | 2 | 4 | - | 24 |
| 5. | Clanjur | - | 3 | 2 | 1 | - | - | - | 3 | 8 | 17 |
| 6. | Cirebon | 21 | - | - | - | - | - | - | - | - | 21 |
| 7. | Garut | - | - | 9 | - | 1 | 4 | - | 3 | 8 | 20 |
| 8. | Indramayu | 16 | - | - | - | - | - | 1 | - | - | 17 |
| 9. | Krawang | 10 | - | - | 2 | - | - | - | - | - | 12 |
| 10. | Kuningan | - | 1 | - | - | 10 | 2 | - | - | 1 | 14 |
| 11. | Lebak | 1 | - | - | 1 | 1 | - | 6 | 7 | 1 | 17 |
| 12. | Majalengka | 5 | - | - | 2 | 3 | 6 | - | - | - | 17 |
| 13. | Pandeglang | 1 | 6 | - | 5 | - | - | 2 | 2 | - | 16 |
| 14. | Purwakarta | - | 2 | - | 2 | - | - | 1 | 1 | 1 | 7 |
| 15. | Serang | 15 | 4 | - | 4 | 2 | - | 1 | - | - | 26 |
| 16. | Subang | 8 | - | - | - | - | 2 | - | - | 1 | 11 |
| 17. | Sukabuml | - | - | 5 | 1 | 1 | 2 | - | 6 | 5 | 21 |
| 18. | Sumedang | - | - | 1 | - | 4 | 7 | 1 | 1 | - | 14 |
| 19. | Tangerang | 13 | - | - | 4 | - | - | - | - | - | 17 |
| 20. | Taslkmalaya | - | 5 | 4 | - | 11 | 3 | - | - | - | 23 |
| | Total | 111 | 32 | 37 | 25 | 48 | 32 | 15 | 28 | 33 | 361 |

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APPENDIX B

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THE SCATTERING OF DISTRICT TYPES WHERE THE VILLAGE SAMPLES ARE LOCATED (West Java Province)

APPENDIX B

TABLE B-1

| | Regency | R | Irrigate ice Fiel | d .d | Dry L | and Far | ming | Fo Pl | rest an antatio | d n | m - + - 1 |
|-----|-------------|------------------|----------------------|-----------------------|------------------|--------------------|-----------------------|------------------|--------------------|-----------------------|------------------|
| | (kabupaten) | 0 to 100 m | 100 to 500 m | more than 500 m | 0 to 100 m | 100 to 500 m | more than 500 m | 0 to 100 m | 100 to 500 m | more than 500 m | TOTAL |
| 1. | Bandung | - | _ | 5 | - | - | 2 | _ | - | 4 | 11 |
| 2. | Bekasi | 12 | - | - | - | - | - | - | - | - | 12 |
| 3. | Bogor | 4 | 10 | 4 | 1 | 1 | 2 | - | 1 | 1 | 24 |
| 4. | Clamis | - | - | - | 2 | 3 | 1 | 2 | 4 | - | 12 |
| 5. | Clanjur | - | - | - | 1 | - | - | - | 1 | 5 | 7 |
| 0. | Clrebon | - | - | - | - | - | - | - | - | - | - |
| 6. | Garut | - | - | 4 | - | 1 | 2 | - | 3 | - | 10 |
| 7. | Indramayu | - | - | - | - | - | - | 1 | - | - | 1 |
| 8. | Krawang | - | - | - | 2 | - | - | - | - | - | 2 |
| 9. | Kuningan | - | - | - | - | 3 | - | - | - | - | 3 |
| 10. | Lebak | - | - | - | - | - | - | 4 | 2 | - | 6 |
| 11. | Majalengka | 1 | - | - | 2 | 1 | - | - | - | - | 4 |
| 12. | Pandeglang | - | - | - | 1 | - | - | 2 | 1 | - | 4 |
| 13. | Purwakarta | - | - | - | 1 | - | - | 1 | 2 | 2 | 6 |
| 14. | Serang | - | - | - | L | - | - | 1 | - | - | 2 |
| ο. | Subang | - | - | - | - | - | - | - | - | - | - |
| 15. | Sukabumi | - | - | - | 1 | - | - | - | 2 | 3 | 6 |
| 16. | Sumedang | - | - | 1 | - | 4 | 7 | 1 | 1 | - | 14 |
| 17. | Tangerang | 13 | - | - | 3 | - | - | - | - | - | 16 |
| 18. | Taslkmalaya | - | 5 | 1 | - | 3 | 1 | - | - | - | 10 |
| | Total | 30 | 15 | 15 | 15 | 16 | 15 | 12 | 17 | 15 | 150 |

THE SCATTERING OF DISTRICT TYPES WHERE THE VILLAGE SAMPLES ARE LOCATED (West Java Province)

Note: Two village samples in every district Scatter Scattering based on majority of elevation land us 0 - 100 m above sea level = 57 districts Irrigat 100 - 500 m above sea level = 48 districts more than 500 m above sea level = 45 districts Dryland

Scattering based on majority land used: Irrigated rice field = 60 districts Dryland Farming = 46 districts Forest and plantation = 44 districts

APPENDIX C

IDENTIFICATION OF DISTRICT /VILLAGE SAMPLES

AND

THE TYPE AND NUMBER OF VILLAGE SAMPLES:

EXPECTED AND ACTUAL

APPENDIX C

TABLE C-1

IDENTIFICATION OF DISTRICT/VILLAGE SAMPLES WEST JAVA, 1973

| Name of | No. of | Name of | Name of | Stage of | Majo | rity |
|---------|----------|---------------------|---|---------------|--------|--------|
| Regency | District | District | Village | Develop't | LU | EL |
| Bandung | 136 | Banjaran | Sindangpanon | 4 | 1 | 1 |
| | 46 | Batujajar | Banjaran Congkrah Babawa | 2 4 | 1 | 1 |
| | 47 | Pamempeuk | Ranayu Andir Sukasari | 4 | 1 | 1 |
| | 137 | Pengalengan | Cikalong | 4 | 1 | 1 |
| | 138 | Pacet | Cipeyeuh Sukarame | 4 | 1 | 1 |
| | 139 | Sindangkerta | Cibenda | 4 | 2 | 1 |
| | 49 | Cililin | Tanjungwangi Cihampelas | 4 | 2 | ĩ |
| | 91 | Cipatat | Cipatat | 4 | 2 | 1 2 |
| | 48 | Rancaekek | Linggar Cangkuang | 4 | 1 | ī 1 |
| | 92 | Cicadas | Sindanglaya Cikadut | 4 | 2 | 2 |
| | 50 | Ujungberu ng | Cinunuk Cileunyi | 4 2 | 1 1 | 1 |
| Bekasi | 1 | Babelan | Babelankota Kedungpengawas | 4 2 | 1 1 | 3 3 |
| | 2 | Bekasi | Perwira Bayangkari | 4 2 | 1 1 | 3 3 |
| | 3 | Lemahabang | Jatirejo Tanjungbaru | 4 2 | 1 1 | 3 3 |
| | 4 | Pabayuran | Bantarjaya Kartasari | 4 | 1 1 | 3 3 |
| | 5 | Pondokged e | Jatiluhur Jati rang on | 4 | 3 1 | 3 3 |
| | 6 | Setu | Sumurbatu Tanjungjaya | 4 2 | 1 1 | 3 3 |
| | 7 | Sukatani | Sukamanah Sukamakmur | 4 2 | 1 1 | 3 3 |
| | 8 | Tambun | Bajong rawalumbu Jatimulyo | 4 2 | 1 | 3 3 |
| | 9 | Cabangbungin | Pantaisederhana Lenggahjaya | 4 2 | 1 1 | 3 3 |
| | 10 | Cibarusa | Sukadame Karangmulya | 4 2 | 1 1 | 3 3 |
| | 11 | Cibitung | Wanasari Gandasari | 4 2 | 1 1 | 3 3 |
| | 12 | Cikarang | Karangsatu Karangsambung | 4 2 | 1 1 | 3 3 |
| Bogor | 31 | Depok | Cipayung Pancoranmas | 4 2 | 1 1 | 3 3 |
| | 93 | Jasinga | Cileuksa Kalongsawah | 4 2 | 1 1 | 1 2 |
| | 121 | Jonggol | Sirnagalih Sukamaju | 4 2 | 1 1 | 2 2 |
| | 14 | Gunungputri | Wanaherang Bojongkulur | 4 2 | 1 1 | 2 2 |
| | 15 | Gunungsindur | Cibadung Rawakalong | 4 2 | 2 2 | 2 2 |
| | 32 | Kedunghalang | Kedunghalang Ciluar | 4 | 1 1 | 2 2 |
| | 140 | Leuwiliang | Nanggung Leuwiliang | 4 2 | 1 1 | 1 1 |
| | 33 | Parung | Karenkil Kuripan | 4 2 | 1 1 | 2 2 |
| | 61 | Parungpanjang | Parungpanjang Jagabaya | 4 2 | 1 1 | 3 3 |
| | 13 | Rumpin | Sukamulya Rumpin | 4 2 | 3 3 | 2 2 |
| | 16 | Sawangan | Mruyung Pangasinan | 4 2 | 3 1 | 2 3 |
| | 34 | Semplak | Condalali Kencana | - 4 2 | 1 | 2 2 |
| | | | | • | - | - |

