

A Note on the Vegetable Growing in East Java*

Hiroshi OGURA

(Faculty of Agriculture, Kagoshima University, Kagoshima Japan 890)

Introduction

From the 1st of June to 14th of July in 1981, the author was sent to the Republic of Indonesia for a field survey of vegetable growing in East Java and Bali Island under the project of "Ecological Biology and the Promotion of Tropical Primary Industry" in collaboration with Bogor Agricultural University (Institut Pertanian Bogor), the Republic of Indonesia.

Informations about vegetable growing in rural areas of East Java and Bali Island are very scanty compared with that of major crops such as rice, maize, sugarcane, tea and tobacco etc. This survey aims to add some informations about vegetable growing in rural areas especially in East Java.

General Consideration

In anywhere vegetable growing is greatly affected by the natural environmental conditions especially by the meteorological and field conditions. this may be true in the tropics too.

Java, Madura and Bali Islands are located between latitudes 6° to 9° South and lie between longitudes 105° to 116° East and they show little difference in day length and atmospheric temperature throughout the year. The mean maximum and minimum temperatures have been recorded in the range of 30°~32°C and 24°~25°C, respectively.

On the other hand, the amount of rainfall in these areas is about 2,000 mm a year but it varies considerably throughout a year depending on the season and also from year to year. The period from November to April experiences much rainfall than the other half of the year from May to October and hence they are called rainy and dry season,

* This work was financed by the Overseas Scientific Survey No. 5641062 from the Ministry of Education, Japan, in 1981.

