

AN ASSESSMENT OF
THE INDONESIAN HORTICULTURAL
MARKET INFORMATION SERVICE

by

Andrew W. Shepherd

and

Alexander J.F. Schalke

Marketing and Rural Finance Service
Agricultural Support Systems Division

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

Rome, December 1995

Selected FAO Marketing Publications

- "Horticultural marketing, a resource and training manual for extension officers", FAO Agricultural Services Bulletin No. 76
- Horticultural marketing - a training video
- Horticultural marketing - extension techniques (video)
- "A Guide to Marketing Costs and how to calculate them"
- Marketing Extension Services for Small Farmers, AGSM Occasional Paper No. 1
- A Market-Orientated Approach to Post-Harvest Management, AGSM Occasional Paper No. 5
- "Wholesale markets - Planning and design manual", FAO Agricultural Services Bulletin No. 90
- "Retail Markets", FAO Agricultural Services Bulletin (forthcoming)
- "FAO-AgriMarket" (MIS software), FAO Computerized Information Series: Agriculture No. 2.

For further information please refer to:

The Chief
Marketing and Rural Finance Service
Agricultural Support Systems Division
Food and Agriculture Organization of the United Nations
Viale delle Terme di Caracalla
00100 Rome, Italy
Tel. ++ 39 6 52251 or 52252265 / 66
Fax ++ 39 6 52256850
E-mail AGS-Registry@fao.org

Shepherd, A.W.

Schalke, A.J.F.

An assessment of the Indonesian horticultural market information service

AGSM Occasional Paper no. 8.

Rome, FAO. 1995. 49 p.

Abstract

This Marketing and Rural Finance Service Occasional Paper reviews the Indonesian horticultural market information service (MIS), which was developed between 1978 and 1985 with German technical assistance. The paper makes an assessment of the efficiency of the operations of the Service and of its utility to farmers, traders and others. The study was conducted as part of an ongoing review of market information services, presently being carried out by FAO. The paper briefly describes the vegetable marketing system and the methods used to initially set up the MIS. It evaluates the present operation of the Service, assesses the extent to which the Service is used by farmers, traders, wholesalers and government officials and examines its contribution to market transparency, spatial and temporal arbitrage. A number of recommendations for improving the effectiveness of the MIS is made, although the broad conclusion is that it functions efficiently and provides a much-appreciated service. Finally, the paper draws lessons from the Indonesian experience which may be of value to other countries contemplating setting up market information services.

Key words: Market Information; Information Services; Marketing; Market Transparency; Horticulture, Fruits, Vegetables; Indonesia.

Acknowledgements

The authors would like to thank the Indonesian Market Information Service of the Ministry of Agriculture in Jakarta, W. Java and N. Sumatra for their excellent co-operation during the research. We are also grateful to the many people who reviewed and provided comments on the first draft of this paper.

David Lubin Memorial Library Cataloguing in Publication Data

Shepherd, A.W.

An assessment of the Indonesian horticultural market information service.

(AGSM Occasional Paper n. 8)

1.Fruits 2.Vegetables 3.Marketing 4.Information services 5.Indonesia

I.Schalke, A.J.F. II.Title III.FAO, Rome(Italy)

FAO Code: 62AGRIS:E70 C30

CONTENTS		Page
Summary		i
1.	Introduction	1
2.	The Vegetable Marketing System	4
	2.1 Government Policy	4
	2.2 Overview of the Vegetable Production System	4
	2.3 The Marketing System	5
	2.4 Consumption of Vegetables	9
3.	Introduction and Operation of the Market Information Service	10
3.1	Historic Overview	10
3.2	Design and Implementation	10
3.3	Institutional Framework	13
	3.4 Finance	13
	3.5 Data Collection	14
3.6	Data Processing and Transmission	21
	3.7 Dissemination	21
4.	Utilisation of Market Information Data	24
	4.1 By Farmers	24
	4.2 By Traders and Collectors	26
	4.3 By Wholesalers	26
	4.4 By Extension Workers and their Supervisors	27
	4.5 By the Ministry of Agriculture in Jakarta	27
	4.6 By Planners and Policymakers	28
5.	Evaluation of the Market Information Service and its Impact	29
5.1	Present Operations of the Service	29
	5.2 Impact on Market Transparency	31
	5.3 Impact on Spatial Arbitrage	33
	5.4 Impact on Temporal Arbitrage	34
	5.5 Impact on Production Planning and Extension Advice	35
6.	Conclusions and Recommendations Regarding the Indonesian Market Information Service	36
	6.1 Data Collection	36
	6.2 Price Broadcasts	36
	6.3 Liaison between Regions and Districts	36
6.4	Analysis of MIS data by MOA and Dissemination of Analysis	37
7.	Lessons from the Indonesian Market Information Service for other Countries	38
	7.1 Design and Establishment of the MIS	38
	7.2 Collection of Data	38
	7.3 Transmission of Data	39
	7.4 Dissemination of Data by Radio	40
	7.5 Printed Dissemination	40

CONTENTS (cont.)		Page
References		41
Annex 1	Development of Gross Trade Margins (GTM) (in Rp/kg at constant 1980 prices) and Farmers' Share, for Selected Vegetables in West Java, 1980-94	43
Annex 2	Differences in wholesale prices between Jakarta and Surabaya (based on Jakarta prices, in Rp/kg and percentages), 1980-94	47

List of Tables

p.16	Table 1	Overview of the number of collection points of price information for vegetables and secondary food crops at production and wholesale markets
p.17	Table 2	Number of vegetables and secondary food crops for which prices are collected at production centres
p.18	Table 3	Wholesale market location and number of vegetables and secondary food crops for which prices are collected
p.33	Table 4	Development of Gross Trade Margins (GTM) (in Rp/kg at constant 1980 prices) and Farmers' Share, for selected vegetables in West Java, 1980-94
p.34	Table 5	Differences in wholesale prices between Jakarta and Surabaya (based on Jakarta prices, expressed in percentages), 1980-94

List of Maps and Diagrams

p.19	Map 1	Main vegetable production and consumption centres where price information is collected
p.20	Map 2	Secondary food crop production and consumption centres where price information is collected
p. 8	Diagram 1	Marketing Channels for Vegetables
p.22	Diagram 2	Information Flow Chart for the Market Information Service in Indonesia

Acronyms used in the paper

CGPRT	Regional Co-ordination Centre for Research and Development of Coarse Grains, Pulses, Roots and Tuber Crops in the Humid Tropics of Asia and the Pacific, Bogor, Indonesia
GTZ	German Technical Cooperation (<i>Deutsche Gesellschaft für Technische Zusammenarbeit</i>)
MIS	Market Information Service
MOA	Ministry of Agriculture
PIKJ	Pasar Induk Kramat Jati, wholesale market in Jakarta
PMS	Project Management System
RRI	Radio Republic Indonesia, the national radio station in Indonesia
SSB	Single Side Band Radio
ZOPP	Objectives-Oriented Project Planning (<i>Zielorientierte Projektplanung</i>)

Summary

1. Under FAO's Regular Programme, the Marketing and Rural Finance Service is carrying out a detailed review of Market Information Services (MIS) in member countries. As an input for this review, the two authors visited Indonesia in June 1995. This paper is intended to provide useful insight into the Indonesian MIS in order to enable readers in other countries to develop their knowledge of issues relating to such services.
2. Indonesia was chosen for study because it has a well-developed MIS. A price monitoring system operating from the early 1950s was transformed into the present Service between 1978 and 1985, with technical assistance from the German Government, executed by GTZ. Throughout the establishment of the MIS, the Logical Framework technique was used. GTZ later adopted this technique as the Objectives-Oriented Project Planning approach (ZOPP).
3. A decade after completion of the technical assistance, the MIS continues to function efficiently and plays an important role. However, there are no grounds for complacency in that operational improvements could be implemented. There are also some grounds for concern over the long-term sustainability of some components.
4. The Indonesian MIS covers vegetables and a number of "secondary" food crops such as maize, soybean and cassava. A particular feature of vegetable production in Indonesia is that it takes place all year round. With good soils and appropriate climates, farmers are able to get three crops a year from the same land. This has important implications for the type of MIS required.
5. During the first period of technical assistance by the GTZ project, considerable research was conducted into the operations of the marketing system and into the needs of potential MIS users. As a result of this research a Service was developed which placed emphasis on prices at farm, or assembly market, level. As a consequence, price data are collected at production level at seventeen locations for vegetables and at six locations for secondary food crops and at seventeen wholesale markets for vegetables and eight for secondary food crops. The MIS is located in the Directorate General of Food Crops of the Ministry of Agriculture and involves some 140 staff and an annual cost of around \$ 840,000.
6. Prices are collected daily between Monday and Friday and are relayed by phone, fax or radio to Provincial Headquarters. They are sent to the local radio station the same day for broadcast in the evening. A provincial price broadcast may have information on prices in several production pockets together with information on local and Jakarta wholesale market prices.
7. Provincial offices, in turn, relay prices to the central MIS unit in the Ministry of Agriculture in Jakarta. Selected prices from production pockets and wholesale markets are broadcast daily on national radio in the evening. The central MIS unit also informs the provinces of Jakarta prices, prepares reports for the national news agency, which distributes these twice weekly to newspapers, and prepares quarterly reports and an annual "Vademekum" which provides monthly averages for nearly all prices collected.