| Name of | No. of | Name of | Name of | Stage of | Najo | rity |
|---------|----------|---------------|-------------------------------------|-----------|--------|--------|
| Regency | District | District | Village | Develop't | LU | EL |
| | 35 | Cariu | Cariu | 4 | 1 | 1 |
| | 36 | Ciampea | Tanjung sari Benteng | 2 4 | 1 1 | 1 |
| | 51 | Ciawi | Cicada s Pasirtanggerang | 2 4 | 1 | 1 2 |
| | 37 | Cibinong | Tajur Cipaeum | 2 4 | 1 1 | 2 1 |
| | 52 | Cibungbulang | Karadinan Gunungbunder | 2 4 | 2 1 | 2 |
| | 53 | Cijeruk | Cemplang Cipelang | 2 4 | 1 | 2 |
| | 94 | Cigudeg | Cigombang Cipayung | 2 4 | 1 | 2 |
| | 38 | Cileungsi | Rengacacar Bojong | 2 4 | 1 | 1 3 |
| | 17 | Cimanggis | Dayeun Sukatani | 4 | 1 | 3 |
| | 39 | Ciomas | Sukmajaya Parakan | 2 4 | 1 | 2 |
| | 54 | Cisarua | Dermaga Cipayung | 2 4 | 1 | 2 |
| | 40 | Citeureup | Megamendung Citeureup | 2 4 | 1 | 1 2 |
| Ciamis | 88 | Kawali | Karangasem Citeureup | 4 | 2 | 2 |
| | 105 | Panjalu | Selamaya Sindangbarang | 4 | 2 | 3 |
| | 74 | Cisaga | Ciomas Budiharja | 4 | 2 | 3 |
| | 90 | Cipaku | Panaragan Selacai | 2 4 | 2 | 3 |
| | 131 | Kalipucang | Cleurih Emplak | 4 | 3 | 2 |
| | 132 | Pamarican | Bagolo Bantarsari | 4 | 3 | 3 |
| | 118 | Pangandaran | Cikupa Sidamulih | 4 | 3 | 3 |
| | 119 | Parigi | Kesaratu Ciliang | 4 | 3 | 3 |
| | 133 | Cijeungjing | Karangkamulian | 4 | 1 | 2 |
| | 73 | Cijulang | Batukaras | 4 | 2 | 3 |
| | 134 | Cimaragas | Masawan Situbatu | 4 | 3 | 2 |
| | 89 | Cigugur | Bojongmalang Jadimulya | 4 | 3 | 2 |
| Cianjur | 148 | Campaka | Cibanggala | 4 | 3 | 1 |
| | 149 | Cibeber | Cibitung | 4 | 3 | 1 |
| | 147 | Sukanegara | Sukanegara | 4 | 3 | 1 |
| | 135 | Mande | Cipeuyeuh | 4 | 3 | 1 |
| | 146 | Pacet | Ciherang | 4 | 3 | 1 |
| | 75 | Sindangbarang | Walahir Sagantan | 4 | 2 | 3 |
| | 150 | Cikalongkulon | Cinangsi | 4 | 3 | 3 |
| Garut | 55 | Banyuresmi | Pasawahan Basawahan | 4 | 2 | 1 |
| | 56 | Kadungora | Cisaat | 4 | i | 1 |
| | 57 | Karangpawitan | Suci | 4 | 1 | 1 |
| | 58 | Leles | Lebakjaya Cangkuang Jangkuang | 4 | 1 | 1 |
| | 95 | Malangbong | Jangkurang Malangbong | 4 | 1 | 1 |
| | 76 | Bungbulang | Bojong | 4 | 2 | 2 |

| Name of | No. of | Name of | Name of | Stage of | Majo | rity |
|----------------|----------|------------------|------------------------------|---------------|--------|--------|
| Regency | District | District | Village | Develop't | LU | EL |
| | | | Cihikeu | 2 | 2 | 2 |
| | 122 | Pameungpeuk | Cibalong Mancagahar | 4 | 2 2 | 1 |
| | 96 | Singajaya | Cibintung Tomblong | 4 2 | 2 2 | 1 |
| | 123 | Cikelet | Cigodog | 4 | 2 | 1 |
| | 124 | Cisompet | Panyindangan | 4 | 2 | i |
| Indramayu | 106 | Cikedung | Depok Amis | 4 | 1 | 3 |
| Karawang | 62 | Pangkalan | Rajasinga Kertasari | 2 4 | 1 | 3 |
| | 63 | Telukiambe | Ciptasari Sirnabaya | 2 | 2 2 | 2 3 |
| Tuningan | 79 | Subang | Pinayungan | 2 | 2 | 3 |
| Kuitiigan | , 0 | Subarry | Tangkolo | 2 | 2 | i |
| | 79 | Ciniru | Pakapasan Rambatan | 2 | 2 | 2 |
| | 77 | Garawangi | Sukaimut Kaduangung | 4 2 | 2 1 | 2 2 |
| Lebak | 107 | Maya | Cipining Binong | 4 | 3 7 | 3 |
| | 108 | Rangkasbitung | Panancangan | 4 | 3 | 3 |
| | 109 | Sajira | Citeras Parungsari | 4 | 3 | 3 |
| | 110 | Cimarga | Lalungbungur Sudamanik | 2 4 | 3 3 | 3 |
| | 125 | Cinanas | Tapen Girilava | 2 | 3 | 3 |
| | 126 | Wagnes agrees a | Lanjaririgasi | 2 | 3 | 2 |
| | 120 | warunggunung | Cikulur | 2 | 3 | 2 |
| Majalengka | 111 | Kertajati | Sukawana Sukamulya | 42 | 1 | 3 |
| | 64 | Dawuan | Mandapa Ranjiwetan | 4 | 1 | 3 3 |
| | 65 | Kadipaten | Pasirmuncang | 4 | 2 | 3 |
| | 80 | Sukahaji | Karayunan | 4 | 2 | 2 |
| Pandeglang | 127 | Jiput | Nanggewer Dahu | 4 | 2 | 2 |
| | 112 | Labuhan | Babakan Larita | 2 4 | 2 2 | 2 3 |
| | 66 | Cigeulis | Caringin Katumbiri | 2 | 2 2 | 32 |
| | 112 | Cimenagu | Cigeulis | 2 | 2 | 3 |
| | 113 | - · | Cimanggu | 2 | 2 | 2 |
| Purwakarta | 115 | Campaka | Cibungur Cikopo | 4 | 3 | 2 |
| | 114 | Darangdan | Bojong Cilingga | 4 | 3 3 | 2 2 |
| | 141 | Wanayasa | Taringgul-tonggoh Babakan | 4 | 3 | 2 |
| | 116 | Campaka | Cibening | 4 | 2 | 2 |
| | 67 | Purwakarta | Cimarangan | 4 | 2 | 2 |
| | 142 | Wanayasa | Cibunar Nagrak | 4 | 1 | 2 |
| Serang | 68 | Anver | Babakan Gunungsugih | 2 | 3 2 | 1 3 |
| | 120 | Cinonako | Kepuh | 2 | 2 | 3 |
| - · · · | 120 | Cinangka | Cinangka | 2 | 2 | 3 |
| Sukabumi | 128 | Cibadak | Caringin Cijengkol | 4 | 3 | 2 |
| | 145 | Cikidany | Cikiray Limus nunggal | 4 2 | 3 3 | 2 1 |
| | 69 | Surade (Ciracap) | Citanglan | 4 | 2 | 3 |
| | 143 | Kalapanunggal | Kabandungan Cihamerang | 4 2 | 3 3 | 1 |

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| Name of | No. of | Name of | Name of | Stage of | Majo | rity |
|---------------------------------------|----------|-------------------|------------------------------|-----------|--------|--------|
| Regency | District | District | Village | Develop't | LU | EI |
| | 144 | Lengkong | Cilangkap | 4 | 2 | 1 |
| | 129 | Warungkiara | Lengkong Warungkiara | 2 4 | 3 2 | 1 3 |
| Sumedang | 130 | Buahdua | Bantargadung Buahdua | 2 | 2 1 | 3 |
| · · · · · · · · · · · · · · · · · · · | 97 | Domonoio | Cikurubuk | 2 | ī | ī |
| | 3/ | Darmaraja | Sukanegara Cikeusi | 4 | 2 | 3 |
| | 98 | Rancakalong | Rancakalong Cibunar | 4 | 2 | 2 |
| | 81 | Situraja | Cikadu | 4 | î | ĩ |
| | 99 | Sumedang-selatan | Cikondang | 4 | 2 | 2 |
| | 100 | Sumedang-utara | Pasanggrahan Ganeas | 4 | 2 | 2 |
| | 82 | Tanjungkerta | Talun Pasirhuni | 2 4 | 2 1 | 2 |
| | 101 | Tanjungsari | Cibodas Nanggerang | 2 4 | 1 | 2 |
| | 83 | Cadasngampar | Gudang | 2 | 1 | 2 |
| | , 05 | | Jemah | 2 | 3 | i |
| | 59 | Cikeruh | Cisempur Sayang | 4 2 | 1 | 1 |
| | 102 | Cimalaka | Citimbun | 4 | 2 | ī |
| | 84 | Conggeang | Conggeang | 4 | 3 | 2 |
| | 117 | Tomo | Cijamb e Bugel | 2 4 | 1 3 | 1 3 |
| | 103 | Wado | Sukarasa Tarikolot | 2 | 1 | 2 |
| | 103 | Wado | Pawenang | 2 | 2 | 1 |
| anggerang | 18 | Balaraja | Balaraj a Tobat | 4 | 1 | 3 |
| | 19 | Batuceper | Neglasari | 4 | 1 | 3 |
| | 20 | Kresek | Kedung | 4 | i | 3 |
| | 21 | Kronjo | Jengkol Jenggot | 2 4 | 1 | 3 |
| | 70 | Legok | Gandaria Malangtengah | 2 | 1 | 3 |
| | 70 | Legok | Bojongnangka | 2 | 1 | 3 |
| | 22 | Mauk | Kosambi Ketapang | 4 | 1 | 3 |
| | 23 | Pasarkemis | Sukamantri Wanakorta | 4 | 1 | 2 |
| | 24 | Rajeg | Rajeg | 4 | i | 3 |
| | 25 | Sepatan | Sukatani Pukuhaji | 2 4 | 1 | 3 |
| | 71 | Formong | Kramat | 2 | 1 | 3 |
| | /1 | Serboud | Pakulanan | 2 | 3 | 2 |
| | 26 | Tanggerang | Pasarbaru Sipondok | 4 2 | 1 1 | 3 |
| | 27 | Teluknaga | Dadap Limo | 4 | 1 | 3 |
| | 28 | Tigar aksa | Tigaraksa | 4 | 1 | 3 |
| | 72 | Cikupa | Pasirgadung | 4 | 2 | 2 |
| | 29 | Ciledug | Serdangkulon Kereo | 2 4 | 1 | 2 |
| | 30 | Ciputat | Pondokkacang Cireundeun | 2 | 2 1 | 23 |
| agikma1 | 41 | Indihiena | Sawah | 2 | 1 | 3 |
| asixmdidyd | 41 | indiniang | Cibunigeulis | 4 2 | 1 | 2 |
| | 42 | Kawalu | Cibeuti Karikil | 4 | 1 1 | 2 |
| | 85 | Manonjaya | Cilangkap | 4 | 2 | 2 |
| | 43 | Rajapolah | Tanjungpura | 4 | 1 | 2 |
| | | | Dawagung | 2 | 1 | 2 |