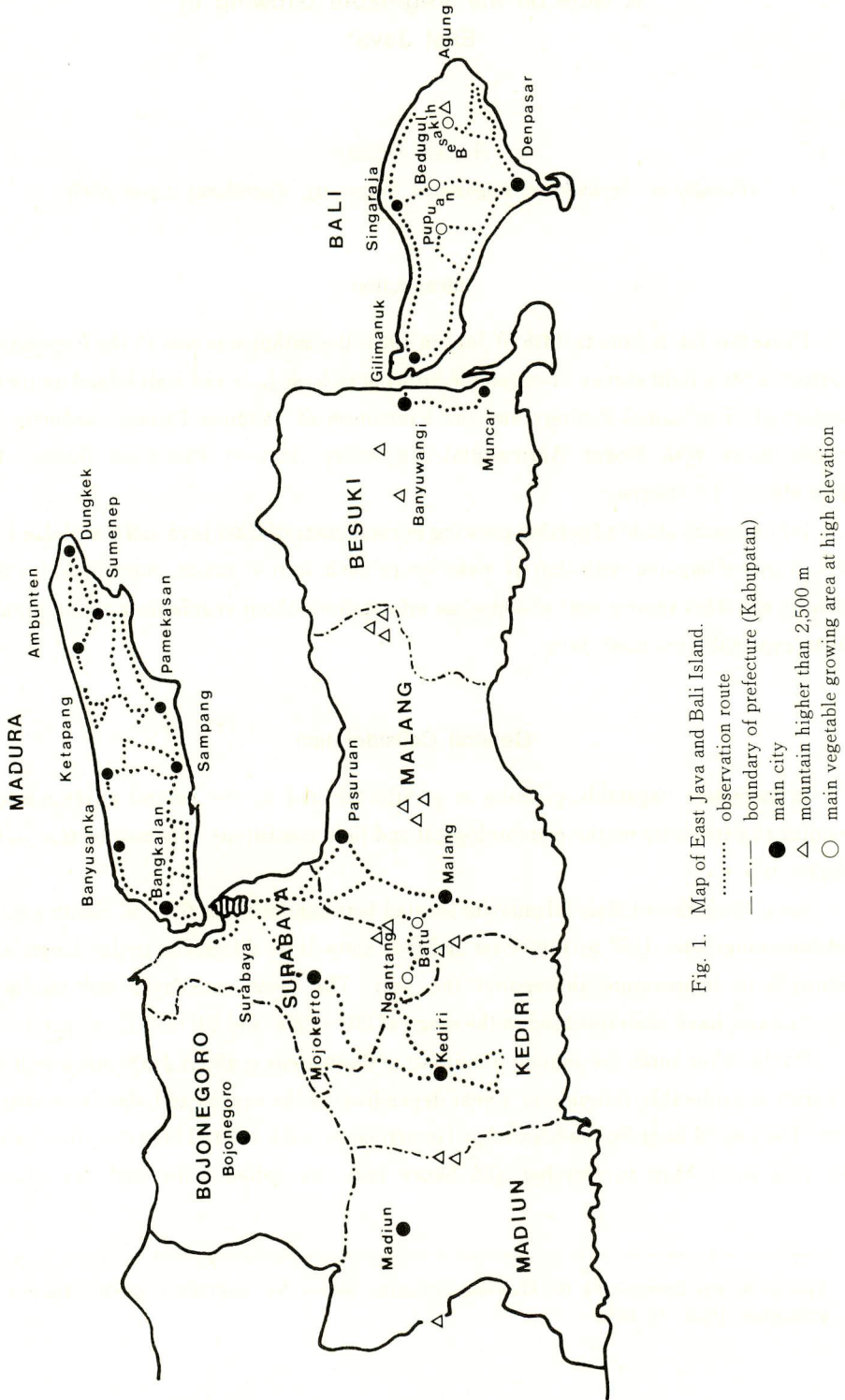


Fig. 1. Map of East Java and Bali Island.

- observation route
- boundary of prefecture (Kabupaten)
- main city
- △ mountain higher than 2,500 m
- main vegetable growing area at high elevation

respectively. The seasonal change of rainfall is more distinct in the more eastern part of this area.

As is well known there are many high mountains and they form complex geographical feature in East Java and Bali Island. At the highlands over 800 m which includes valleys and slight mountain slopes the weather becomes mild and allows successful growth of some vegetables.

Sites for Vegetable Growing in East Java

Plant production in East Java has been done mainly under three field conditions such as paddy fields, upland fields including slope lands, and gardens. On the slopes of mountains, coffee, tea, clove, palms, cassava and banana etc. are commonly grown.

In the areas where it is possible to secure enough water cultivation of paddy rice is given the first priority. In uplands and paddy fields which hold insufficient water to grow paddy rice in dry season, various kinds of crops including vegetables are grown in these fields.

In some areas for example prevailing swamps and lowlands with very poor drainage systems rice is grown in a specific way which combined with fish culture. Frequently, vegetables are grown on heaped up earth in a paddy field.

Out of these fields, upland fields and small gardens are usually the most important and suitable sites for vegetable growing. Upland fields are sites for large scale production of vegetables for marketing.

On the other hand, gardens which are generally located around or next to the house are often surrounded by hedges and lie usually under shading palm, mango or other trees. The areas of gardens are relatively small and most of them are in the range of about 100 ~ 300 m². In these small gardens various kinds of fruits, crops, and vegetables are grown by traditional methods mainly to supply family food, which play important role in maintaining health, life and economy in rural areas in East Java.

Elevation and Vegetable Growing in East Java

As is mentioned in previous sections, high temperature condition prevails on lowland in East Java throughout the year.

The temperature falls with the rise in elevation, and at elevations of over 800 m, several vegetables which prefer mild temperature condition are grown successfully.

Elevation which is closely related to temperature is another important factor for vegetable growing in the tropics, and it frequently determines the kinds or varieties of vegetables which would grow best in each respective area.

Many of the important vegetables which originated in the temperate zone such as carrot, radish, potato, broccoli, brussels sprouts, cabbage, cauliflower, chinese cabbage, garlic and a few kinds of legumes etc. are now usually grown in East Java at relatively high elevations. Fortunately, there are many highlands suitable for growing these type of vegetables in southern part of East Java. Malang prefecture, especially Batu area is one of the most famous vegetable production areas in East Java.

On the other hand, most of the important vegetables which originated in the tropics or the subtropics such as amaranth, ceylon spinach, water convolvulus, chilli, cucumber, eggplant, okra, squash, water melon, many kinds of legumes, sweet potato, yam and others tolerate well and grow under high temperature conditions and they are grown throughout the lowlands of East Java.

Kinds and Production of Vegetables in East Java

The vegetables which are grown in East Java could be divided into two groups according to their characteristics, for example, tolerance to high temperature conditions and methods of planting. The first is a group of vegetables which tolerate high temperature conditions, especially traditional vegetables such as amaranth, ceylon spinach, chard, goose foot, okra, leaf mustard, new zealand spinach, purslane, shallot, roselle, water convolvulus, angled loofah, bitter gourd, cucumber, chayote, chilli, eggplant, tomato, watermelon, cassava, ginger, kaffir potato, edible canna, sweet potato, taro, yam, some of herbs and legumes etc. Many of them are grown in small gardens for home use, using traditional methods. However, some of them are also grown in upland fields on relatively large scale. Some of these vegetables serve more than just one purpose. For example, the young leaves of cassava and some of legumes are used as leaf vegetables for some time during their life cycle, even if their final and main products are roots or seeds.