8. The main users of market information are farmers. That this would be the case was clearly acknowledged at the design phase of the German project. Farmers tend to use local price broadcasts as a check on the prices they receive and, more importantly, as an aid to negotiation with traders the following day. A substantial part of vegetable farmers are commercial farmers, rather than subsistence farmers selling occasional surpluses, and almost all listen to the price broadcasts on a regular basis and greatly appreciate them.

9. Traders and wholesalers, on the other hand, have other sources of information and claim to listen infrequently to the radio. Traders make regular, often daily, visits to terminal markets while wholesalers are in phone and fax contact with other markets. The MIS does not appear to assist them in any significant way. Possibly this represents a change from when the MIS was first set up, in that telecommunications have improved noticeably over the last decade.

10. The MIS is run efficiently. Its staff are knowledgeable and competent and provide timely information of commercial use to farmers. In the production areas, the data collectors seem to have considerable enthusiasm for their work and maintain good relations with farmers and traders. An improved flow of information from the central MIS unit and the regional headquarters would be beneficial. At present, data collectors appear not to receive copies of the weekly written reports sent by the provincial offices to Jakarta nor copies of quarterly and annual reports prepared in Jakarta.

11. While resources have been made available annually for the MIS, there is no guarantee that such resources will always be adequate. Attention should therefore be paid to ensuring sustainability of the Service through both cost reduction, e.g. through a merger of the MIS with the Marketing Extension Service, and revenue generation, e.g., through the sale of annual reports and the Service's comprehensive database.

12. The Service is less strong in its subsidiary role of providing analysis for planning and policy purposes. The annual Vademekum is very detailed but no analysis is provided and meaningful analysis in other reports is also lacking. Reports generated by the MIS unit and the provinces are poorly circulated. Well-prepared, widely circulated reports could lead to an increased impact for the MIS. However, in making such improvements it should not be forgotten that the primary objective of the MIS in Indonesia is to provide daily price information to farmers and improved analysis should not be achieved at the expense of reduced data dissemination.

13. The Indonesian MIS can serve as an example of how to set up and run a successful MIS. That is not to say that countries wishing to establish such a Service should use it as a model. Many characteristics of the Indonesia vegetable production and marketing system are fairly unique, not least the year-round production and the concentrated production areas. Consequently, the type of MIS required in this environment may be far removed from the type required in other countries. Nevertheless, all countries should endeavour to replicate the approach to developing the Service. Prior to the development of the structure for its operation, the German technical assistance team and their Indonesian counterparts conducted detailed research into the operation of the horticultural production and marketing systems, in order to develop a full understanding of how they functioned. Extensive discussions were held with farmers and other potential users of the market information in order to ascertain their

requirements.

14. An important positive aspect of the Indonesian Service is that it provides daily information. Given the tendency of prices to fluctuate, every MIS for vegetables should aim to do this where produce is traded on a daily basis. This does, however, require a considerable commitment on the part of all staff to ensure that data is collected, processed and disseminated on time. Such commitment is evident in Indonesia, in part at least because the work of the entire MIS unit, and the data collectors in particular, is clearly appreciated by the farmers.

AN ASSESSMENT OF THE FUNCTIONING OF THE INDONESIAN HORTICULTURAL MARKET INFORMATION SERVICE

1. INTRODUCTION

As urban areas rapidly expand and average incomes of urban dwellers grow, the potential for farmers living in appropriate agro-climatic areas to grow crops for the market also expands. It has always been the assumption of the Marketing Group of FAO and other agencies concerned with agricultural marketing that reliable and timely information on price movements in markets is essential to give the price signals for such market-oriented production to develop. In theory, such a service can:

- a) contribute to improving the bargaining position of farmers;
- b) stimulate competition among traders;
- c) promote the adaptation of supply to demand; and
- d) facilitate more effective agricultural policy formulation, as a result of greater awareness of price trends.

We define a Market Information Service (MIS) as:

A service, usually operated by the public sector (Ministry of Agriculture or a dependent agency or institute), which involves the collection on a regular basis of information on prices, and in some cases quantities supplied, of widely consumed agricultural products¹, from wholesale markets, rural assembly and retail markets, as appropriate, and dissemination of this information on a regular basis through various means (bulletin boards, radio or television bulletins, newspapers, etc.) to farmers, traders, government officials, policy-makers and others.

A service providing market price information is seen as promoting:

- "transparency," i.e. the full awareness of all parties involved of the prevailing market prices and other pertinent information;

Transparency in a market facilitates:

- "arbitrage", i.e. the act of buying at a lower price and reselling at a higher price.

Two forms of arbitrage can be distinguished:

- "spatial arbitrage", i.e. the ability of traders and farmers to ship produce to markets offering the most profitable trading opportunities; and
- "temporal arbitrage", i.e. the opportunity to store products in order to take advantage of likely higher prices later in the season or, in some cases, in subsequent years.

¹ this could include fruits, vegetables, cereals, meat, livestock and fish.

A "Market *Information* Service" should not be confused with a "Market *Intelligence* Service". The latter is generally used to refer to a service offered to exporters to assist them to identify markets and marketing channels for their products. Nor should "*Market Information*" be confused with "*Marketing Information*", the latter being a much wider concept, which is likely to include details on potential market channels, payment requirements, packaging, quality and a whole range of other information, including market information.

We have deliberately chosen to use the word "*Service*" rather than "*System*" in order to emphasise that an MIS has the main function of providing a service to the private sector by making available, on an up-to-date basis, price and other information which can be used for trading purposes. Unfortunately, in many countries there are market information systems which do not provide a service, i.e they devote considerable resources to collecting market information but do not distribute it in any commercial useful way. The essence of a market information service is that the information provided should be up-to-date, in order to permit its use for commercial purposes.

While some attempts have been made to establish commercial market information services in developing countries, these have not, by and large, been successful. Market information can be seen as a public good which should benefit all and not just those willing and able to pay. While market information services can be seen as being most appropriate for crops with volatile prices such as vegetables, where prices fluctuate on a daily basis, the liberalisation of staple food markets in many countries also opens up a need for information on prices of these crops to be disseminated, in order to assist the developing private sector. A market information service which is operated by the public sector and servicing primarily the private sector, can also facilitate the sustainable functioning of an efficient and reliable price monitoring system for planning and policy development, extension, research, and early warning for food security.

The experience with market information services in many developing countries has been far from positive. As noted, they have often failed to provide information of use to the commercial sector on a timely basis. Many have proven to be unsustainable once external assistance has been withdrawn. In view of this, and also the increasing number of requests from FAO member countries for technical assistance to set up or improve their market information services, it was decided to conduct a detailed evaluation of the theoretical and practical benefits of market information services and of their implementation to date. This is expected to be published in 1997. As an input into this global study the present authors paid a visit to Indonesia for two weeks in June 1995, visiting Jakarta, West Java and North Sumatra. The following is a report of their mission.

It should be stressed that the time available was inadequate for a detailed, systematic survey of all aspects of Indonesia's market information service in all parts of the country. The approach adopted was very much one of "rapid marketing appraisal" through open interviews with farmers, collectors, traders and government officials, covering areas such as the farming system, the marketing system, farmers' source of price information and price formation. The

limitations of this approach should be borne in mind when reading the report.²

Indonesia was chosen for study because, outside Western countries, it has one of the world's most developed market information services. A price monitoring system was set up in the early 1950s and transformed to the present service between 1978 and 1985, with technical assistance from the German Government through the Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ). This report therefore also serves as a very unofficial *post hoc* evaluation and impact assessment of a technical assistance project. Such evaluations are normally conducted either during or immediately after technical assistance projects and rarely do donors or assistance agencies return after several years to see how things are going. It is therefore pleasing to report that, after a decade, the assistance provided by GTZ has been shown to be both technically valid and sustainable. However, there are no grounds for complacency; operational and analytical improvements can be implemented and there is an element of concern about the long-term sustainability of some activities of the service.

The authors hope that this report will provide a useful insight into the Indonesian MIS, and that it will enable readers in countries wishing to establish or further develop such services to broaden their knowledge of the issues involved.

² See also Casley et al. (1982, 1987 and 1988), jointly published by the World Bank - IFAD - FAO and The World Bank (1994).