TABLE C-1 (Continued)

| Name of Regency | No. of District | Name of District | Name of Village | Stage of Develop't | Majo o LU | rity f EL |
|--------------------|--------------------|----------------------|--------------------|-----------------------|-----------------|-----------------|
| | 44 | Singaparna | Cintaraja | 4 | 1 | 2 |
| | | | Cikunir | 2 | 1 | 2 |
| | 86 | Sukaraja | Cibalanarik | 4 | 1 | 2 |
| | | - | Leuwibudak | 2 | 1 | 2 |
| | 45 | Cibeureum | Awipari | 4 | 1 | 2 |
| | | | Karangsembung | 2 | 1 | 2 |
| | 87 | Cineam | Rahayu | 4 | 2 | 2 |
| | • | | Rajadalu | 2 | 2 | 2 |
| | 60 | Sukasukur (Cisavong) | Cisayong | Ā | ī | ī |
| | •• | banabanar (brbajong, | Cilevleve | 2 | ĩ | ĩ |
| | 104 | Calann | Noglagari | Ā | 2 | ī |
| | 104 | Cata#4 | Sukahurip | 2 | 2 | î |

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TABLE C-1 (Continued)

Note: Stage of development: 4 = above average; 2 = below average. LU (Land Use); 1 = Ricefield, 2 = Dryland, 3 = Plantation & forest. EL (Elevation); 3 = 0-100 meters asl., 2 = 100-500 meters asl., 1 > 500 meters asl.

Since the majority of land use had been designated according to the real condition of the village samples, the type breakdown for the 300 villages is shown in the following table.

| Description | | | Тур | e Num | ber of | Stra | tum | | | | m =+=1 |
|---|------|------|------|-------|--------|------|------|------|------|---|---------------|
| Description | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | | TOTAL |
| Distribution of dis- trict types | 111 | 32 | 37 | 25 | 48 | 32 | 15 | 28 | 33 | | 361 |
| Scattering of dis- trict types (where village samples are located) | 30 | 15 | 15 | 15 | 16 | 15 | 12 | 17 | 15 | | 150 |
| Expected village samples | 60 | 30 | 30 | 30 | 32 | 30 | 24 | 34 | 30 | | 300 |
| Village sample types according to the field work | 67 | 46 | 44 | 29 | 27 | 28 | 18 | 22 | 19 | | 300 |
| Percentage differ- ence from expected samples | +12% | +538 | +478 | -38 | -16% | -78 | -251 | -358 | -378 | M | 26 |
| District samples of district types | 30% | 728 | 598 | 56% | 278 | 443 | 60% | 398 | 278 | M | 46% |

TABLE C-2

THE TYPE AND NUMBER OF VILLAGE SAMPLES: EXPECTED AND ACTUAL

By examining the above table, it can be seen that the range of village samples as a result of the field work, is 12 to 53 percent higher and 3 to 37 percent lower than the expected village types, or an average deviation of 26 percent. If the two village samples are considered to represent each district (two village samples, above and below average), the district samples range from 27 to 72 percent, or an average of 46 percent of district types.

APPENDIX D

ORIGINAL RESULTS OF HOUSEHOLD LEVEL

FACTOR ANALYSIS

APPENDIX D

TABLE D-1

ORIGINAL RESULTS OF HOUSEHOLD LEVEL FACTOR ANALYSIS

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| Variables | | | | | | Fact | or Numb | ere | | | | | |
|-------------------------------|------|------|------|------|-----|------|-------------|------------|------|------|-----|-----|-----|
| | | ~ | m | - | 5 | و | 2 | æ | 6 | 10 | 11 | 12 | 13 |
| S-3 Family dependents | .06 | - 49 | .25 | 13 | 10. | 05 | .02 | .06 | 60. | .02 | 25 | .07 | .03 |
| S-4 Land Ownership | 04 | 19 | 01 | 05 | .07 | .04 | . 05 | .02 | . 90 | 07 | 04 | .13 | .07 |
| S-5 Land operation | 03 | 22 | 02 | 05 | .08 | .02 | . 05 | .01 | 06. | 06 | 03 | .07 | .07 |
| S-6 Total family income | .08 | 79 | 27 | .04 | 03 | 01 | .08 | .03 | 91. | - 00 | .10 | .03 | .04 |
| S-15 Total consumption | 11. | 79 | .08 | 60. | .01 | .02 | .05 | .08 | .14 | 03 | .11 | 03 | .05 |
| S-16 Total house construction | 03 | 03 | 10 | .87 | 00 | .03 | 03 | .04 | 08 | 03 | 06 | .08 | -01 |
| S-22 Total prod. investment | .05 | 06 | .02 | .02 | .91 | 03 | 05 | .04 | .08 | 00. | 10. | 01 | 07 |
| S-23 Total money savings | 03 | 06 | 02 | 00. | 04 | .07 | .94 | 05 | .04 | 03 | 05 | 06 | 06 |
| S-24 Total expenditures | .04 | 57 | 01 | .57 | .16 | .03 | .12 | .07 | 07 | .01 | .08 | .02 | .00 |
| S-25 Religious org. | .26 | 51. | 09 | .05 | .11 | .12 | .04 | .40 | .05 | .05 | 30 | 05 | 23 |
| S-26 Boy Scout org. | .61 | 15 | .08 | 03 | .07 | • 06 | 04 | 60. | 01 | .07 | 00. | .13 | .08 |
| S-27 Self-defense org. | .42 | .26 | 02 | 03 | 03 | .08 | 04 | . 05 | .07 | 01 | .18 | 10 | .03 |
| S-28 Cooperative org. | .59 | 12 | 07 | 06 | 03 | 02 | .05 | .06 | .10 | 04 | .07 | .05 | .13 |
| S-29 Sport org. | .72 | 03 | .04 | 01 | 60. | 00 | 09 | 09 | 01 | 09 | .04 | 03 | 60. |
| S-30 Cultural org. | .69 | .04 | .02 | .07 | 60. | 04 | 06 | 14 | .01 | 03 | 02 | 00 | .03 |
| S-31 Professional org. | .41 | .06 | 05 | .01 | 15 | .05 | .10 | .01 | .07 | 02 | 04 | 09 | 19 |
| S-32 Loan union | .57 | 15 | .02 | .03 | 06 | 15 | .18 | 06 | 03 | .07 | 09 | .07 | .05 |
| S-33 Org. head of family | .86 | 11. | 06 | .06 | 01 | .03 | .04 | .06 | 03 | .04 | 06 | 02 | .08 |
| S-34 Org. members of family | . 83 | 10 | .03 | 01 | 60. | .02 | 00. | 1 . | • 04 | 01 | 06 | .05 | 05 |
| S-35 Presence election | 03 | .02 | 02 | .01 | 01 | .01 | .02 | 60. | .07 | .04 | .39 | 03 | 05 |
| S-36 Election participation | 60. | 11 | •04 | . 02 | 09 | 02 | 13 | .01 | 12 | .28 | .42 | .06 | .08 |
| S-37 Intensive guid. under. | .02 | .01 | .02 | .03 | .02 | 00 | E 0. | . 62 | .01 | 06 | 21 | .01 | .25 |
| S-38 Intensive guid. part. | .03 | 12 | .01 | .03 | 06 | 09 | 05 | .65 | 03 | 00. | .15 | 10 | 01 |
| S-39 Fam. planning under. | .02 | 02 | • 06 | .04 | 04 | .03 | .05 | .30 | 09 | 05 | 28 | .01 | .54 |
| S-40 Fam. planning part. | .15 | 09 | 60. | .08 | 03 | 11 | .10 | 01 | 18 | .01 | .07 | 03 | .41 |
| S-41 Multi-coop. under. | 11. | 01 | 00. | 03 | 02 | 05 | .07 | 22. | 07 | 08 | 02 | 01 | .40 |
| S-42 Multi-coop. part. | .11 | 03 | .03 | 05 | 03 | .02 | 02 | .40 | 12 | 11 | .19 | .10 | E. |
| S-43 Source of information | .01 | 11 | 03 | 01 | 08 | .06 | 10 | .23 | 03 | .01 | 11 | 12 | .50 |
| S-44 Reading newspaper | .27 | 22 | .01 | .04 | 01 | 15 | .10 | 04 | 16 | 03 | 02 | 01 | .45 |
| S-45 Radio listening | .10 | 03 | 01 | .01 | 01 | 03 | 04 | .01 | 19 | .10 | 04 | 09 | .62 |
| S-46 Radio programs | .08 | .10 | 00 | E0. | 02 | .01 | . 05 | 00. | .17 | .01 | .02 | 00 | .55 |
| S-47 Land reform program | 60. | .06 | .05 | 03 | .02 | 12 | .04 | .14 | .08 | 66 | .12 | .11 | .30 |
| S-48 Involvement land reform | .01 | 09 | .05 | .01 | 04 | .04 | .01 | .04 | 09 | .81 | 07 | 03 | 13 |
| S-49 Stage involvement | .05 | 60. | .01 | 10 | .04 | 06 | 03 | 00 | • 06 | .58 | .17 | 60. | 60. |

| Continued) | |
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| ABLE D-1 (| |