The other group of vegetables requires relatively mild temperature conditions for successful growth especially those vegetables which originated in the temperate zones. Many of the commercial vegetables belong to this group and are difficult to grow and obtain high yield unless cultivated in areas with relatively cool temperature. Most of cole crops such as brussels sprouts, broccoli, cabbage, cauliflower and, garlic, onion, potato

and carrot are representative vegetables of this group. These vegetables are grown in East Java at the heights of about 800 m or even higher than it. However some varieties which are bred to tolerate high temperature conditions, for example, some cabbage varieties are also grown in low land in some areas.

The main factor which influences the growth of vegetables at high elevation is temperature, hence the suitable sites and areas for these type of vegetables to be successfully grown in the tropics are limited by elevation.

The production of vegetable in East Java is directly affected by changes of rainfall, the height of elevation and field conditions. In the months of May and November which are the beginning of the dry and wet season in East Java, respectively production was

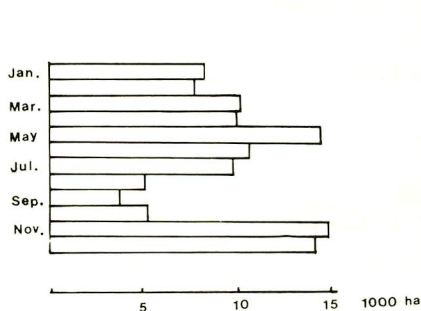


Fig. 2. Total planted area of vegetables in each month in East Java, 1979.

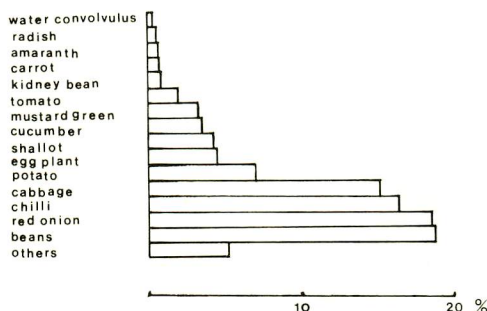


Fig. 3. Shares of 15 main kinds in total vegetable production in East Java, 1979.

considerably large in planted areas of vegetables. Each of five months from December to April, production was relatively large in planted areas but was smaller than that in May and November. Production in September which is the middle of the dry season was smallest and less than one fourth that in November. This fact gives an idea that planted areas of vegetables in East Java are directly related to the amount of rainfall.

As mentioned in the previous section, various kinds of vegetables are grown in East

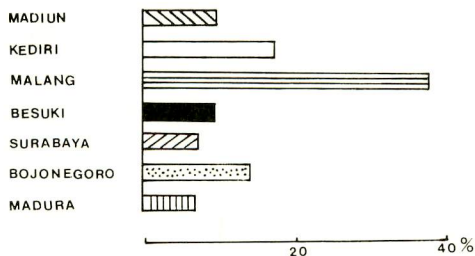


Fig. 4. Share of each prefecture to total vegetable production in East Java, 1979.