2. THE VEGETABLE MARKETING SYSTEM

2.1 Government Policy

Indonesian agricultural policy has for a long time focused on promoting the production of tree crops such as rubber, palm oil and coconut, followed by production encouragement programmes for beverage crops, such as coffee, cocoa and tea. The second important focus has been on food crops, in particular rice, with the main goal of achieving a high degree of food security. Rice self-sufficiency was achieved in the early 1980s as a result of substantial government subsidies and large-scale development programmes. More recently, with falling oil revenues, the focus has shifted to other high-value food and export crops and to the promotion of the private sector in agribusiness, including agro-industry and agro-processing. The Fifth Five-Year Plan (Repelita V, 1989 -1993) and the Sixth Five-Year Plan (Repelita VI, 1994 - 1999), both express these aims. Government policy on rural development has been to avoid the negative impact of excessive urbanization by encouraging people to remain in and make an economically viable living in rural areas, while not necessarily engaging only in agricultural production.

2.2 Overview of the Vegetable Production System

The share of agriculture in the Indonesian economy is around 18 per cent, with a slight decrease having occurred over the last decade. Although vegetable production expanded considerably during the 1980s its contribution to the Gross National Product is small in comparison with that of estate crops and the main staple crop, rice.

The market-oriented production of vegetables and secondary food crops is highly intensive. A substantial part of production is by smallholders (mainly farming between 0.5 and 3.0 hectares) on upland fields in a variety of crop combinations and sequences. The production of vegetables and secondary food crops is often highly concentrated. There are some twenty well-defined major production pockets.

Six horticultural production and cropping systems can be distinguished by using two parameters; intensiveness and altitude (Ferrari):³

In the Highlands (over 800 m):

- Intensive and commercialized farming systems located in relative homogeneous and concentrated production areas,
- Less intensive but still commercial production, often in combination with perennial crops and secondary food crops, located in the remote highland areas in a more dispersed manner.

In the medium altitude areas (200-800 m):

- Fully commercialized production systems located in the vicinity of urban centres,
- Less intensive cultivation in areas more remote from cities.

³ Ferrari (1994) p. 25.

In the lowlands (under 200 m):

- Intensive, highly commercialized systems,
- Less intensive systems.

The highland vegetables include: cabbage, potato, tomato, cauliflower, onion, french beans, carrot, garlic, different varieties of cabbage and chinese cabbage, celery and chayotte, while the lowland vegetables include different varieties of chili.

With intensive cropping systems, the growing period between planting and harvest is around 100 days for most vegetables. This is followed by a short fallow period, thus permitting three harvests a year. Production is based on a high level of input use and is highly labour intensive in certain periods (e.g. land preparation, planting, weeding and spraying, and harvesting). Most of the vegetable production is rainfed and, depending on the location, the rainy season has a strong influence on production and marketing.

Most farmers produce on an individual basis and, at least in the areas visited, there are no strong farmers' organizations. Handling, grading and sorting is generally of a poor standard. Feeder roads are not well maintained but distances to major markets are relatively short and in most cases produce is in retail shops or markets within 48 hours of harvest.

The major production and consumption centres of vegetables and secondary food crops are indicated in Maps 1 and 2 (see paragraph 3.4).

2.3 The Marketing System

The marketing of horticultural produce is fully in the hands of the private sector. Public sector support from the Directorate General of Food Crops of the Ministry of Agriculture involves encouragement of production and marketing through services such as the Extension Service and the MIS.

Marketing channels for vegetables vary by commodity and province because of the diversity of physical and demographic situations. However, some aspects are more or less common to all marketing channels, as shown in Diagram 1 "Marketing Channels for Vegetables".

There is a number of marketing options available to the farmer. The most common are:

- a. farmers go themselves to the local assembly market, either with their own or a rented vehicle, where they sell to traders who supply wholesale markets;
- b. traders buy the field (standing crop purchase) and deliver to wholesale markets;
- c. traders collect from farmers at or close to farm gate and deliver to wholesale markets;
- d. field-traders collect from farmers and sell to the retail market or to traders for delivery to wholesale markets, and;
- e. farmers sell, either through an agent or directly, to a packing house which prepares shipments for institutional buyers, supermarkets or export.

When traders meet farmers, either in the field, at the roadside or at rural assembly markets,

they ask farmers the price at which they want to sell their produce. Farmers report the difference between their initial asking price and the final price of the transaction as being between ten and twenty five per cent. The standard unit is the kilogram, which is widely accepted, so prices of produce are uniformly expressed per kilogram. At some assembly and wholesale markets independent persons with a scale weigh the produce for a fee.

Traders sometimes purchase vegetables in the field prior to harvest, the so-called standing crop purchase. This practice is called *tebasan* in the Indonesian language and is more commonly used for fruit marketing. Although there is an element of risk for farmers that the agreement may undervalue the crop, their reasons for accepting this practice include availability of cash before harvest and assurance of outlet.

A trader may collect smaller amounts of vegetables from several sub-collectors, called here 'field-traders', as well as directly from farmers, in order to compile a large shipment. Such a trader usually rents a truck and sends it around to field-traders and farmers to collect a full load of vegetables. The truck then goes to the wholesale market in a nearby city. In some locations, e.g. Cipanas in W. Java, the traders operate at a central assembly point, to which the field-traders deliver.

In the large urban areas, wholesale markets are supplied by traders who send shipments of vegetables from the production regions to a consignee. The consignee, who usually has a long-term contract with the trader, unloads the produce and sells it by bag (weighing approximately 50 kg) to wholesalers. For this role, the consignee receives a certain agreed commission and gives the rest of the money to an agent of the trader, who accompanies the shipment and returns with the money.

The national capital, Jakarta, is mainly supplied through two wholesale markets for vegetables: *Pasar Induk Kramat Jati* (PIKJ), located in the southwestern part of Jakarta, and another market called *Pasar Cibitung* in the town of Bekasi located on the eastern outskirts of Jakarta. Jakarta is a market of growing importance for vegetables as it is a fast expanding city with around 11.5 million inhabitants and a growth rate of approximately 4.3 per cent per annum for the 1990 to 1995 period.⁴ Both markets receive trucks of vegetables and fruits from all over Java and Sumatra. PIKJ is geared mainly for distribution to retailers such as grocers (*warung*), street vendors and pedlars. Apart from its wholesale function, PIKJ also has a retail section.

In other cities there are few purpose-built wholesale markets for horticultural produce. In most cities, wholesaling takes place on street markets in the early morning and there is no physical market infrastructure. Traffic congestion is common, complicating handling and adding to marketing costs. A major requirement in Indonesia would appear to be the development of suitable wholesale markets to facilitate fresh produce distribution, promote price formation and reduce produce losses.

Retail markets at both village level and city level are called '*pasar*'. The '*pasar*' is usually provided by the municipal government. These, often crowded, markets attract traders,

⁴ United Nations (1995).

farmers and consumers. Traders who offer products for sale have to pay a market fee. These retail markets are generally highly price competitive, with a large number of buyers and sellers. Vegetables for these smaller urban areas are mainly marketed by '*pasar* vendors'. These *pasar* vendors are mostly women, who market the vegetables produced by them, their husbands or other farmers. They collect around 100 to 200 kg of vegetables and transport the produce by minibus or other means of transport to the *pasar* for sale.

In addition to these channels, a growing but still small quantity is sold through packing houses to institutional buyers and supermarkets. Delivery for this channel usually is on contract-basis with a fixed price and pre-determined delivery conditions, such as timing, quantity and quality of the product. Contracts are usually on a long-term basis, with a revision of the price and delivery conditions at specified intervals (e.g. every two weeks). In packing houses, the grading and sorting of the produce is carried out according to the needs of the supermarkets or institutional buyers such as restaurants and hotels.

From North Sumatra, especially the Medan area, a substantial amount of vegetables are exported to Kuala Lumpur in Malaysia and Singapore. Exporters assure supplies of good quality and prepare the vegetables by cleaning and packing in packing houses. They arrange transport to the harbour of Belawan (near Medan) for shipment to the nearby Port Klang in Malaysia for delivery to the Kuala Lumpur wholesale market, or to the harbour and wholesale market of Singapore.

The vegetable marketing system in Indonesia has two particular aspects of note. Firstly, there is a separation of the channel for local consumption from that of regional trade. This can be explained by the high perishability of vegetables. Secondly, the collection of vegetables for consignment to terminal markets is often characterised by close relationships between all parties involved. In many cases such relationships have been developed over years or even generations. Frequently they are based on credit provision. For example, a trader may always consign to the same wholesaler; a field-trader may always work with just one trader, even though he is not so much acting as an agent but buying and selling on his own account. Farmers are also sometimes linked to traders who have provided them with loans for input purchase.

Diagram 1 Marketing Channels for Vegetables⁵

⁵ Based on FAO - ADB (1984) Annex 6 p.5 and Hayami et al. (1991) p.18.