| Variab]es | | | | | | Fact | or Numb | ers | | | | | | |
|-------------------------------|------|-------------|-----|-----|------------------|----------|---------|----------|------|------|-------|-------|------|--|
| | | 7 | ~ | - | 5 | 9 | ٢ | œ | 6 | 50 | Ħ | 12 | 13 | |
| S-50 Total food crop prod. | 0.0 | - 20 | 01 | 10 | 0.0 | 1 8.5 | - 03 | ٤Û | ЯL | 5 | - 03 | 5 | 5 | |
| S-59 Total prod. cost | .03 | 1.45 | 04 | 02 | .02 | - 23 | - 04 | .12 | 45 | 02 | .02 | 25 | . 05 | |
| S-60 Per capita income | 01 | - 47 | 42 | 11. | - 04 | 03 | 50. | - 03 | 08 | 10. | . 25 | 07 | 50. | |
| S-61 Consumption | 07 | -01 | 92 | .07 | - 01 | .06 | .01 | 0 | 01 | . 02 | | | 00. | |
| S-62 House construction | 01 | .13 | .07 | .90 | 04 | .00 | 05 | .02 | 04 | 02 | 10 | .06 | .01 | |
| S-63 Production investment | .06 | .06 | .04 | 5 | .87 | 01 | 04 | .02 | 00. | 00 | 02 | 03 | .10 | |
| S-64 Money savings | 03 | .02 | .03 | .01 | 00. | .08 | .95 | 04 | 03 | 02 | .03 | 07 | 03 | |
| S-65 Per capita expenditures | 03 | 27 | 14 | .71 | .18 | .03 | 80. | .03 | 01 | .18 | .01 | .01 | 01 | |
| S-66 Food crop prod. cost | .02 | 09 | .02 | .01 | 66. | 36 | 08 | .10 | 15 | 16 | 02 | 54 | 04 | |
| S-67 Seed cost | 00. | .20 | 07 | 04 | .07 | 10 | .03 | .03 | .21 | .16 | .11 | .05 | .13 | |
| S-68 Fertilizer cost | .00 | 01 | 05 | 02 | .01 | 23 | .07 | .51 | .02 | .14 | .10 | .00 | 08 | |
| S-69 Insecticide cost | .02 | .01 | 03 | 02 | 01 | 40 | .38 | .23 | .07 | .10 | 05 | .07 | .05 | |
| S-70 Labor cost | 16 | .01 | .06 | .08 | 00 | .03 | 05 | .48 | . 22 | 09 | .05 | .02 | 09 | |
| S-71 Farm tool cost | 01 | - 00 | .04 | 06 | 01 | 07 | 03 | 14 | 03 | 12 | 30 | .46 | 08 | |
| S-72 Land rent | 01 | 04 | .01 | 03 | .01 | 11 | .03 | 14 | 08 | 07 | 08 | 59 | 01 | |
| S-73 Land taxes | .16 | 14 | 01 | 05 | 05 | .02 | 06 | .05 | . 04 | 05 | 21 | .41 | 23 | |
| S-74 Miscellaneous cost | 00. | 05 | .04 | .02 | .06 | 13 | 02 | .10 | 14 | 10 | .22 | • 36 | 15 | |
| S-75 Value of food crop | 02 | 03 | 04 | 01 | .01 | 87 | 03 | .05 | 15 | 05 | 03 | 18 | 00 | |
| S-76 Income from nonagric. | .03 | 24 | 05 | .02 | 04 | 68 | .07 | 01 | 08 | 01 | .08 | .00 | .01 | |
| S-79 Food cost | 11 | .11 | .87 | .01 | 02 | .08 | .01 | . 02 | 04 | .03 | 04 | 11 | 00. | |
| S-80 Clothing cost | 60. | .07 | 5 | .07 | •04 | - 08 | 0.0 | 00. - | .02 | 07 | .11 | .12 | 00 | |
| S-81 Medical cost | .07 | .13 | .26 | .51 | 06 | 03 | .02 | 05 | 60. | .01 | 02 | 06 | .04 | |
| S-82 Education cost | .01 | 35 | .67 | 05 | .03 | .07 | 04 | 01 | .06 | .08 | .02 | .05 | .07 | |
| S-83 Durable goods | .06 | .02 | 02 | 02 | .17 | 02 | 01 | 11 | .02 | 11 | .43 | 08 | 01 | |
| S-84 Gifts | .13 | • 06 | 60. | .20 | - .09 | 10 | 05 | 08 | .36 | 01 | .05 | 05 | 02 | |
| S-85 Recreational spending | 04 | 10 | .16 | 01 | .10 | 00 | .17 | .05 | 02 | 03 | .38 | .10 | .03 | |
| S-86 Other expenses | 60. | 13 | .17 | 03 | 04 | 09 | .03 | 02 | 04 | 11 | 60. | 26 | 15 | |
| S-87 Investment in land | . 02 | • 06 | .02 | .01 | .75 | 01 | .04 | . 02 | 10. | 00 | .04 | 03 | 05 | |
| S-88 Investment in farm tools | 00. | 00 | 04 | 03 | 12 | .10 | 07 | .15 | .06 | 18 | .22 | .03 | 16 | |
| S-89 Investment in vehicles | .03 | 07 | 04 | .01 | .05 | .03 | 04 | 04 | 04 | .01 | 05 | 02 | .06 | |
| S-90 Investment in buildings | | .05 | 01 | .06 | - 02 | 36 | .03 | - 12 | | 06 | .10 | .36 | .05 | |
| S-91 Investment in miscel. | .01 | 10 . | 03 | 02 | č 0. | .01 | • 0 • | 04 | 04 | 04 | • 0 • | • 0 • | .10 | |

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APPENDIX E

ORIGINAL RESULTS OF VILLAGE LEVEL

FACTOR ANALYSIS

APPENDIX E

TABLE E-1

ORIGINAL RESULTS OF VILLAGE FACTOR ANALYSIS

| Variahlee | | | | | | Fact | or Numb | ers | | | | | |
|---------------------------------|-----|-----|-----|------|------|------|---------|------|--------------|-------|------|------|------|
| | н | 2 | 3 | 4 | 5 | 9 | ۲ | 80 | 6 | 10 | 1 | 12 | 13 |
| L-1 Per capita inc. | 01 | 01 | .12 | . 77 | 04 | 19 | .01 | .15 | 60 . | 60. | .07 | .12 | 15 |
| L-2 Irrigated ricefield | .01 | .19 | 44 | | 06 | 30 | 01 | 60. | .03 | . 25 | 39 | 06 | 01 |
| L-3 Eroded and flooded land | 02 | 03 | 17 | 06 | .05 | 18 | 10 | 01 | 14 | 35 | 10 | 1. | .45 |
| L-4 Ricefield intensity | .05 | 00. | 17 | 06 | 06 | 10 | .02 | .87 | 07 | 01 | 07 | .03 | 05 |
| L-5 Dryland intensity | .02 | 03 | .06 | .04 | .01 | 06 | .11 | 05 | .68 | .05 | 00. | 03 | 11 |
| L-6 Ricefield int. guid. sys. | 02 | .78 | .03 | 05 | 15 | 02 | .04 | 03 | ۲ | 06 | .02 | .13 | 02 |
| L-9 Rainfed ricefield | .08 | 32 | .36 | 02 | .08 | .33 | 06 | 04 | 01 | 27 | .28 | 11. | .02 |
| L-10 Forest and plantation | 06 | .08 | .29 | 07 | 01 | .20 | 04 | .07 | 10 | .31 | .05 | 35 | 07 |
| L-11 Dryland farming | .18 | 11 | 28 | 05 | 01 | 05 | .14 | 18 | . | 05 | .34 | .15 | 13 |
| L-12 Average cult. land | .33 | 28 | 09 | 09 | 13 | 29 | .26 | 16 | .24 | 01 | .37 | 60. | .01 |
| L-14 Adult | 12 | .07 | .02 | 04 | .17 | .01 | 16 | .03 | .07 | .02 | 15 | . 74 | 16 |
| L-15 Adults elem. ed. | 09 | .32 | .05 | .04 | 09 | 02 | .04 | .11 | .17 | 02 | .42 | 23 | 11 |
| L-16 Adults more than elem. ed. | 04 | .32 | 32 | .03 | -04 | .12 | .07 | .02 | .27 | .13 | • 06 | .01 | .08 |
| L-17 Adults vocat. ed. | .07 | .08 | 02 | . 02 | 00. | .14 | .12 | .66 | .01 | 02 | ч | 12 | .03 |
| L-18 Pupil/teacher ratio | 10 | 15 | 08 | 05 | 17 | 60. | .11 | 05 | 13 | .12 | • 06 | .05 | .50 |
| L-19 Pupil/children ratio | .06 | .05 | 02 | 05 | .01 | .12 | .10 | -07 | .05 | .06 | .11 | .71 | .03 |
| L-20 Farmers using credit | .08 | .57 | .05 | .04 | .16 | 09 | .29 | 02 | 04 | 05 | .13 | .12 | 12 |
| L-22 People in the family | .32 | 12 | 23 | .11 | 03 | 13 | .48 | 18 | .03 | .15 | .03 | 03 | .17 |
| L-24 Population density | 11 | .21 | 45 | .21 | .34 | .14 | 14 | 06 | 09 | 05 | 33 | .10 | 06 |
| L-25 Credit used | 04 | .34 | 00. | 08 | 60. | .08 | .05 | 05 | 05 | 47 | .07 | .04 | 15 |
| L-26 Production cost | .01 | .25 | 07 | 0.05 | 10 | 09 | .07 | .20 | .17 | .08 | . 05 | . 02 | - 42 |
| L-29 Tractor used | 60 | .27 | .17 | 04 | 08 | .03 | .03 | 07 | .05 | .08 | 02 | 01 | 42 |
| L-30 Outside labor used | .04 | 05 | 00. | .06 | .03 | .03 | .03 | .86 | 14 | 06 | 02 | .03 | .08 |
| L-31 Large animals | .25 | 12 | .08 | 02 | . 75 | 11 | 06 | 10 | 08 | 04 | .08 | .05 | .05 |
| L-33 Village funds | .03 | .14 | 02 | 02 | .06 | 02 | -01 | -01 | - 19 | 60. | .06 | 02 | 01 |
| L-34 Local contributions | .66 | 02 | 01 | 08 | 03 | •04 | 06 | . uu | • 1 • | .20 | 00.1 | .07 | 06 |
| L-35 Government subsidies | .65 | .04 | .02 | .02 | .08 | .03 | .05 | .12 | 05 | 15 | 13 | 05 | 00 |
| L-36 Credit used on each farm | 04 | 04 | .03 | 03 | 09 | 06 | .02 | .04 | .08 | 47 | .08 | 13 | 02 |
| L-40 Permanent house | .21 | .04 | 49 | .03 | 18 | .02 | • 06 | 08 | 03 | 01 | 05 | .22 | 17 |
| L-41 Temporary house | 05 | 02 | .13 | .07 | .76 | 04 | .24 | 40. | .02 | .13 | 00. | 10. | 01 |
| L-44 Fertilizer used | .08 | .52 | 06 | .30 | 03 | 07 | 08 | 03 | 03 | 06 | 03 | 04 | E0 |
| L-45 Insecticide used | •0• | .47 | .02 | .40 | 14 | . 05 | .05 | .10 | 10 | 08 | 23 | 06 | 60. |
| L-46 Seed used | .01 | .08 | 25 | . 65 | .01 | • 06 | 12 | 02 | 00. | .07 | .02 | 07 | .17 |
| L-47 New inputs for rice prod. | .08 | 5 | 52 | 00 | 03 | • 06 | 9 | 60. | .15 | 03 | .06 | 05 | 06 |
| L-48 New inputs for int. guid. | | | | | | | | | | | | : | |
| вув. | 12 | .13 | 59 | .02 | .11 | - 05 | 34 | . 06 | 81. | • 0 • | 81. | 13 | B1. |

