the Rice Region and the Upland Tree Region, and lowest on farms in the Forest Region. They are independent from land classes and size of farm area. The application of fertilizer is a managerial matter since farmers can buy as much fertilizer as they could from the local markets at a price comparable to that at which they pay for their fertilizer rations from Taiwan Food Bureau.

11. The larger the farm is, the more efficiently the labor is used. This implies that the disguised unemployment does not exist to so great an extent on larger farms as it does on smaller farms.

54. An Economic Study of Land Use in Pingtung Hsien, Taiwan from 1951-60

屏東縣土地利用之經濟研究

Sponsor: National Science Council
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Purpose of Study:

1. To determine the present agricultural regions of Pingtung Hsien, based on its natural features, land use patterns and land area per family or per person.
2. To subclassify the agricultural regions by economic land classes based on the intensity of land use and the yields of main crops.
3. To make a map of agricultural regions and economic land classes for Pingtung Hsien.
4. To explore the factors related to the intensity of land use and to analyze their inter-relationships.
5. To examine the relationships of various factors to income and other business aspects.
6. To test the following relationships:
   (1) The relationship of economic land class to production costs per chiao.
   (2) The relationship of economic land class to farm income.
   (3) The relationship of farm size to farm income.
   (4) The relationship of farm size to yield per chiao.
7. To make constructive suggestions with the hope that they will be adopted by agricultural extension workers as well as individual farmers in improving land use pattern and farming efficiency.
8. To provide essential information on income gaining capacity of the land so that government policy-makers could design a fair base for land-tax collection.

Methods of Study:

1. Determining agricultural regions:
   (1) Printing maps to show village boundaries for Pingtung Hsien in recording the available data.
   (2) Studying natural features, land use patterns and land area per family or per person to determine agricultural regions.
2. Classifying economic land classes within each agricultural region:
   (1) Collecting information concerning land use at the village level from various township offices.
   (2) Classifying preliminary economic land classes based on the data collected.
   (3) Using aerial photos to make interpretations of land use and to review the preliminary economic classification, and then making corrections of the preliminary economic land classification map through field review.
   (4) Studying soil reports of Pingtung Hsien extensively and using information of various soil groups with respect to their chemical contents, adaptability to all kinds of crops and productivity to determine economic land classes.
3. Conducting a farm management survey stratified by preliminary agricultural regions and economic land classes:
   (1) Selecting sample villages and sample farm households by stratified systematic random sampling.
   (2) Interviewing farmers about land use, income, expenses, investment and other economic characteristics related to the land use study.
   (3) Calculating and analyzing data collected from the farm management survey.
   (4) Summarizing the results of the study by agricultural regions and economic land classes.

Summary and Conclusions:

Pingtung Hsien is located at the most southern part of Taiwan with a rather narrow and long area distribution. The topography is roughly delineated as mountainous, rolling hill, plain, and low hill and terrace regions, in which the first three are distributed in the eastern, southern and western parts of this hsien respectively, while the last one is scattered between the rolling hill and the plain regions. The annual rainfall, increasing with the elevation, ranges from 2,274 to 5,059 mm.; while the average temperature, decreasing with the elevation, ranges from 24.4°C. to 19.1°C. The soils in this hsien are coarse in texture with rather good physical properties but with low water holding capacity. The soil nutrient contents are generally high in potash, medium in phosphorus and nitrogen, and low in organic matter. The transportation is good in the western plain area and most inconvenient in the eastern mountainous area. This hsien is one of the important agricultural production areas in Taiwan. As witnessed by the fact shown in Table 2.7 of the report, 14% of the first crop of rice, 10% of the 2nd crop of rice, 65% of soybeans, 94% of sisal, 32% of banana and some of other important fruits with rather high proportions of the total production of Taiwan are produced in the plain and rolling hilly lands of this hsien. However, the results and conclusions of this study are summarized as follows:
1. According to broad differences in the physical characteristics and in land use pattern, the total land area of Pingtung Hsien is mapped and divided into four agricultural regions, namely: (1) the rice region (2) the upland field crop region, (3) the upland tree region and (4) the forest region. The differences between agricultural regions are mostly caused by climatic condition, elevation, topography and irrigation.

2. Within each agricultural region, farms grow similar kinds of crops, and are of roughly similar size. The income per farm family is about the same in the rice and upland crop regions, but lower in the upland tree and forest regions. The rice and upland crop regions are the most densely populated and intensively used regions in Pingtung Hsien, followed by the upland tree and forest regions.

3. Within an agricultural region, land is further mapped and subclassified into economic land classes according to differences of intensity of land use to which it will repay. In this study, the intensity of land use is measured by the index of multiple cropping and the yield of main crops. Four economic land classes, 1, 2, 3 and 4, are defined and used in the rice region; three economic land classes, 2, 3 and 4, in the upland crop and upland tree regions; while in the forest region, land is not subclassified in this study. Land class 1 is, therefore, the most intensively used land, and it shows evidence of the highest income potential; and land class 4 is the least suitable for intensive use, and it offers the least opportunity to the average farmers to earn income and accumulate capital.

4. Income per farm family varies significantly among economic land classes. Farms on the more productive land tend to earn higher income than those on the less productive land. This evidence justifies the land classification made in this study.

5. Within each economic land class, great differences in income are related to size of farm area. Size of farm appears to be more important a factor than economic land class in governing farm earnings.
6. Higher incomes are generally earned by the farm families who operate large farms on the best land, and these farms are more commercialized and are able to accumulate more capital.

7. Farmers with small size of land area are more eager to seek off-farm work and other non-agricultural opportunities for income. In order to maintain an acceptable level of living, they always depend more on these off-farm incomes than farmers with larger size of farm area. As for the economic land classes and the percentage of farms having non-agricultural receipts off the farm, no evident relationship is found.

8. The total capital investment per farm is interrelated with land class and size of farm. Value of land is the decisive factor that causes the variation in the total Capital investment of farmers. In this study, it has been found that value of land constitutes the highest percentage of the total investment; it is generally 87% in the rice region, 83% in the upland crop region, 66% in the upland tree region and 67% in the forest region.

9. Gross farm earnings per farm and family farm expenses per farm are both related to size of farm area. Large farms earn the largest gross farm receipts and have on the average higher family farm expenses than the smaller ones do. The advantage of the large farm in practice is not that it produces more per dollar spent; instead, it has an opportunity to earn return on a greater expenditure per farm.

10. The fertilizer expenses per chia are the highest on farms in the rice region, and the lowest on farms in the upland tree region. The application of fertilizer is much influenced by the managerial factor other than by the productivity of land and size of farm.

11. The larger the farm, the more efficiently the labor is used. This implies that the disguised unemployment does not exist to so great an extent on larger farms as it does on smaller farms.