2.4 Consumption of Vegetables

The population of Indonesia has increased from almost 80 million in 1950 to nearly 200 million in 1995. The United Nations forecasts a population of over 245 million in 2010.⁶ Java, the main island of Indonesia, where the MIS was started, had over 108 million inhabitants on 132,000 square kilometres in 1990, resulting in a population density of over 800 per square kilometre.

The concentration of the Indonesian population in urban centres increased from 12.4 per cent in 1950 to 28.8 per cent in 1990. The average annual rate of urban growth was 4.49 per cent for the period 1985 to 1990. For the next decade this growth is expected to continue at a rate of more than 3.5 per cent per annum.⁷

Total consumption of vegetables is growing and vegetables form an important component of daily food of the Indonesian population. There is a rising share of vegetables in total household expenditure, and the number of consumers is increasing in urban areas, requiring increased market-oriented production.

Food expenditure is a major component of total household expenditure, although a decrease from 64 per cent in 1978 to 57 per cent in 1987 was recorded. The main component in total food expenditure is cereals (mainly rice), which decreased during the same period from 40 to 35 per cent of the total. The second and third components are fish and seafood, and vegetables, which both account for approximately nine per cent of total food expenditure. Expenditure on vegetables increased by one percentage point, from 8.6 per cent in 1978 to 9.6 per cent in 1987.⁸

⁶ See United Nations (1995).

⁷ *ibid.*

⁸ See FAO (1993).

3. INTRODUCTION AND OPERATION OF THE MARKET INFORMATION SERVICE

3.1 Historic Overview

The Indonesian MIS was established in the late 1950s as a price monitoring system to collect weekly producer and wholesale prices for all food crops. In 1979 a price information service for vegetables was established and this was later extended to what are referred to as secondary food crops (maize, cassava, groundnuts, soybeans and mungbeans).

Vegetables were the MIS's first target because of the perceived severe marketing problems faced by primarily small-scale producers who, although the production of vegetables was highly market-oriented, suffered from information deficits concerning prevailing prices, while being faced with considerable price fluctuations. The second target group of commodities were the secondary food crops. These were chosen because of the importance of this group in the food supply in Indonesia. Fruits are currently included on a pilot basis, but were originally not included because the bulk of production was seen as home garden production and, unlike vegetables, there were at the time few farmers who could be said to be producing primarily for the market.⁹

3.2 Design and Implementation

The modern-day MIS was introduced with technical assistance from the Indonesian-German Agricultural Market Information Project, which started in 1978 and was supported by GTZ until 1985. The MIS project was identified during the initial two-year period of an earlier marketing project and, after extensive consultations between both Governments, a commitment was made to support the project with substantial external as well as national resources.

One of the elements of crucial importance in the design of the project was the decision to pay no salary supplements to the Indonesian Government officials. The project was seen as a technical assistance project, designed to assist the government for a limited time, with no realistic outlook for government support of increased salaries after project handover. Nowadays, government official salaries are still at a modest level (see paragraph 3.4).

Schubert et al.¹⁰ explain that throughout the design and implementation of the MIS the Logical Framework technique was used, with systematic, sequential planning and step-by-step implementation of the Service. The market information project had been using the Logical Framework technique since the start of the project in 1978, years before this method was adopted as the Objectives-Oriented Project Planning approach (ZOPP) by GTZ. The project is thus an example of a project in which ZOPP was extensively used and documented in planning, implementing and evaluating, from the first to the last day.

In addition to ZOPP the project developed the Project Management System concept (PMS).

⁹ Zehrfeld, personal communication.

¹⁰ Schubert et al. (1988) p. 51 - 82.

The PMS gave a framework to the management functions of planning, organizing, allocating, leading, linking, controlling, monitoring, evaluating and replanning. The methodology of ZOPP and PMS are described in Schubert et al.¹¹ in relation to the MIS project and in a general way in two GTZ publications.¹² A summary of the design and implementation of the MIS project is provided below, based on these sources:

a) Project Identification and Needs Assessment

The identification of the project started with assessing the need for a market information service. Main criteria for this assessment were whether the existing marketing situation had a high degree of market orientation with considerable price fluctuations. Further, the prevailing information dissemination was assessed. It was concluded that market participants suffered from information deficits concerning current prices and other market parameters.

b) Pre-feasibility analysis

A pre-feasibility analysis consisted of checking whether there were constraints for the effective use of improved information and whether the public institutional basis was suitable for the MIS. Part of the pre-feasibility analysis was a Cost-Benefit Analysis, consisting of analyzing whether the expected end result of the costs and benefits of the service were positive.

On the basis of the assessment of needs and the pre-feasibility analysis, the identification team took the decision to accept the initial idea of the project.

c) Initial Project Planning

Initial project planning had the following three components:

- a Situation Analysis: the analysis of the existing situation was based on a rapid appraisal of the marketing system, to facilitate decisions on priorities with regard to products, areas and type of information required. Further, a thorough assessment of the potentials and constraints of the institutional framework was carried out to determine whether commitments for organizational improvements had to be included in the planning documents and what assistance in terms of training, advice and equipment were required. Finally, the situation analysis involved an assessment of existing agricultural market information activities, in order to avoid duplication, utilize previous experience and identify possibilities for cooperation;
- an Outline Plan, which had to establish an outline for the project and consisted of a re-assessment of all decisions taken during project identification. This determined the medium and long-term objectives of the project and the different phases in which they should be attained. Finally, the Outline Plan contained the specification of the resource requirements for the different project phases;

¹¹ pp. 83-111.

¹² GTZ (1988 a and b).

- the Pilot Phase Plan: before implementation started a pilot phase was planned in detail by using an overview of the objectives, indicators, assumptions and inputs in a Project Planning Matrix. Furthermore, a Plan of Operations was prepared, allocating time (work plan), resources (personnel and equipment plans) and costs (budget plan) to the activities required to achieve the outputs.

After completion of the first pilot phase the Outline Plan was revised and the Operational Plan for the second project phase was worked out. This sequential planning procedure, with planning and plan revision on the basis of implementation experience, was carried out throughout all phases of the project.

d) Project Implementation

During the monitoring of the project it was stressed that a market information service can only be successful if its users have confidence in the information provided. Secondly, operational discipline and continuity of supply of resources are the main prerequisites for its effective and sustained operation and, finally, full integration of the project into the organization designated to run the service after handover is a precondition for sustainability.

The project introduced a management system, called the Project Management System (PMS), which consisted of the following elements: organizing, allocating, leading, linking, controlling and monitoring and evaluation.

Organizing assured every provision necessary for sustained, reliable and effective operation while ensuring that this was achieved in the most cost-effective way. This was facilitated by the compilation of a detailed Manual of Operation¹³ with all organizational and operational details.

Allocating resources for the activities was done bearing in mind that the quality of the data collectors determines the quality of the entire service. The proper running of the service depended on the availability of equipment and access to the public telephone system for data transmission and access to mass media for dissemination. Earlier experiences in project implementation had shown that field activities suffered primarily from inadequate management of operational funds. These, therefore, had to be tailored to the operating units and guaranteed to be channelled to the field level.

Leading of the Service required the attitude of the management to sustain or increase the motivation of the officers working in the Service.

Linking was achieved as the project management established and maintained good relations with target groups (especially farmers and traders) and with cooperating agencies (e.g. mass media and extension service). A participatory approach was adopted and good public relations emphasized through meetings, press releases and leaflets.

¹³ Haerah et al. (1979).

Controlling had to ensure that implementation occurred according to the plan. By monitoring the inputs, activities, assumptions, outputs and effects, mistakes were corrected through re-allocation of resources, changes in procedures and adjustments to the plan of operations.

A yearly internal evaluation was carried out and re-design was done when required.

e) Handover

Although the German assistance was a long-term commitment of seven years continuous technical support, from the very first day steps were undertaken to guarantee sustainable operation of the service. One of the elements which contributed to this was the monitoring of the performance of the MIS in the technical assistance phasing-out period of three to four years and provision of "trouble-shooting" short-term technical assistance when needed.

3.3 Institutional Framework

The Market Information Service is part of the Ministry of Agriculture and is situated in the Sub-Directorate of Marketing, one of the six Sub-Directorates of the Directorate of Food Crops and Horticultural Economics. This is one of the eight Directorates of the Directorate General of Food Crops and Horticulture which reports directly to the Minister of Agriculture. The internal organization of the Market Information Service consists of:

- 1) a national Market Information Service Unit in Jakarta (with one section head supervising one import/export analysis officer, one price data analysis officer, one data receiving officer, two data programming and operating officers and one data receiving, processing and dissemination officer);
- 2) at provincial level, in seventeen of the twenty seven provinces, the provincial Director of the Department of Food Crops and Horticulture supervises the Sub-Directorate of Food Crops and Horticultural Economics which has at district level a Marketing Section and an MIS Unit with, depending on the province, between one and fifteen data collectors. Normally, two data collectors are assigned to each production area.