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| Continued) | |
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| Variahlee | | | | | | Fact | or Numb | ers | | | | | | |
|---|-----|------|----------|---------|-----|------|---------|-----|------|-----|------|-----|-----|--|
| 2 J T T T T T T T T T T T T T T T T T T | 1 | 2 | 3 | 4 | 2 | 9 | 7 | 89 | 6 | 10 | 11 | 12 | 13 | |
| L-51 Distance to larger city | .05 | 27 | .07 | .12 | 10 | 04 | 00. | .20 | 02 | 22 | .58 | 11. | 12 | |
| L-52 Distance to regency cap. | 03 | 11 | .35 | 01 | 11. | .03 | 05 | .07 | .41 | .24 | H. | .19 | .07 | |
| L-53 Mutual activities | .18 | 14 | 22 | 03 | 05 | .16 | 06 | .14 | 07 | .33 | .26 | 00. | 01 | |
| L-54 Mutual act. participants | .66 | 00 | .07 | .03 | .05 | .05 | 08 | .17 | 01 | .19 | .07 | 02 | 03 | |
| L-55 Cooperatives | 12 | .13 | .00 | 09 | .04 | .11 | .57 | .12 | 11. | 17 | 09 | 06 | .01 | |
| L-56 Cooperative members | .01 | .18 | .04 | 06 | .17 | .10 | Ŀ. | .11 | .20 | 08 | .08 | 06 | 04 | |
| L-57 Village staff | .75 | .08 | .02 | .10 | .03 | 09 | 8 | 02 | 19 | 05 | .10 | .05 | .05 | |
| L-57 Neighborhood assoc. | .38 | .18 | 05 | 60. | 14 | 06 | .34 | 07 | 08 | 60. | .21 | .16 | 11 | |
| L-60 Village defense | .08 | .10 | 60. | .04 | 04 | 05 | 03 | .37 | . 02 | 22 | .49 | .14 | 60. | |
| L-62 Agric. prod. per trader | 12 | 03 | .03 | 02 | .07 | 39 | 04 | .01 | 08 | 07 | .02 | 02 | 17 | |
| L-64 Indust. and agric. prod. | 80. | 06 | •04 | .80 | .04 | .16 | 02 | 02 | .03 | 05 | .06 | 17 | .03 | |
| L-65 Food crop sector | 04 | .03 | 10 | - 13 | .07 | 83 | .16 | .12 | 05 | 10 | 60. | 01 | .11 | |
| L-66 Animal husbandry sector | .06 | 02 | 21 | 10 | .19 | . 23 | 08 | 02 | .08 | 07 | .01 | 12 | .56 | |
| L-67 Fishery sector | .05 | .25 | .21 | .04 | 15 | .10 | 14 | 06 | .04 | .03 | .11 | .43 | .26 | |
| L-68 Forest and plant. sector | .12 | - 04 | .17 | 06 | 08 | .30 | 33 | 03 | 21 | .21 | .08 | 07 | 40 | |
| L-69 Excavation sector | .03 | 15 | .01 | н. | 13 | .14 | 00 | .02 | .22 | 22 | 47 | .07 | 22 | |
| L-70 Home industry sector | 03 | 17 | 04 | .47 | .04 | .34 | .03 | 18 | 14 | 19 | .12 | 14 | 08 | |
| L-71 Transportation sector | .02 | .06 | . 05 | .05 | 06 | .21 | .07 | .04 | .45 | 13 | 35 | 02 | .12 | |
| L-72 Credit sector | 07 | .19 | 08 | 1. | 02 | .22 | .04 | 07 | 24 | 17 | .17 | .04 | 23 | |
| L-75 Trade sector | 09 | 05 | .03 | 09 | .07 | .54 | .35 | .07 | 06 | .12 | 10 | .06 | .10 | |
| L-76 Labor | 14 | 01 | .12 | 05 | 03 | .14 | 08 | 10 | .12 | .40 | .06 | 14 | 21 | |
| L-77 Public service sector | 00 | 23 | 52 | 07 | 22 | 05 | .17 | 04 | 11 | .08 | .07 | .05 | 06 | |
| L-78 Public construction | .63 | .03 | H. | 14 | .05 | .13 | 15 | .01 | .16 | 17 | 24 | 11 | 04 | |
| L-79 Private construction | 10. | .06 | 24 | 06 | .06 | .31 | 27 | .04 | .20 | 18 | .10 | .07 | 02 | |
| L-80 Housing sector | 00. | 00 | .00 | .00 | 00 | 00 | 00 | 00. | 00. | 00. | 00 | 00. | 00 | |
| L-82 Draft animals used | .01 | 07 | 13 | 00 | .82 | 01 | 03 | 04 | .03 | .05 | .02 | .07 | .06 | |
| L-83 Motorable road density | 08 | 08 | 59 | .15 | .04 | .17 | E0. | 00. | 14 | 11 | 03 | 02 | .16 | |
| L-84 Radio and television | .20 | 07 | . | 00.1 | 20 | 11 | .46 | 07 | .11 | .06 | .22 | .11 | 01 | |
| L-85 Traders and retails | 07 | 12 | 11 | 08 | 04 | .36 | .14 | .10 | 14 | .07 | 08 | .22 | .04 | |
| L-86 Bulk product | 12 | 03 | .22 | 4 | 00 | 21 | 06 | 60. | 10 | .25 | - 01 | 11 | 00 | |
| L-87 Land productivity | 05 | 60. | 09 | <u></u> | .07 | 04 | .06 | .02 | .03 | .04 | 14 | .09 | 11 | |

APPENDIX F

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ORIGINAL RESULTS OF DISTRICT LEVEL FACTOR ANALYSIS

APPENDIX F

TABLE F-1

ORIGINAL RESULTS OF DISTRICT LEVEL FACTOR ANALYSIS

| aalde ivell | | e 4 | ICTOR Numbe | rs | |
|------------------------------------|------|-----|-------------|------|-------------|
| | ч | 7 | m | 4 | ъ |
| T-1 Alluvial soils | . 83 | -07 | - 0.7 | - 00 | 18 |
| T-2 Latosol | 26 | 05 | .25 | 57 | .43 |
| T-3 Andosol | 63 | 02 | 17 | .58 | 24 |
| T-4 Settlements | .74 | 07 | .21 | .20 | 04 |
| T-5 Ricefield once a year | .64 | 01 | 26 | 06 | 40 |
| T-6 Ricefield twice a year | .35 | 10 | .15 | .29 | .52 |
| T-7 Miscellaneous gardens | 17 | .49 | .06 | 14 | 23 |
| T-8 Dryland farm | 05 | 16 | 13 | 10 | .74 |
| T-9 Forest and shrubs | 71 | 13 | 16 | 05 | ц |
| T-10 Plantations | 58 | 17 | 05 | .16 | .07 |
| T-11 Range | 21 | 02 | 08 | 33 | 04 |
| T-12 Swamp and marsh | 01 | .85 | 10 | 60. | .15 |
| T-13 Eroded land | 16 | .29 | 23 | 17 | .46 |
| T-14 Per cap. income | .11 | 17 | .15 | .54 | <u>. 05</u> |
| T-15 Children in family | .33 | 02 | .10 | .16 | .13 |
| T-16 Children/pop. | .01 | .84 | .03 | 11 | .20 |
| T-17 Adult/pop. | .18 | 06. | 06 | 03 | .12 |
| T-18 Farmers | .35 | .68 | .22 | .10 | 00. |
| T-19 Businessmen | 01 | .58 | 12 | .10 | 27 |
| T-20 Government staff | .13 | .62 | .29 | .16 | 17 |
| T-21 Village staff | .17 | 06 | 11 | .10 | 36 |
| T-22 Workers | 23 | .17 | 05 | .43 | .19 |
| T-23 Asphalted roads | .06 | 03 | <u>. 96</u> | .02 | 00 |
| T-24 Graveled roads | 05 | 04 | .96 | 01 | 02 |
| T-25 Dirt roads | .12 | 01 | 14 | .27 | .56 |
| T-26 Bicycle owners | .59 | .49 | 09 | .22 | .08 |
| T-27 Nonmot. trans. owners | .11 | .11 | .92 | - 04 | 06 |
| T-28 Motorcycle owners | .33 | .02 | 04 | .20 | .11 |
| T-29 Motorized trans. owners | 22 | .11 | .43 | -58 | 21 |
| T-30 Transportation cap. | .03 | 03 | 06 | 58 | 09 |
| T-31 Ricefield | .86 | 10 | 60. | 60. | 19 |
| T-32 Value agric. products | .16 | .04 | .03 | . 77 | 12 |
| T-33 Prod. cost of principal crop. | .16 | 03 | • 06 | . 79 | 02 |