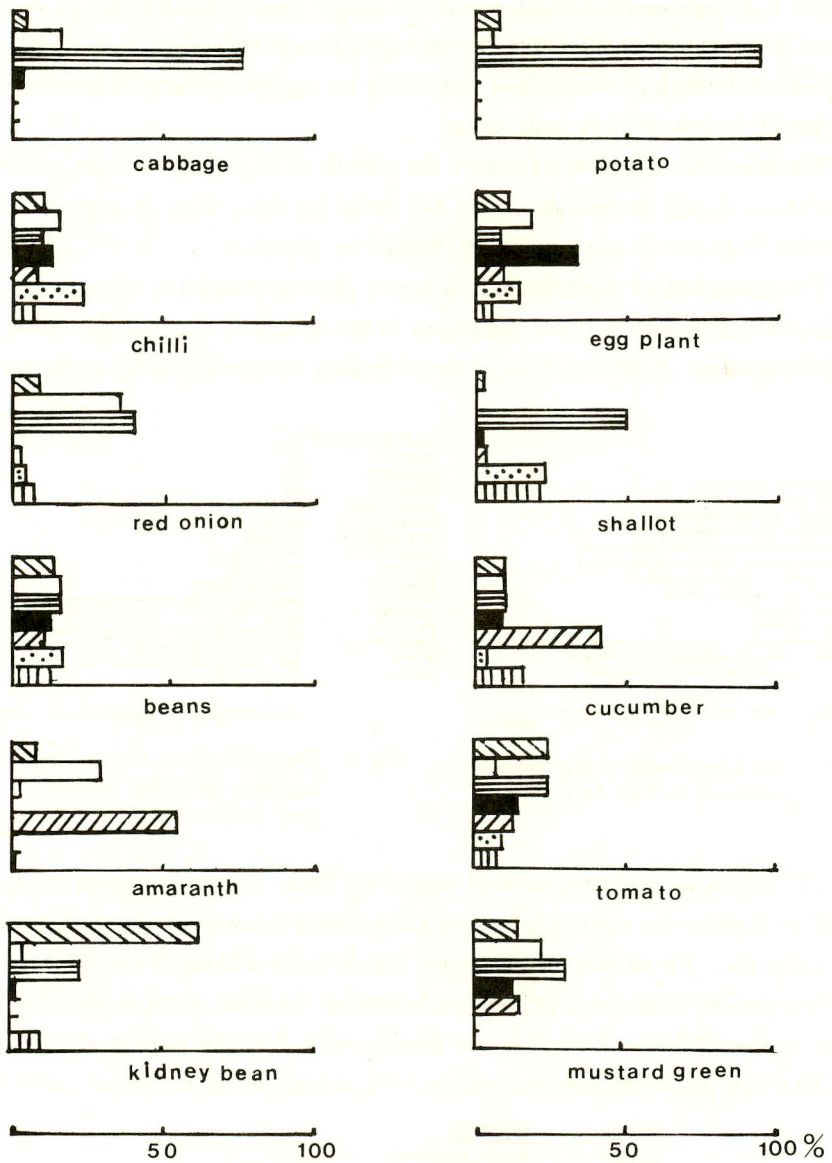


Fig. 5. Share of vegetable production in each prefecture of 12 main kinds of vegetables produced in East Java, 1979. Symbols are same as in Fig. 4.

Java and it is easy to find many of those vegetables in gardens or fields of many peasants. However, the number of important vegetables is relatively few. And, about 70% of total vegetable production are constituted by four kinds of bean, red onion, chilli and cabbage.

Also, the conspicuous locality in vegetable production seems to be a specific feature in East Java. For example, Malang prefecture which is the most famous and largest vegetable growing area, produces about 40% of the total production of vegetables in East Java. Specifically Malang prefecture produces the following vegetables in the ratios given below : potato 95%, cabbage 75%, shallot 50%, red onion 40%, and mustard green 30% compared to whole of East Java. Surabaya prefecture supplies 55% of amaranth and 40% of cucumber while Madiun prefecture supplies 60% of all kidney bean produced in East Java. Some of the important vegetables, for example, potato, cabbage, kidney bean, are produced mainly in one or two prefectures, and it seems that successful production has some relation between the vegetable and specific conditions in the area. In the case of Malang prefecture the most important factor affecting the specificity of vegetable growing is the elevation. In Surabaya prefecture, on the other hand, the specificity seems to be directly affected by plenty of suitable fields for growing some vegetables such as cucumber or amaranth, and these fields are located near a large consuming city Surabaya. In the east coast area of Besuki prefecture, there are many fields of sandy soil with good irrigation system and this condition seems to enhance vegetable growing in this area.

Vegetables which have high temperature tolerance such as chilli, some of the legumes, tomato and eggplant etc. are grown throughout in East Java.

The superiority of Malang prefecture and the specificity of some prefecture in vegetable production in East Java, largely depend upon their geographical features, especially the elevation of fields and soil or field conditions.

Summary

In East Java, many kinds of vegetables are grown under tropical climatic conditions and various field conditions which are derived from complex geographical features.

The main sites for vegetable growing were found to be paddy fields, upland fields including sloping lands and gardens.

The paddy and upland fields are relatively large and are usually used for commercial growing of vegetables. Most gardens are small in area and they are in the range of about 100~300m². Many kinds of vegetables including traditional ones are grown intensively mainly for self-supply in small gardens.

At elevations of about 800 m or higher, several vegetables which were derived from

temperate zone have been grown successfully in East Java. The major vegetable growing areas are established according to their elevation and soil or field conditions.

Acknowledgements

I would like to express my sincere gratitude to team leader Prof. Dr. Shigero IWAKIRI and all other members of the team, especially Ir. Kusman MANGUNSUKARTO and Ir. Daniel Rudolf MONINTJA for their advice and helping throughout the field survey.

And also, I am grateful to Indonesian Institute of Sciences (LIPI) and Bogor Agricultural University (IPB) for their pertinent advice and helpful cooperation on doing this survey.

References

- 1) Agricultural Statistics : Central Bureau of Statistics Jakarta, Indonesia. (1979)
- 2) TINDALL, H. D. : Commercial Vegetable Growing, Oxford Tropical Handbooks. Oxford University Press. (1968)
- 3) Statistical Pocketbook of Indonesia 1979-1980. Bureau of Statistics Jakarta, Indonesia. (1981)