The total number of staff working on the Service is approximately 140, of which 89 are data collectors and seven central MIS Unit officers who are assigned on a full-time basis. The remainder (divided between data processors, data analysts and managers) are assigned on a part-time basis.

3.4 Finance

The MIS is completely nationally financed. The total budget amounts to around US\$ 840,000 annually. This amount comes from three sources:

- a) The MIS is mainly funded on a "Project Basis", that is to say, each year the financing for this budget has to be approved. This annual "MIS Project" budget is approximately US\$ 450,000 with the following components:

- salaries (for non-MOA staff data collectors) 10 percent,
 - materials 5 percent,
 - travel 30 percent and
 - others (telephone, training, meetings, maintenance, etc.) 55 percent.
- b) There is a separate yearly budget of approximately US\$ 30,000 for equipment such as computers, motorcycles and radios.
- c) Salaries of HQs and regional MOA staff working full and part-time on the MIS are around US\$ 75 per month for data collectors, US\$ 100 for data supervisors, around US\$ 125 for provincial unit officials, US\$ 150 for section heads and around US\$ 250 for provincial heads, resulting in a total annual cost of about US\$ 360,000.

An FAO - ADB study¹⁴ estimated that in 1983 some eight million households were producing vegetables and fruits with an annual farm value of US\$ 800 million. Considering these numbers, the current cost of running the Service, at US\$ 840,000 (corresponding to 0.1 percent of the farm value) can be considered reasonable.

3.5 Data collection

When the MIS was set up data were collected for sixteen vegetables and in eleven provinces.¹⁵ Since then, the Service has been expanded. Data are currently collected for seventeen vegetables and fourteen secondary food crops in the fourteen provinces containing the major production areas.

Price data are collected at two levels in the marketing channel;

a) at production level (assembly markets):

- for vegetables at thirteen locations (see Map 1) and
- for secondary food crops at six locations (see Map 2) and

b) at wholesale markets:

- for vegetables at nineteen locations (see Map 1) and
- for secondary food crops at eleven locations (see Map 2).

Coverage of different crops varies according to their importance in each production area. Prices of vegetables are collected at between three and twelve production pockets depending on a crop's importance at each location. For example, potato prices are collected at eleven locations while carrot prices are collected in six locations. In the case of secondary food crops, cassava and yellow soybean are the most recorded products, with prices being collected in four production areas (see Table 1).

¹⁴ FAO - ADB (1984) p. ii and Annex 6 p. 1.

¹⁵ See also Nainggolan and Simatupang (1990).

The GTZ Project established precise grades and standards for produce for which price data should be collected. These grades and standards include:

- a) quality of the produce;
- b) packaging of the produce; and
- c) minimum transaction volume.

Precise definitions of grades and standards are a condition for transparency of the price and product information for all those involved in the market. Subsequent to the project more precise grades and standards have been introduced. Whereas most vegetables and secondary food crops are covered by one grade, for some of them, e.g. garlic and peanuts, two or three different grades have been introduced.

The production location which records prices of the greatest number of vegetables is the village of Rejang Lebong, where prices of twelve vegetables are collected daily. In the village of Grobogan prices of seven secondary food crops are collected. Noticeable is the clear differentiation of production areas of vegetables and production areas of secondary food crops (see Table 2).

Wholesale prices of individual vegetables are collected at between three and seventeen markets, depending on the importance of the markets for particular crops. In Jakarta, for example, prices of fourteen vegetables and nine secondary food crops are collected, while in Ujung Pandang prices of seven vegetables and four secondary food crops are collected. Prices of both vegetables and secondary food crops are collected in only four major cities, i.e. Jakarta, Surabaya, Ujung Pandang and Semarang. Prices of vegetables only are collected in thirteen cities, i.e. Bandung, Medan, Pontianak, Banjarmasin, Surakarta, Yogyakarta, Palembang, Samarinda, Bali (Island), Padang, Pekanbaru, Jambi and Banda Aceh, whereas only prices of secondary food crops are collected in lesser cities, i.e. Tj. Karang, Matarem and Menado (see Table 3).

The criteria for including a crop in the Service were the traded volume, price fluctuations and volatility and marginal costs of data collection, processing and dissemination. Since volumes of less popular vegetables, e.g. broccoli, are not yet substantial, no data are collected for these.

Price information is collected every day from Monday to Friday from both rural assembly markets and wholesale markets (see also Diagram 2). Data collectors have to interview five respondents for each crop. If this is not possible, at least three respondents are required. Price information has to be collected from transactions between:

- farmers and traders at well-defined assembly points (roadside or actual assembly market);
- and
- wholesalers and retailers at wholesale markets.

Table 1 Overview of the number of collection points of price information for vegetables and secondary food crops at production centres and wholesale markets

Commodity	Production level	Consumption level
Vegetables (<i>Sayur-Mayur</i>)		
01 Cabbage 'Bulat' (<i>Kol Bulat</i>)	3	7
02 Cabbage 'Gepeng' (<i>Kol Gepeng</i>)	12	14
03 Potato (<i>Kentang</i>)	11	17
04 Tomato (<i>Tomat</i>)	3	17
05 Carrot (<i>Wortel</i>)	6	15
06 French Beans (<i>Buncis</i>)	8	8
07 Shallot or Bombay Onion (<i>Bawang merah</i>)	3	16
08 Small Chilies (<i>Cabe Merah Keriting</i>)	3	9
09 Big Chilies (<i>Cabe Merah Besar</i>)	-	10
10 Bunching Onion (<i>Bawang Daun</i>)	5	8
11 Celery (<i>Saledri</i>)	3	4
12 Chayotte (<i>Labu Siam</i>)	5	-
13 Samho (<i>Siampo</i>)	8	3
14 Cauliflower (<i>Blumkol</i>)	3	-
15 White mustard (<i>Sawi Putih</i>)	-	4
16 Garlic, National (<i>Bawang Putih Lokal</i>)	-	4
17 Garlic, Imported (<i>Bawang Putih Impor</i>)	-	8
Secondary food crops (<i>Palawija</i>)		
01 Yellow maize (<i>Jagung Kuning</i>)	3	5
02 White maize (<i>Jagung Putih</i>)	1	4
03 Yellow Soybean (<i>Kedele Kuning</i>)	4	7
04 Black Soybean (<i>Kedele Hitam</i>)	1	-
05 Mungbean 'Butek' (<i>Kacang Hijau Butek</i>)	2	5
06 Mungbean 'Nylon' (<i>Kacang Hijau Nylon</i>)	2	6
07 Cassava (<i>Ubikayu</i>)	4	3
08 Dried Cassava (<i>Gaplek Glondong</i>)	-	2
09 Yellow Soybean imp (<i>Kedele Kuning Imp.</i>)	-	5
10 Soybean mixture (<i>Kedele Campuran</i>)	-	1
11 Peanuts 7 mm (<i>Kacang Tanah 7 mm</i>)	-	6
12 Peanuts 8 mm (<i>Kacang Tanah 8 mm</i>)	-	6
13 Peanut mixture (<i>Kacang Tanah Campuran</i>)	-	1
14 Sweet potato (<i>Ubi Jalar</i>)	-	4

Source: "Vademekum", MOA, 1995

Table 2 Number of vegetables and secondary food crops for which prices are collected at production centres

Production Location	Vegetables	Secondary Food Crops
Lembang	5	-
Batu	4	-
Tanah Karo	8	-
Pangalengan	3	-
Cikajang	3	-
Dieng	1	-
Sumbaran	5	-
Jimbaran	5	-
Ngablak	4	-
Pujon/Mantung	3	-
Alahan Panjang	3	-
Pagar Alam	5	-
Rejang Lebong	12	-
Ciwidey	3	-
Bukit Tinggi	2	-
Cipanas	5	-
Brebes	1	-
Jember	-	2
Kederi	-	2
Malang	-	3
Grobogan	-	7
Pati	-	4
Wonogri	-	2

Source: "Vademekum", MOA, 1995

Data collectors are instructed to choose, within indicated time limits, the peak hours of transaction for each crop. To successfully obtain reliable price data day-in-day-out they clearly have to maintain good relationships with all types of farmers, traders and market officials. Prices are normally collected in the morning in production areas and in the afternoon at wholesale markets, when the main arrivals from the production areas take place. Most of the production areas visited had two data collectors, who take it in turns to visit the main assembly areas.

Table 3 Wholesale market location and number of vegetables and secondary food crops for which prices are collected

Consumption	Vegetables	Secondary Food Crops
Jakarta	14	9
Bandung	10	-
Surabaya	13	10
Ujung Pandang	7	4
Medan	11	-
Pontianak	10	-
Banjarmasin	9	-
Semarang	8	8
Surakarta (Solo)	6	8
Yogyakarta	9	-
Palembang	10	-
Samarinda	9	-
Bali	5	-
Padang	5	-
Pekanbaru	6	-
Jambi	6	-
Banda Aceh	3	-
Tj. Karang	-	4
Mataram	-	8
Menado	-	3

Source: "Vademekum", MOA, 1995

Map 1 Main vegetable production and consumption centres where price information is collected.¹⁶

¹⁶ Based on the "Vademekum", MOA (1995).