APPENDIX G

ORIGINAL RESULTS OF MULTI-LEVEL FACTOR ANALYSIS

APPENDIX G

TABLE G-1

ORIGINAL RESULTS OF MULTI-LEVEL FACTOR ANALYSIS

l

| aalde ineV | | | | | Factor | Number | | : | | |
|-------------------------------|-----|------|-----------------|-----|--------|--------|-----|-------------|------------|-----|
| | г | 2 | с | 4 | S | v | 7 | 80 | 6 | 10 |
| S-4 Land ownership | 12 | .17 | .77 | 17 | 12 | .05 | 10 | 02 | 11. | .03 |
| S-5 Land operation | 10 | .19 | . 77 | 20 | 08 | .01 | 12 | 01 | 60. | 02 |
| S-6 Total family income | .31 | .30 | .20 | 45 | .02 | 03 | .14 | .21 | 10 | .12 |
| S-15 Total consumption | .34 | .30 | .24 | 22 | .04 | .03 | .21 | 21 | .14 | .31 |
| S-22 Total prod. investment | .33 | . 08 | .20 | 17 | .08 | 06 | 16 | 27 | 08 | 16 |
| S-26 Boy Scout org. | .08 | .81 | 11. | .01 | 19 | 01 | .07 | 10 | .22 | 06 |
| S-28 Cooperative org. | .02 | .67 | 02 | 09 | 02 | .07 | .15 | 09 | 06 | .06 |
| S-29 Sport org. | .03 | .67 | .04 | .18 | .10 | 06 | 14 | 05 | 18 | 07 |
| S-30 Cultural org. | 08 | . 62 | 12 | .30 | 05 | 19 | 09 | .06 | 12 | .03 |
| S-32 Land union | .08 | .55 | 06 | 00 | 06 | 26 | 03 | 02 | 40 | .06 |
| S-33 Org. head of family | 09 | .82 | 26 | .04 | 14 | 15 | 03 | .04 | <u>.03</u> | .04 |
| S-34 Org. member of family | 04 | .82 | .09 | .13 | 07 | 05 | .20 | 06 | 03 | .04 |
| S-37 Intensive guid. under. | 11 | .27 | .10 | 02 | 02 | .07 | .60 | .27 | 01 | 01 |
| S-38 Intensive guid. part. | .07 | .22 | 07 | .11 | 02 | .20 | 62 | .30 | 00 | 16 |
| S-45 Radio listening | .29 | .31 | .15 | .13 | .27 | .11 | 08 | .20 | 19 | .03 |
| S-46 Radio programs | 10 | .33 | .02 | 13 | .39 | .05 | 13 | .30 | .10 | 23 |
| S-47 Land reform program | 16 | .29 | .38 | .04 | .18 | .31 | .19 | .12 | 21 | 28 |
| S-48 Involvement land reform | .15 | 04 | 36 | .04 | 35 | 21 | 15 | 60 . | .09 | .20 |
| S-49 Stage involvement | 07 | .20 | 11 | 03 | 39 | 37 | .03 | .04 | .11 | 30 |
| S-61 Consumption | 06 | .34 | 01 | .83 | . 02 | .12 | 02 | .01 | 04 | .08 |
| S-62 House construction | .01 | 02 | 13 | .15 | .46 | 08 | 09 | 60. | .05 | 01 |
| S-64 Money savings | 60. | 02 | 08 | .06 | .08 | 17 | .17 | 25 | .17 | 02 |
| S-65 Per capita expenditures | .27 | .13 | 11 | 22 | .31 | 16 | .10 | .03 | 00 | .26 |
| S-68 Fertilizer cost | 13 | .08 | 15 | 07 | 25 | .15 | 42 | .05 | 17 | 08 |
| S-72 Land rent | .15 | • 08 | 12 | .12 | .35 | 23 | .29 | 60 . | 04 | 36 |
| S-75 Value of food crop | .08 | .02 | 03 | 07 | 06 | 02 | .15 | .05 | 85 | 19 |
| S-76 Income from nonagric. | .06 | .08 | 00 | .03 | .10 | 00 | 09 | .04 | .86 | .26 |
| S-79 Food cost | 13 | .29 | 09 | .81 | 01 | .11 | 04 | .02 | .01 | .07 |
| S-80 Clothing cost | 60. | .33 | .25 | .47 | 01 | .13 | 12 | 15 | 17 | 02 |
| S-81 Education cost | .33 | .39 | .17 | .32 | .08 | .12 | 04 | 06 | 14 | .23 |
| S-87 Investment in land | .25 | 12 | .25 | 04 | 40 | .02 | .00 | 28 | 02 | 22 |
| L-l Per capita incôme | .02 | 03 | 23 | 02 | 60. | 15 | .45 | 09 | 26 | .19 |
| L-4 Ricefield intensity | 00. | 05 | .24 | 10 | 06 | 02 | .57 | 10 | 03 | .07 |
| L-5 Dryland intensity | 55 | 03 | 15 | 12 | 11 | 07 | 06 | 18 | 20 | .12 |
| L-6 Ricefield int. quid. sys. | .08 | 05 | 18 | 07 | .22 | .11 | .61 | 12 | .07 | 09 |

| (Continued) | |
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| 6-1 | |
| TABLE | |

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| Variahlaa | | | | Fac | ctor Num | ber | | | | |
|---|-----------------|----------------------|--------------|------------|---------------|-------------|-------------|---------------|----------------------------|------------|
| A 81 1 80 1 8 | | 2 | m | 4 | S | 9 | ٢ | æ | 6 | 10 |
| | d | ć | | Ľ | ľ | ľ | | | | - |
| L-14 AQUIT T-17 Advilte voert edve | 80°- | 07 | 57 | | \ | | 777 | 5 T • F | | 8 T C |
| I-I/ AUUILS VOCAL. EUUC. I_10 Divi1/childron viti0 | 10.1 | | 60. - | | | | | | •••• | |
| L-19 Fupil/Children fatio | | • • • | 1. | | 9 1 9 | | | | | |
| L-20 Farmers using creat | 10. | • T 4 | - 24 | | 20. | | 0 . | /0.1 | 77. | |
| L-30 Outside labor used | 09 | . 02 | 08 | 23 | .15 | 5 | .13 | 03 | • 06 | .12 |
| L-31 Large animals | 04 | 32 | .55 | .22 | 05 | 16 | 16 | | .03 | .05 |
| L-33 Village funds | .24 | 06 | | 06 | | | .21 | .15 | 07 | .20 |
| L-35 Government subsidies | | 11 | .01 | 01.1 | . 19 | 12 | 05 | - 64 | .05 | 15 |
| L-41 Temporary nouse I-46 Sood used | .1. | | | | 1 | | - - - | | | ν. |
| L-5) Distance to larger gity | | 3 C | | | | | | | | 1 80 |
| L-54 Miltinal act narticinante | | | - <u>00</u> | | 4 U | | | | 10. | 2 r 2 r |
| L-55 Cooperatives | . 0.4 | . 25 | .07 | - 36 | <u>90</u> | 60. | . 04 | 60 | 10 | . 25 |
| L-57 Village staff | .05 | 07 | 26 | .20 | .30 | 22 | .13 | 60. | 04 | .05 |
| L-64 Indus. agric. products | .19 | .14 | 02 | 13 | 04 | .01 | .03 | 10 | .11 | .43 |
| L-65 Food crop sector | 10 | 08 | 22 | 02 | 12 | .12 | .29 | 18 | 04 | 43 |
| L-66 Animal husbandry | 01 | 39 | .32 | .22 | 10 | 26 | .13 | 11 | 21 | 04 |
| L-78 Public construction | 60. | 19 | .27 | .21 | .01 | 16 | .41 | .16 | .01 | .06 |
| L-83 Draft animals used | 68 | 24 | .57 | .18 | 12 | 13 | .15 | 04 | 02 | .13 |
| L-83 Motorable road density | .52 | .07 | 18 | 11 | .11 | .08 | 09 | 03 | 03 | 06 |
| L-87 Land productivity | .46 | .01 | 24 | 14 | 02 | .02 | .14 | .14 | 01 | 44 |
| T-I Alluvial soils | 87. | •18 | 16 | 4 0 | 08 | .08 | .22 | 11 | .19 | .01 |
| T-2 Latosol | 44 | 15 | . 25 | 10 | 18 | 06 | 03 | .18 | 44 | 16 |
| T-3 Andosol | ו איי זיי | - - - | | 91 | 17. | | 12 | | 1 0 0 0 0 0 | .1. |
| T-4 Settlements m 2 niceficiti concernents | | | 17 | | , 1. 1. | | | 00. | - - - | |
| T-b Kicerleid once a year m 6 puiltei faun | | | ••• | 1 | 71 | | | 07 . - | 11 | 77. |
| T-6 UTYLANG LAIM T-0 Torget and shuibs | | 01. - | 00°. | | 10. | 1.10 | | TO | - - - | |
| T-10 Plantations | 60 | .12 | - 14 | 10. | .17 | - 03 | - 03 | - 07 | 101. | 40 |
| T-12 Swamp and marsh | 10 | 14 | .03 | .03 | 03 | .84 | .03 | 05 | 04 | 12 |
| T-16 Children/pop | .06 | 06 | .08 | .12 | 15 | .79 | 03 | 10. | .08 | 23 |
| T-18 Farmers | . 43 | 12 | 09 | .11 | 04 | .62 | 09 | .24 | .02 | .03 |
| T-19 Businessmen | 00 | 11 | 18 | .18 | 04 | .60 | .08 | - 18 | 08 | .21 |
| T-20 Government staff | .16 | 08 | 16 | .26 | 15 | 12 | 60 | 1 | 06 | .21 |
| T-23 Asphalted roads | .08 | 10 | 01 | 05 | 10 | 60 | .13 | 83 | .02 | 00. |
| T-25 Dirt roads | .17 | 07 | 80 | 61.1 | - 05 | 20. | 50. | 20 | 12 | 202 |
| T-26 BICYCLE OWNERS | <u>ה</u> | | 9 T . | 80. | | | \ <u>0</u> | .1. | 01. | 0.0 |
| T-27 Nonmot. trans. owners. | .14 | 60 | 01 | 02 | 07 | • 0 • | .13 | 181 | 90 . | .06 |
| T-29 Motorized trans. owners | 10.1 | | - N - | 20. | 5.0 | 90 . | c1 | | | CT. |
| I-30 ILANSPOLLALION CAP. | • • | F -1 -1 |] | | | | 04. | | | |
APPENDIX H

