reservoir built in Free China. Its original irrigation area was estimated about 56,318 ha, which belongs to three irrigation associations, Hsinghai 5,083 ha, Taoyuan 29,292 ha, and Shihmen 21,943 ha. But the actual benefited area, as it were, was limited to the area of 21,943 irrigated by shihmen Irrigation Association; of course other area rather than the Shihmen canal Irrigation Area might also be benefited from the reservoir but extremely low and could be neglected in the actual estimation of tangible benefits.

Of the four agricultural regions the Rice Region is the only region benefited by the reservoir. Upland Field Crops and Upland Tree Region received no benefits at all in 1964. Should the poor tea gardens in both of the two regions, be developed in the near future, then the benefited area will possibly be extended to these two regions.

In 1964 severe drought occurred, the reservoir was under its originally planned capacity without sufficient water to irrigate the farm land. This calamity and the high irrigation costs borne by farmers were the cause of the disputing problems as described in chapter VI of this report. Since the reservoir has created troublesome problem for the management, operation and maintenance of the administration caused criticisms. So proper measures should be adopted as soon as possible for maximizing the benefits of water utilization of the reservoir and minimizing the burden of the farmers.

52. An Economic Study of Land Use in Tainan Hsien and City, Taiwan
台南縣市土地利用之經濟研究

Sponsor: The Joint Commission on Rural Reconstruction
合作機構: 中國農村復興聯合委員會
Author: Shison C. Lee
作 者: 李慶謙
Accomplished Date: 1966
**Purpose of Study:**

1. To determine the present agricultural regions of Tainan Hsien and City, bases on land use patterns, natural features and land area per family or per person.
2. To subclassify the agricultural regions by economic land classes based on the intensity of use to which the land is adopted.
3. To make maps of agricultural regions and economic land classes for Tainan Hsien and City.
4. To explore the factors related to the intensity of land use and analyze their inter-relationships.
5. To examine the relationships of various factors to income and others 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 size of farm to farm income.
   (4) The relationship of size of farm to yield per chiao.
7. Based upon findings of this study to make constructive suggestions to be adopted by agricultural extension workers as well as individual farmers in improving land use pattern and farming efficiency.
8. To make constructive suggestions to governmental policy makers so as to designing a fair land-tax according to income gaining capacity of the land and the type of farmers.

**Methods of Study:**

1. Determining agricultural regions:
   (1) Printing maps showing village boundaries for Tainan Hsien and City to be used in recording the available data.
   (2) Studying natural features, land use patterns and land area per person or per family to determine agricultural regions.
2. Classifying economic land classes within each agricultural region.
   (1) Collecting from various township offices information concerning land use at the village level.
   (2) Classifying preliminary economic land classes by making use of the data collected.
   (3) Using aerial photos to make interpretations of land use and review the preliminary economic classification, and then making corrections in the preliminary economic land classification map through field review.
   (4) Studying soil reports of Tainan Hsien and City extensively and making use of information of various soil groups respective to their chemical contents, adaptation of kinds of crops and productivity in determining economic land classes.

3. Making a farm management survey stratified by preliminary agricultural regions and economic land classes.
   (1) Selecting sample vill and sample farm households by stratified systematic random sampling.
   (2) Interviewing farmers on land use, income expenses, investment and other economic and sociological characteristics relative to the economic study of land use.
   (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 Conclusion:**

1. According to broad differences in the physical characteristics and in land use pattern, the total land area in Tainan Hsien and City was mapped and divided into five Agricultural Regions, namely: (1) the Rice Region, (2) the Rotational Crop Region, (3) the Upland Field Crop Region, (4) the Upland Tree Region and (5) the Forest Region. Differences between Agricultural Regions were mostly caused by climatic condition, elevations, 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, Rotational Crop and Upland Crop Region but is lower in the Upland Tree and Forest Region. This verifies the principle that agricultural Regions do not necessarily differ in the income produced by per farm family or per person but do vary in number of persons supported per unit of area. The Rice Region and the Rotational Crop Regions are the most densely populated and intensively used regions in Tainan Hsien and City, followed by the Upland Field Crops, Upland Tree Crop and Forest Regions.

3. Within an Agricultural Region, land was further identified and classified into economic land classes according to differences of intensity of land use which it will repay. Four economic land classes were defined and used in this study. Land Class 1 was the most intensively used land and showed evidence of the highest income potential. Land Class 4 was defined as the least suitable for intensive use and offering the least opportunity to the average farmer to earn income and accumulate capital. Land in the Rice Region and the Rotational Crop Region was classified as economic land classes 1, 2, 3, and 4 land in the Upland Crop and Upland Tree Region as economic land classes 2, 3 and 4. The Forest Region was not sug-classified in this study.

4. Income per farm family varied significantly among economic land classes. Farms on the more productive land tend to have higher incomes than those on less productive land.

5. Within each economic land class, great differences in income are related to size of farm area. Size of farm appears to be even more important than economic land class in governings farm earnings. It was found that the size of farm area is independent from economic land class as a farm characteristic.

6. The higher incomes are earned, on the average, by farm families who operate large farms on the best land. In fact, these farms are more commercialized and they are able to accumulate more capital. If a farm family operates
less than about 0.5 chia land, the management and labor return is very low, even on the better-than-average land.

7. Farmers with small size of land area are more eagerly to seek off-farm work and other non-agricultural opportunities for income. In fact, they depend more and on these off-farm incomes than farmers with larger size of farm area. There was little relationship found between economic land classes and the percentage of farms having non-agricultural receipt off the farm.

8. The total capital investment per farm is interrelated with land class and size of farm. The distribution of the capital investment among different kinds of capital was remarkable similar within each Agricultural Region. Value of land constituted the highest percentage of the total investment; it was generally about 85 percent.

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 spend higher family farm expenses on the average than small ones do, but the family farm expenses are not large enough to offset the advantage in gross from earnings. The percentage of family farm expenses against gross farm earnings are about the same between different sizes of farm area in the same land class. The advantage of the large farm in practice, is not that it produces more, per dollar spent; instead, it has an opportunity to earn a return on a greater expenditure per farm.

10. The fertilizer expenses per chia are the highest on farms in the Rice Region, and lowest on farms in the Upland Crop Region. They are independent from land classes and size of farm area. The application of fertilizer is a managerial matter since farmers can by as much fertilizer as they could from the local markets at prices comparable to those at which they pay for their fertilizer rations from Taiwan Provincial Food Bureau.

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

53. An Economic Study of Land Use in Kaohsiung Hsien and City, Taiwan

高雄縣市土地利用之經濟研究

Sponsor: National Science Council

Author: Shison C. Lee

Accomplished Date: 1967

Purpose of Study:

1. To determine the present agricultural regions of Kao-Hsiung Hsien and City, based on land use patterns, natural features and land area per family or per person.
2. To subclassify the agricultural regions into economic land classes based on the intensity of use to which the land is adopted.
3. To make maps of agricultural regions and economic land classes for Kao-Hsiung Hsien and City.
4. To explore the factors related to the intensity of land use and analyze their inter-relationships.
5. To examine the relationships of various factors between income and other business aspects.
6. To test following relationships:
   (1) The relationship of economic land class and production costs per chiao.
   (2) The relationship of economic land class and farm income.
   (3) The relationship of size of farm and farm income.
   (4) The relationship of size of farm and yield per chiao.
7. Based upon findings of this study this author tries to make