Map 2 Main secondary food crop production and consumption centres where price information is collected.¹⁷

¹⁷ Based on the "Vademekum", MOA (1995).

3.6 Data Processing and Transmission

Immediately after price collection, a first data processing is done by collectors at field level using the "clean average" method, i.e. crossing out the highest and lowest prices and calculating the mean of the remaining three prices. The average prices are then immediately sent to the provincial headquarters where they are compiled into a report for broadcast on the local radio station at 19.30 and are also forwarded to the MIS Unit in Jakarta. Transmission of data is mainly by SSB radio. Telephone and fax are less used. West Java province is intending to install a network of computers in the Ministry of Agriculture district offices and will then be transmitting data by modem. In some cases breakdowns of SSB radios or fax machines cause the need to transmit data by telephone, which is not only costly but, because the quality of reception is often worse than that of the radio, can also introduce errors in the data.

3.7 Dissemination

The central MIS Unit in Jakarta prepares a national bulletin for broadcast by Republic of Indonesia Radio (RRI) on the same day the prices are collected, at 20.05 from Monday to Friday. Radio bulletins on RRI are in the official national language, Bahasa Indonesia, whereas provincial radio bulletins are in the local language or dialect. The MIS pays the RRI and the Provincial radio stations a small fee to carry the broadcasts.

In the national broadcast, wholesale prices of two to eight products in each of fourteen cities and producer prices of one to three products in eleven production areas are disseminated. The RRI broadcasts, because of time constraints, can only carry selected information from around the country.

The MIS Unit in Jakarta re-transmits wholesale and production level prices every afternoon to the provinces for inclusion in Provincial Radio evening bulletins.

Prices are reported daily in provincial and twice-weekly in national newspapers. Price bulletins of vegetables and secondary food crops are listed in combination with price bulletins of other agricultural produce for domestic consumption as well as export commodities (e.g. meat and poultry, fish, coffee, cocoa and tea) and form a mixture with agricultural news and background articles on the agricultural situation.

There are also notice boards at rural assembly markets and at the entrances to the major wholesale markets, where the data collectors write down their price recordings as well as prices from other locations.

Diagram 2: Information Flow Chart of the Market Information Service in Indonesia.¹⁸

¹⁸ Based on Schubert et al. (1988) p. 24.

Data collectors and supervisors are also expected to provide a weekly report of the price movements and an explanation of these price movements to the regional coordinator, who should send this weekly bulletin to the central MIS Unit in Jakarta. However, during our visit to North Sumatra it was apparent that these weekly reports were not being prepared on a regular basis. There seems to be little feedback from the provincial headquarters to the district offices; district data collectors do not receive copies of the provincial reports forwarded to Jakarta.

The central MIS Unit in Jakarta compiled monthly reports until December 1994 but stopped doing this because of budget constraints. These reports were not widely circulated, being primarily reserved for use by a few officers in the Directorate. In January 1995 it was decided to continue this service with quarterly bulletins.

Every year, in February, the central MIS unit publishes an extremely detailed "Vademekum" containing monthly average prices for the previous ten years for most crops and locations where prices are collected, together with other pertinent information about the vegetable trade. 500 copies of the Vademekum are distributed annually to government offices, universities and research institutions, and to the private sector.

4. UTILISATION OF MARKET INFORMATION DATA

4.1 By Farmers

The authors met approximately fifty farmers in five production pockets in N. Sumatra and W. Java provinces and met no farmer who did not in some way utilise price broadcasts. All but one farmer interviewed possessed a radio and the one who did not reported obtaining radio price information from fellow farmers. Our findings show a greater degree of price information utilisation than previous studies by the Ministry of Agriculture and GTZ in 1980¹⁹ and by the Ministry of Agriculture in 1989²⁰ which found that in general around 70 per cent of farmers listened to radio prices. The areas visited were fully commercialised highland areas, where farmers harvest almost daily. It is possible that had we visited the less commercial and small-scale lowland farmers (e.g. chili producers), much lower listening levels would have been noted. Due to time constraints, our research did not involve a structured, random survey of farmers and our limited sample of relatively easily accessible farmers who were actively marketing produce at the time of our visit may not have been representative. On the other hand, since the last survey carried out by the Ministry of Agriculture, there may well have been an increase in radio ownership leading to an increase in the percentage of farmers listening to prices.

Many farmers listen to the radio daily, others only when they are contemplating harvesting. Almost all farmers listen primarily to the radio station closest to them. For example, farmers in N. Sumatra production pockets listen to broadcasts of the local radio station based in Brastagi, in preference to those from the regional capital in Medan, while farmers in W. Java listen to prices broadcast from the regional capital of Bandung, there being no local radio stations. We encountered few farmers who listen to prices on national radio, possibly because the reception is poor or the prices are not considered relevant.

The above suggests that farmers do not use radio information to identify price trends in terminal markets as a means of forecasting likely price movements in production areas, nor do they use price information to carry out basic spatial arbitrage. This is consistent with what farmers told us and with our knowledge of the functioning of the horticulture marketing system which, as noted in Chapter 2, in many parts of the country is based very much on traditional trading relationships and offers neither farmers nor rural collectors the opportunity to carry out spatial arbitrage. Furthermore, travel time between terminal markets and production areas is in most cases a matter of a few hours and thus terminal market price changes are invariably reflected in production area prices before they are broadcast on the radio.

Farmers thus listen to the radio primarily as a check on local market prices prior to negotiating with traders for sale of their produce and for comparison with prices they received on the previous day. (This is discussed in more detail in Chapter 5) It might be thought that as vegetable farmers are concentrated in relatively few areas they could easily ask their fellow farmers what prices they received the day before or even on the same day. In this case the

¹⁹ See Ramm et al. (1980).

²⁰ See Direktorat Bina Usaha Petani dan Pengolahan Hasil (1995).

MIS could be considered superfluous. However, we were assured by farmers that while they trust other farmers to tell them the prices broadcast on the radio they would be less confident about information on actual sale prices. Fellow farmers were generally seen as being reluctant to admit to getting low prices, either through bad negotiating skills or poor produce quality, and therefore as being liable to inflate the price received.

Farmers are relatively sophisticated in their understanding of price broadcasts. They appeared to have a good appreciation of marketing costs and of the impact of produce quality on prices. They were also aware that prices do fluctuate frequently (although not excessively) and that price broadcasts can thus only be considered as indicative. This is, of course, a point which traders stress to farmers at every opportunity, as an argument against paying the broadcast price. As the MIS collects prices only once a day it is impossible to say with any certainty how frequently and by how much prices do change within a day.

Notice boards are not used to the same extent as the price broadcasts. During our visit we saw some ten boards in varying states of repair. All but one were kept up-to-date with price information. The exception was Cikole, close to Lembang, W. Java, where a change in market location meant that the existing board was now redundant. Steps need to be taken to move it to a more appropriate location. In W. Java the previous day's local prices are faithfully recorded on the boards but in N. Sumatra the boards show the Medan prices but not the local market prices. We were advised that, because prices in the market change frequently, farmers became angry that the board prices were not the same as the prevailing prices and threatened to destroy the boards. They had not, apparently, threatened to take any such retaliatory action against the local radio station, which suggests that they appreciate that there is inevitably a time lag with radio broadcasts but do not see why prices on a notice board should not be "real time." We were also told that traders had been known to "attack" boards, although this was infrequent.

Some consideration could therefore be given to increasing the frequency of price monitoring in locations, such as Brastagi, where there is a clearly defined "market" (as opposed to a collection area) in order to provide more up-to-date prices on the notice boards. However, such a step would inevitably require additional resources as, if price collection were a full-time job, the collectors would have no time available for price analysis and general marketing extension activities, not to mention the extra-curricular jobs which their low salaries oblige them to carry out.

For one, relatively small, group of farmers daily price broadcasts are less important. These are the producers of higher quality produce who either sell directly to companies who pack for supermarkets in the major cities or produce for export. In these cases sales are largely by contract, with the price being renegotiated every two weeks or so. At the time of price negotiation farmers do listen to price broadcasts, adding a quality premium to the prevailing price before negotiating. They may benefit from knowledge of export market prices if these were available.