ORIGINAL RESULTS OF FACTORIZATION, MULTI-LEVEL ANALYSIS ON BANDUNG REGENCY

APPENDIX H

TABLE H-1

ORIGINAL RESULTS OF FACTORIZATION, MULTI-LEVEL ANALYSIS ON BANDUNG REGENCY (1973)

| | 10 | 09 | 04 | 10 | 09 | .27 | 08 | .05 | .13 | 09 | .01 | 19 | .05 | 07 | 04 | 05 | .16 | .03 | 12 | 09 | 13 | 03 | .04 | .07 | 19 | .23 | 00 | 04 | 15 | 03 | .12 | .58 | 00. | .05 | .01 | .21 |
|---------------|----|--------------------|--------------------|-------------------------|------------------------|-----------------------------|---------------------|-----------------------|-----------------|--------------------|------------------|--------------------------|----------------------------|-----------------------------|----------------------------|----------------------|---------------------|--------------------------|------------------------------|------------------------|------------------|-------------------------|--------------------|------------------------------|----------------------|----------------|-------------------------|----------------------------|----------------|--------------------|---------------------|-------------------------|-----------------------|-------------------------|-----------------------|-------------------------------|
| | 6 | 22 | 12 | 25 | 32 | .15 | 20 | 07 | .24 | .19 | 15 | .02 | 14 | 31 | 48 | 05 | .12 | 08 | 06 | 09 | .05 | .44 | .19 | .03 | - 69 | .28 | 08 | .04 | .09 | 04 | 01 | .17 | .08 | 11 | 10 | .01 |
| Factor Number | 8 | .25 | . 25 | .25 | .18 | 03 | .40 | .49 | .02 | .13 | .14 | .34 | .22 | .11 | .10 | 00. | .26 | 10 | 00. | .18 | 26 | 08 | .07 | .26 | 01 | 16 | 05 | .05 | 25 | 15 | 10 | 22 | .17 | .26 | .20 | .22 |
| | 2 | .03 | .11 | 19 | 14 | 25 | 00 | 05 | 05 | .13 | 02 | .15 | 03 | .45 | .50 | .50 | .52 | <u>. 05</u> | 03 | .03 | .17 | .31 | 12 | 01 | 00.1 | .59 | 03 | .02 | .18 | 11 | 17 | 07 | 32 | 02 | 33 | .24 |
| | 9 | 10 | 06 | .08 | .06 | 00 | 19 | .07 | .23 | .13 | .34 | .02 | .03 | .15 | .08 | .32 | .10 | .37 | 06 | .13 | 08 | 06 | 30 | 15 | .22 | .15 | .82 | 86 | 11 | .11 | 00 | 02 | .27 | .04 | 60. | 08 |
| | S | .19 | .15 | .33 | .46 | .07 | 13 | 19 | . 05 | 15 | 20 | 35 | .01 | .21 | .11 | .15 | 10 | .71 | - 69 | 71 | .08 | . 25 | .04 | .31 | 13 | .05 | .20 | 08 | .01 | .21 | .10 | .10 | .45 | .38 | 20 | .21 |
| | 4 | .72 | .82 | .19 | .05 | .50 | 19 | 09 | .16 | 03 | .10 | 09 | .18 | 13 | 10 | .07 | .17 | . 02 | 15 | 14 | 14 | 07 | . 05 | 07 | .04 | 04 | 01 | 04 | 18 | .13 | .08 | .46 | 33 | 60. | .04 | 43 |
| | e | . 08 | .02 | 28 | 20 | 03 | 06 | .03 | 07 | 17 | 31 | 19 | 07 | 02 | .20 | 60. | .06 | .18 | 08 | 23 | .14 | 12 | 11 | 36 | .15 | 21 | 10 | .02 | .17 | .12 | .08 | .11 | 30 | .05 | 05 | .11 |
| | 2 | .12 | .10 | .08 | .22 | 60. | .65 | . 55 | .70 | 69. | .50 | . 65 | .80 | .13 | .21 | .28 | .04 | .27 | 04 | .08 | .81 | <u>. 05</u> | .01 | .05 | .08 | .01 | .05 | .02 | .75 | . 75 | . 65 | 05 | 11 | 26 | 07 | 15 |
| | -1 | 09 | 09 | .42 | .43 | .20 | .22 | 02 | 02 | 17 | .07 | 04 | 01 | .14 | .21 | .19 | 19 | 15 | .29 | . 08 | 15 | 14 | 07 | .23 | 13 | .07 | . 04 | .10 | 20 | 00. | .24 | .12 | 02 | .15 | 65 | .14 |
| Variah]es | | S-4 Land ownership | S-5 Land operation | S-6 Total family income | S-15 Total consumption | S-22 Total prod. investment | S-26 Boy Scout org. | S-28 Cooperative org. | S-29 Sport org. | S-30 Cultural org. | S-32 Loan unions | S-33 Org. head of family | S-34 Org. member of family | S-37 Intensive guid. under. | S-38 Intensive guid. part. | S-45 Radio listening | S-46 Radio programs | S-47 Land reform program | S-48 Involvement land reform | S-47 Stage involvement | S-61 Consumption | S-62 House construction | S-64 Money savings | S-65 Per capita expenditures | S-68 Fertilizer cost | S-78 Land rent | S-75 Value of food crop | S-76 Income from nonagric. | S-79 Food cost | S-80 Clothing cost | S-82 Education cost | S-87 Investment in land | L-1 Per capita income | L-4 Ricefield intensity | L-5 Dryland intensity | L-6 Ricefield int. guid. sys. |

TABLE H-1 (Continued)

| Variahles | | | ĥ, | actor Nu | mber | | | | | |
|---------------------------------------|----------|---------|---------------|---------------------|---------------|--------------|------------|-------------|-------|------|
| | -1 | 7 | m | 4 | ŝ | Q | ٢ | 80 | 6 | 10 |
| L-14 Adult | 20 | .06 | .06 | 29 | 10 | 16 | 05 | 39 | .08 | . 04 |
| L-17 Adults vocat, educ. | 27 | 02 | 04 | .01 | 10. | - 04 | 60. | .52 | 14 | .16 |
| L-19 Pupil/children ratio | 02 | .46 | .07 | 07 | .22 | 23 | .06 | - 40 | 10. | . 25 |
| L-20 Farmers using credit | 60. | .04 | 09 | 26 | 21 | 18 | .36 | .07 | 15 | .24 |
| L-39 Outside labor used | • 06 | 15 | .62 | 03 | .08 | 02 | .12 | .52 | 07 | 60. |
| L-31 Large animals | 06 | 17 | 13 | .14 | 03 | 12 | .05 | 15 | 54 | .08 |
| L-33 Village funds | .27 | 07 | 16 | 16 | .38 | 4 0. | .22 | 03 | .03 | 18 |
| L-35 Government subsidies | .02 | 18 | 16 | .13 | 01 | . 02 | .42 | .01 | .40 | 13 |
| L-41 Temporary houses | 14 | 11 | 00. | 14 | .10 | . 08 | .12 | 01 | .13 | .74 |
| L-46 Seed used | .03 | 02 | 01 | 09 | .10 | 9 0 . | .10 | .13 | .06 | . 79 |
| L-51 Distance to larger city | 13 | .08 | 22 | .28 | .32 | 16 | 00. | 24 | 47 | 07 |
| L-54 Mutual act. participants | 22 | 17 | .01 | 13 | .14 | 10 | .28 | .29 | 12 | .46 |
| L-55 Cooperatives | 03 | .10 | •04 | .23 | 04 | 09 | • 06 | .67 | .16 | 05 |
| L-57 Village staff | .02 | .05 | 18 | 18 | 09 | 05 | .32 | 07 | 13 | .49 |
| L-64 Indus. and agric. product | .18 | .10 | .01 | 01 | . 08 | 16 | 23 | .46 | .14 | 02 |
| L-65 Food crop sector | 17 | 17 | .10 | .05 | 13 | .04 | 10 | 21 | 35 | 60. |
| L-66 Animal husbandry sector | 09 | 13 | 11 | .38 | 32 | .18 | . 24 | 28 | 35 | 60. |
| L-78 Public construction | .07 | 01 | 01 | .06 | • 04 | .14 | .53 | 03 | 19 | 06 |
| L-82 Draft animals used | 11 | 09 | 02 | .03 | .03 | 06 | 10. | .02 | 45 | 03 |
| L-83 Motorable road density | .49 | .02 | .08 | .21 | 60 | - 00 | .21 | .07 | .22 | . 04 |
| L-87 Land productivity | 55 | 05 | 05 | 29 | .17 | .01 | 12 | .30 | .18 | 16 |
| T-l Alluvial soils | <u>8</u> | .16 | .07 | 10 | 02 | 19 | 12 | .06 | 00 | .07 |
| T-2 Latosol | - 40 | 36 | 06 | .20 | .11 | . 40 | .15 | 14 | 05 | 44 |
| T-3 Andosol | 51 | • 16 | 02 | 08 | 60 . - | .57 | 01 | .07 | .05 | . 33 |
| T-4 Settlements | 8 | 17 | 04 | 02 | 13 | .20 | - 08 | 00.1 | 1 | .03 |
| T-5 Ricefield once a year | 69. | .07 | 07 | 80. | 19 | | 40 | - 10 | 23 | . 28 |
| T-8 Dryland farm | 60°- | 28 | - 09 | 20 | 20 | E0. | .20 | .05 | 65. | • 15 |
| T-9 FOTEST AND SNTUDS | | | 11 | | | | | 5. | | 1 |
| T-10 FLANCACIONS | ?k | | 8 0 0 1 | | | 7 - 7 | | | | |
| T-12 SWAMP and marsn | 10. | | 200 | 80. | 71. | 10 | | cn . | | |
| T-IO CULLATEN/POP. | | | | | 0 - | 5 | 1 . | | | |
| T-16 Farmers | 14. | 90. | 22. | 71. | | . 02 | | 11 | 01. I | |
| T-19 Bustnessmen | | | | | , r c | | | | | |
| T-20 GOVERNMENT STALL | | # (| | | 02 | | | 71. | | |
| T-23 ASPAGITEG IOAG M-75 Nich word | | | | 0 4 4 0 4 0 4 | | 77. 72 |) | | | |
| T-25 ULT FORG | | 07 | ••• | | | | | | | • |
| T-26 Bicycle owners | 292 | | 64. | 60 . - | 60. | - 07 | | 50 . | 50. | 11 |
| I-7 / WOITING - TANGA - ANTATA | | | | | | | 20 | | 12 | 50 - |
| T-29 Motorized transp. owners | - 08 | 07. | 1 | 07 | | 10.1 | | | | 51. |
| T-30 Transportation cap. | 70. | 00. | | 73. | 01. | | > 1 | • | • | } |