4.2 By Traders and Collectors

As noted in Chapter 2, there are a variety of stages that vegetables can go through between the farmer and the wholesale market. With the exception of the field-trader who purchases the crop in the field, those buying from the farmer have, at the time of purchase, a good idea of the likely price they will receive when they sell the produce. On isolated occasions traders make losses on transactions when sudden price falls occur, but such losses are unusual. Moreover, in W. Java at least, the traditional trading relationships between field-traders and traders and traders and wholesalers provides a built-in safety mechanism. An additional protection against losses is that, with demand being relatively constant and with spatial arbitrage being carried out only to a limited extent, and then only for a few crops, the wholesale market price is frequently dictated by the supply from one or two producing areas. The Brastagi area, for example, is the dominant supplier to Medan and the price to the producer in Brastagi market is almost entirely related to the amount of produce delivered to the market by other farmers on the same day.

In the production areas we visited, the terminal markets are a maximum of five hours drive away. Many traders visit these markets daily, or obtain information on prices through their truck drivers. Thus, through direct contacts, they are as, if not more, up-to-date with prices than are the radio broadcasts. Even if a trader does not make daily visits to the market, others do and there appears to be considerable exchange of information among traders. Many traders also have access to phones, enabling them to easily check prices with terminal wholesalers. It is thus not surprising that we found few traders or collectors who admitted to listening to price broadcasts on the radio or to consulting the price boards at the entrance to wholesale markets. Those who do are likely to be those who trade in crops which are liable to some measure of spatial arbitrage, e.g. W. Java potato traders may listen to the prices to get some idea whether potatoes are being delivered to Jakarta wholesale market by Central Java wholesalers. This suggests that additional information regarding quantities supplied to terminal markets could make the MIS more relevant to the trading sector.

Even if traders listen to prices they will always check them through other sources, and will not base the price they are prepared to pay to farmers solely on MIS broadcasts. In fact, far from having a positive benefit for traders and collectors, the MIS is a source of some mild annoyance. Several traders complained to us that information on the radio gave farmers a false picture of the situation, not so much because it was inaccurate as because of the frequent market price fluctuations. This would, however, appear to confirm the value of the MIS to farmers. However, we were not advised of any case where traders had refused to collaborate with price collectors.

4.3 By Wholesalers

Wholesalers operating in terminal markets stated that they rarely listened to price broadcasts. This confirms the findings of previous studies. Information on market prices is obtained through personal contact and by telephone. When the MIS was first developed the level of phone usage by wholesalers was relatively limited and utilisation of the MIS broadcasts was probably much greater than it is now.

Spatial arbitrage is carried out in a number of ways. For example, traders in N. Sumatra regularly send consignments of cabbages to Jakarta, if prevailing prices are considered sufficient to cover their costs, which is invariably the case. Traders in Surabaya may phone Bandung wholesale market to obtain the latest price for potatoes and if arbitrage possibilities exist will then travel to Bandung the next day to purchase a truckload.

Wholesalers are rarely in direct contact with farmers, with the exception of those farmers who also act as traders. Thus they report that they rarely have to negotiate prices with suppliers who quote radio broadcasts as the basis for their price negotiation.

4.4 By Extension Workers and their Supervisors

At a superficial level, at least, the MIS price collectors make considerable use of market price data in their interaction with farmers. Although there is also an official marketing extension service, the price collectors are in closer contact with farmers and traders and certainly better informed about prices and market opportunities than are the marketing extension workers. All price collectors visited kept up-to-date charts of price movements. This is in line with the training they receive annually, although the coverage of these charts varied according to the office visited, suggesting that some of the officers are exercising individual initiative in going beyond the diagrams suggested by head office in Jakarta. For example, while most officers are content simply to plot local prices for a range of crops, some also plot prices in the terminal wholesale market so that marketing margins can be identified.

All price collectors reported that farmers frequently visited them to discuss the charts and production possibilities although, as will be discussed in Chapter 5, the scope for profitable off-season production appears limited. Collectors appear to have no concept of the effect of inflation on price developments and this could perhaps be introduced into future training. Price collectors in production pockets prepare weekly reports on the reasons for price movements and these are eventually submitted to Jakarta through the regional capital. However, the collectors receive no feedback on these reports, do not receive copies of the regional reports sent to Jakarta and thus have no idea of the analysis being carried out by their fellow collectors in other production pockets. Exposure to reports from other production areas could enable collectors to better advise farmers and could inspire them to improve their own reports to match the quality of those produced by colleagues.

With regard to MIS supervisors based in the regional capitals, the impression gained was that, while providing necessary support to field price collectors, they are not themselves actively using price information. As noted above, they provide no feedback to the price collectors on price trends and seem to provide little additional analysis of prices beyond that provided weekly by the price collectors.

4.5 By the Ministry of Agriculture in Jakarta

Staff of the Sub-Directorate of the MOA responsible for the MIS receive price information daily and disseminate this on the same day over the national radio station. Much of the price information received is not disseminated in view of the limited time available for the radio broadcast. Prices of the same crops from wholesale markets and production pockets are

broadcast daily, with only limited variation of the crops covered, according to market conditions. Given that the main users of the MIS are farmers, and that they appear to rarely listen to the **national** price broadcasts, some re-examination of these broadcasts may be in order.

Until last year, the MIS unit was producing monthly reports which analysed price trends. These were broadly based on the weekly reports received from the field, together with further analysis carried out by Jakarta. However, circulation of these reports was minimal and there is little evidence that the information was used by the recipients. It is now proposed to produce quarterly reports. At the time of our visit the first such report was still awaited but two have been subsequently published. Despite the fact that the MIS unit presently has relatively limited analytical skills, wide circulation of quarterly reports could be of value. This is discussed in more detail in Chapter 5.

The Ministry of Agriculture also uses the prices at wholesale and production level for the preparation of the annual "Vademekum" described in Sect. 3.5. Copies are distributed annually to government officials, universities, research agencies and to the private sector at their specific request. Interestingly, copies are not sent to those responsible for the initial price collection, although they are sent to regional headquarters. The data presented in the Vademekum is a considerable resource and, if the Directorate was permitted to generate its own funds from commercial transactions, more could be made of its value. Additionally, the data appearing in the publication are all stored on Spreadsheets which could be made available, for a price, in order to facilitate research and analysis.

4.6 By Planners and Policymakers

Utilisation of MIS information by senior officials is mainly limited to the use they make of the Vademekum. No reader survey has been conducted and time did not permit us to interview recipients.

5. EVALUATION OF THE MARKET INFORMATION SERVICE AND ITS IMPACT

5.1 Present Operation of the Service

The MIS has proved sustainable and provides a valuable service, most notably for farmers. A measure of its impact is that other sections of the Ministry of Agriculture have since copied its approach in setting up market information services for meat and for fish.

Since the GTZ project some further development work has been carried out by the MIS unit. The number of crops covered has been increased from the sixteen originally foreseen by GTZ (mainly vegetables) to thirty-one and a pilot project has been started to include prices of some fruits at wholesale and production levels. More precise definition of the grades for which prices should be collected has also been introduced for some vegetables, e.g. potatoes. In other respects, however, the Unit has been rather static in its approach. It has not developed any significant analytical capacity, an area which GTZ also did not emphasise. Training of staff, while carried out on a regular basis, seems to be mainly designed to "refresh" the memories of the field staff. While this is clearly necessary, it may also be desirable to develop new skills, such as analytical ability. It was surprising to note that training includes a course on computer usage, even though price collectors do not have access to computers (a situation which may, however, be partially rectified in the near future).

Much of the funding for the MIS comes from a Ministry of Agriculture "project" (see paragraph 3.4). This is an approach commonly employed in Indonesia and does not imply that funding is in jeopardy. However, expenditure on the project has to be justified every year and some funding constraints have been experienced recently, which does raise slight doubts about long-term sustainability. Further, many staff, particularly those in the field who collect price information, are not employees of the Ministry of Agriculture but are employed by the "project." They do not have the same rights as Ministry staff and express concern about the situation. On the other hand, it may be that the "project" status has positive benefits in that the need to justify the existence of the MIS every year may contribute to the quality of the work done.

In general, we found those employed on the MIS at all levels to be knowledgeable, competent, interested in their work and motivated. The MIS unit is, however, concerned that some price collectors may be less than diligent and may sometimes make up information. Due to staff resignations and the failure by regional authorities to replace them there have been some recent gaps in data collection, notably at Surabaya wholesale market. In general, however, daily prices are sent on time to the regional offices and to Jakarta. Some problems have been experienced with weekly reports, e.g. during our visit Jakarta was not receiving the weekly reports from N. Sumatra.

Field data collectors appear to have excellent relations with farmers and traders. As noted previously, the collectors plot price movements on graphs and display these on their office walls. Most offices also have diagrams of the local marketing systems displayed.

Price dissemination also appears to function as planned under the GTZ project. In the two

provinces visited we found no farmers who complained that the prices had not been broadcast on the radio on some days. Funding for price broadcasts does not appear to present significant problems. With one exception, the Notice Boards observed are all updated daily with, according to the location, information on the local price, prices at other production pockets in the region and wholesale market prices. It was slightly surprising to note that Boards in W. Java production areas such as Pangalengan report information on prices in Jakarta, whereas we were advised that most traders deal with Bandung market. All Boards could do with a "face-lift" and the one which is not used, in Cikole, Lembang, should be relocated.