153

APPENDIX I

ORIGINAL RESULTS OF SECOND ORDER FACTORIZATION, MULTI-LEVEL ANALYSIS OF BANDUNG REGENCY

APPENDIX I

TABLE I-1

ORIGINAL RESULTS OF SECOND ORDER FACTORIZATION, MULTI-LEVEL ANALYSIS OF BANDUNG REGENCY (1973)

| | Description of Dathoung | ar an | Fa | ctor Num | ber | |
|-----|--|---|-------------|-------------|-----------|-------------|
| | Description of Patterns | 1 | 2 | 3 | 4 | 5 |
| 1. | Proper land use, building infra structure, and provision of development facilities combined with demographic suitability, will pre- cede industrial activity. | . <u>60</u> | 36 | 16 | 05 | .05 |
| 2. | Organization participation and pri- mary expenditure back-up the development activity for human progress. | .10 | .10 | .19 | <u>73</u> | .02 |
| 3. | The demographic composition will influence intensive agriculture. | .13 | 13 | 00 | 08 | . <u>81</u> |
| 4. | Land tenure system and basic investments precede technological advancement. | 10 | 29 | . <u>57</u> | .08 | 18 |
| 5. | Last decade program influences family income/expenses and industrial activity. | . <u>72</u> | .22 | .16 | .14 | . 02 |
| 6. | The sources of income are influenced by physical land use as well as the economic conditions. | 21 | 07 | 10 | <u>72</u> | 02 |
| 7. | Access to development program and having proper production tools will stimulate development activity. | .10 | . <u>61</u> | 21 | 08 | .10 |
| 8. | Intensive agriculture and organi- zation participation are the base for collective action. | .43 | 07 | 10 | 21 | <u>56</u> |
| 9. | Agricultural modernization and extensive farming are related to public security. | 11 | 10 | <u>79</u> | .13 | 16 |
| 10. | Development activity through extensive farming will lead to industrial activity. | 08 | . <u>68</u> | .12 | .05 | 19 |
| | Sum of squares | 1.17 | 1.14 | 1.12 | 1.12 | 1.08 |

APPENDIX J

ACTUAL AND ESTIMATED VALUE OF TOTAL FAMILY INCOME (Y), AND THE RESIDUALS FROM THE LINEAR MULTIPLE REGRESSION ANALYSIS (in rupiah, \$1.00 = Rp. 415.00) OF BANDUNG REGENCY (1973)

TABLE J-1

ACTUAL AND ESTIMATED VALUE OF TOTAL FAMILY INCOME (Y), AND THE RESIDUALS FROM THE LINEAR MULTIPLE REGRESSION ANALYSIS (in rupiah, \$1.00 = Rp. 415.00) OF BANDUNG REGENCY (1973)

| | Village Samples Name | Actual Value of Y | Estimated Value of Y | Difference Between Actual and Estimated Value of Y | Difference as Percentage of Actual Value of Y |
|-----|------------------------------|-------------------------|----------------------------|---|--|
| 1. | Nyalindung | 80,663,130.00 | 142,547,800.00 | -61,884,670.00 | 76.7 |
| 2. | Cipatat | 82,426,250.00 | 36,274,430.00 | 46,168,820.00 | 56.0 |
| з. | Cimareme | 486,916,000.00 | 354,211,000.00 | 132,705,000.00 | 27.3 |
| 4. | Ngamprah | 289,939,100.00 | 253,192,200.00 | 36,746,970.00 | 12.8 |
| 5. | Cibabat | 221,096,100.00 | 263,227,200.00 | -42,131,040.00 | 19.1 |
| 6. | Melong | 295,977,300.00 | 271,158,800.00 | 24,818,500.00 | 8.4 |
| 7. | Antapani | 286,326,700.00 | 201,928,400.00 | 84,398,300.00 | 29.5 |
| 8. | Ciburial | 212,991,600.00 | 209,815,600.00 | 3,175,954.00 | 1.5 |
| 9. | Cipadung | 182,169,400.00 | 204,004,400.00 | -21,835,000.00 | 12.0 |
| 10. | Cinunuk | 263,435,300.00 | 201,987,300.00 | 61,447,950.00 | 23.4 |
| 11. | Bojonglo a | 181,653,100.00 | 247,965,700.00 | -66,312,600.00 | 36.5 |
| 12. | Haurpugur | 192,510,000.00 | 276,334,300.00 | -83,824,260.00 | 43.5 |
| 13. | Cikasungka | 128,076,300.00 | 208,295,900.00 | -80,219,650.00 | 62.6 |
| 14. | Tenjolaya | 215,677,400.00 | 337,126,500.00 | -121,449,100.00 | 56.3 |
| 15. | Nanggeleng | 219,412,800.00 | 202,036,800.00 | 17,375, 9 00.00 | 7.9 |
| 16. | Ciroyom | 119,122,500.00 | 166,221,700.00 | -47,099,210.00 | 39.5 |
| 17. | Raj ama nd ala | 193,066,300.00 | 176,974,100.00 | 16,092,190.00 | 8.3 |
| 18. | Cikalong | 206,049,500.00 | 172,619,800.00 | 33,429,710.00 | 16.2 |
| 19. | Cihideung | 218,455,600.00 | 181,766,100.00 | 36,689,500.00 | 16.8 |
| 20. | Cihanjuang | 213,550,600.00 | 246,563,500.00 | -33,012,830.00 | 15.5 |
| 21. | Cikahuripan | 324,447,000.00 | 333,173,500.00 | -8,726,543.00 | 2.7 |
| 22. | Cibodas | 244,621,900.00 | 284,869,000.00 | -40,247,110.00 | 16.5 |
| 23. | Buahbatu | 505,021,900.00 | 364,138,800.00 | 140,883,100.00 | 27.9 |
| 24. | Cipagalo | 230,606,900.00 | 310,472,200.00 | -79,865,280.00 | 34.6 |
| 25. | Sukamenak | 352,888,800.00 | 325,647,300.00 | 27,241,450.00 | 7.7 |
| 26. | Sukapura | 346,582,500.00 | 272,740,900.00 | 73,841,640.00 | 21.3 |
| 27. | Sukagalih | 189,988,100.00 | 148,502,800.00 | 41,485,360.00 | 21.8 |
| 28. | Sukasari | 270,519,400.00 | 266,769,500.00 | 3,749,837.00 | 1.4 |
| 29. | Kamasan | 237,038,500.00 | 181,367,800.00 | 55,670,740.00 | 23.5 |
| 30. | Nagrak | 365,275,000.00 | 293,862,500.00 | 71,412,460.00 | 19.6 |
| 31. | Sukamaju | 155,864,400.00 | 196,510,600.00 | -40,646,230.00 | 26.1 |
| 32. | Warnabari | 112,097,700.00 | 225,143,000.00 | -113,045,200.00 | 100.8 |
| 33. | Cipeuyeum | 178,256,400.00 | 1/4,683,300.00 | 3,5/3,096.00 | 18.8 |
| 25 | Thur | 212 222 600 00 | | -43,148,130.00 | 31.4 |
| 35. | Cinodog | 174 193 600.00 | 103,413,700.00 | | 14.0 |
| 27 | Dadaeuka | 207 936 300 00 | 267 711 800 00 | | 2.0 |
| 30 | Wangigagara | 267 834 100 00 | 262 215 700 00 | -09,073,310.00 5 619 403 00 | 23.5 |
| 30. | Manggabang | 229 530 000 00 | 196 098 000 00 | 33 432 020 00 | 14 6 |
| 40 | Babakan | 177 503 100 00 | 172 317 800 00 | 5 195 344 00 | 2 9 |
| 41 | Sadu | 246 846 400 00 | 241 998 400 00 | A 947 979 00 | 2.0 |
| 42 | Cilegon | 189.350 000 00 | 235 971 400 00 | | 24 6 |
| 43. | Panyocokan | 230,835,600,00 | 257,425,600,00 | -26.589.980.00 | 11 6 |
| 44 | Cinelah | 201,512,500,00 | 172 083 000 00 | 29,429,530,00 | 14 6 |
| 45. | Sukamulya | 195.052.900.00 | 160.466.100.00 | 34.586.800.00 | 17.7 |
| 46. | Cikoneng | 191,357,500,00 | 193,130,600,00 | -1.773.140.00 | 0.9 |
| 47. | Selacau | 195,740,600,00 | 221,066,400,00 | -25,325,750,00 | 12.9 |
| 48. | Utama | 201,915,900,00 | 239.504.800.00 | -37,588,920,00 | 18.6 |
| 49. | Tanjungjava | 150,918,400.00 | 148,568,800.00 | 2,349.562.00 | 1.6 |
| 50. | Tanjungwangi | 119,559,400.00 | 189,089.700.00 | -69,530.360.00 | 58.2 |
| 51. | Sindangkerta | 355,154,400.00 | 249,645,500.00 | 105,508,900.00 | 29.7 |
| 52. | Cikadu | 216,898,800.00 | 252,708,800.00 | -35,810,090.00 | 16.5 |
| 53. | Gununghalu | 351,742,800.00 | 329,709,100.00 | 22,033,610.00 | 6.3 |
| 54. | Sodong | 406,304,600.00 | 390,058,100.00 | 16,246,500.00 | 4.0 |
| | - | | | | |

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