Market Information Services should be designed to provide immediate and relevant information to farmers and/or traders. In this respect the Indonesian MIS succeeds admirably. It is weaker, however, in the subsequent use of the information generated, a subsidiary but nevertheless important function for an MIS. Attention does need to be paid to this area, but this should not be at the expense of the present daily price information service, particularly that through regional stations. Most MISs tend to err by emphasising the provision of data for planners and policymakers over and above the needs of farmers and traders.

Staffing and resource constraints meant that the Monthly Report formerly produced by the MIS unit has been discontinued. It was not, anyway, widely circulated. A quarterly replacement has been introduced but this is also unlikely to be widely circulated. While we recognise that a monthly report probably places an unnecessary burden on staff of the MIS unit, the preparation of a quarterly report which is widely circulated is attractive for a number of reasons:

- with upgrading of the analytical skills and strengthening of staff resources, it would provide an opportunity to review price trends in a simple way and identify any possible problems related to, e.g., supply constraints or market imperfections;
- wide circulation of a well-prepared report would increase the profile of the MIS unit and strengthen the argument for future funding;
- circulation of such reports to field offices would improve the capacity of price collectors to advise and discuss knowledgeably with farmers and would also make them appreciate that there is a purpose to the weekly reports they prepare.

At present, any analysis of price data which is carried out in Indonesia utilising the MIS data would be carried out by the recipients of the annual "Vademekum." Around 500 copies of this publication are distributed to Government officials, universities, etc. It contains large amounts of valuable data but lacks analysis. Anyone using the data has to re-enter prices or other information onto their own spreadsheets. There may, therefore, be a case for the MIS unit to offer an "on-line" service or to sell data on diskette. There may also be a case for increasing circulation of the Vademekum by selling copies to the private sector.

The monthly average prices printed in the Vademekum appear reliable, although we did notice some data discrepancies between the Vademekum and monthly price averages calculated by field officers. Some prices are missing, for reasons outlined above. Inevitably, the "average" prices are straight means of the daily prices and are not weighted to reflect

supply, as reliable information on supply is not available. In the Indonesian context this is probably not a major problem, as supply rarely fluctuates significantly. However, this would not be an acceptable approach for countries with more pronounced seasonal differences.

5.2 Impact on Market Transparency

Farmers listen to and appreciate price broadcasts. This, in itself, would appear sufficient to justify continuation of the MIS. Farmers are also strongly of the opinion that knowledge of the prices enables them to negotiate with collectors or traders from a position of some strength. It would appear that the normal negotiation procedure is for the farmer to name the price he wants and for the trader to respond with a much lower price. The gap between the farmers' initial prices and those of the traders can be anything up to 25 per cent.

As many farmers sell frequently, sometimes daily, the price on the radio is not just an aid to negotiation but also a check that the price they received the previous day reflected the market price. If it did not they may conclude that they should seek out other traders in future, try to negotiate more forcefully or try to improve their quality. Farmers are relatively sophisticated and do understand the significance of quality differences and of marketing costs. Nevertheless, it needs to be stressed again that farmers almost always use only the prices of their local market and do not appear to attempt to gain information from wholesale market prices which could assist them with bargaining.

Farmers selling at or close to farm gate appear to place considerable reliance on price broadcasts. Those who take their produce to a recognised market, e.g. that at Brastagi in N. Sumatra, will use the broadcast as a basis and will then ask around the market. A particularly popular source of information consists of the "scale men", i.e. those who weigh the produce for a fee once a price has been agreed between buyer and seller.

The MIS was set up to collect prices at peak selling times at origin and peak arrival times at markets and this continues to be the practice. Traders are quick to claim that prices fluctuate so much that the radio prices are useless. To some extent this is a negotiating tool but the reported hostility of farmers to the Notice Boards which display the previous day's prices at local markets suggests there is a strong element of truth in the claims. As noted in Chap. 4, it would be useful to empirically verify the extent of price fluctuations.

It is somewhat difficult to verify the impact of MIS broadcasts on market transparency. In many ways the fact that farmers appreciate the service should be taken as sufficient proof of its utility. A short time after the introduction of the MIS in W. Java the GTZ project did question farmers regarding their knowledge of prices from the radio and related this knowledge to the prices they had actually obtained.²¹ It was concluded that farmers who listened to the radio generally obtained higher prices than those who did not. However, the methodology was flawed and little confidence can be placed on the results. A present-day attempt to conduct a similar investigation would be difficult in view of the small number of farmers who do not listen to price broadcasts.

²¹ See Ramm et al. (1980).

Subsequently, GTZ sought to examine gross trade margins for selected crops.²² They identified a significant fall in such margins and a rise in the farmers' share of the wholesale price in the first years after the start of the project. While recognising that other factors such as changes in marketing costs and market structure could affect margins, they nevertheless concluded that the MIS had to a great extent been responsible for these developments. We have replicated this analysis, using data presented in the latest Vademekum, and controlling for inflation using the Food Price Index.

The quality of any statistical analysis is based primarily on the quality of the data. In this case we feel it is important to note some weaknesses in the data. Firstly, daily prices are calculated using the clean average method for three to five prices recorded in the market. These prices are not weighted averages of prices and volumes. Further, data are aggregated to months and years, thus smoothing out variations within months or years. Finally, there is a limited number of data gaps in the Vademekum (caused by lack of price collection in some locations) as well as inconsistencies between some editions of the Vademekum, which complicate correct statistical interpretation.

As can be seen from Table 4 and Annex 1, the gross trade margin for tomatoes traded from Lembang to Jakarta stayed almost constant in real terms between 1980 and 1984 but subsequently rose significantly, leading to a fall in the share of the wholesale price received by farmers. In the case of both potatoes and cabbage shipped from Pengalengan to Jakarta, margins, while fluctuating on an annual basis, showed no appreciable trend. As there was no MIS prior to 1980, it is impossible to assess the impact of the Service on margins from these data. It can, however, be noted that farmers receive a consistently high share of the potato price while, as would be expected, margins for the more perishable cabbage crop are somewhat higher. The increase in gross trade margins for tomatoes is difficult to explain without further research. Possibly it is a reflection of greater supply leading to higher physical losses. On the surface, however, these figures would seem to indicate relatively inefficient marketing. Trends such as that for tomatoes would appear to be the sort of information that the MIS Unit in Jakarta should be highlighting. At present this is not being done.

²² Schubert et al. (1988) p. 41-45.

Table 4 Development of Gross Trade Margins (GTM) (in Rp/kg at constant 1980 prices) and Farmers' Share, for Selected Vegetables in West Java, 1980-94

Year	Tomato: Lembang -Jakarta		Potato: Pengalengan -Jakarta		Cabbage Gepeng: Pengalengan - Jakarta	
	GTM	Farmers' %	GTM	Farmers' %	GTM	Farmers' %
1980	40	78	n.a.	n.a.	n.a.	n.a.
1981	44	76	11	95	22	70
1982	47	81	11	96	64	41
1983	36	81	16	93	35	69
1984	41	82	18	89	46	53
1985	58	76	20	88	47	51
1986	58	70	18	90	40	55
1987	43	74	18	90	58	55
1988	100	50	32	85	47	54
1989	84	52	21	87	43	51
1990	124	46	26	86	37	62
1991	110	54	22	91	28	75
1992	125	47	38	78	30	70
1993	124	46	31	86	31	71
1994	142	55	43	87	31	81

5.3 Impact on Spatial Arbitrage

As previously noted, traders and terminal market wholesalers tend to deny listening to the radio broadcasts, either at national or regional level. Our finding rather conflicts with GTZ studies,²³ but their studies were conducted ten years ago when telephone ownership was less widespread. In fact, GTZ argued²⁴ that the introduction of price broadcasts had significantly reduced price disparities between markets. It is difficult to justify attributing such reductions to price broadcasts. As the GTZ publication notes, other factors such as improved transport must be considered and telephone availability was increasing during the period of the project.²⁵ Nevertheless, it is an interesting exercise to replicate the GTZ analysis using up-to-date data in order to assess the level of spatial integration in the Indonesian vegetable

²³ *ibid* p. 39-40.

²⁴ *ibid* p. 46-50.

²⁵ At least one of the authors has subsequently revised his opinion regarding the impact of the MIS on spatial arbitrage. Zehrfeld, personal communication.

market.

Table 5 Differences in wholesale prices between Jakarta and Surabaya (based on Jakarta prices, expressed in percentages), 1980-94

Year	Tomato	Potato	Carrot
1980	n.a.	n.a.	8
1981	13	13	-1
1982	-26	-26	-3
1983	4	4	-4
1984	10	-18	-3
1985	-12	4	-3
1986	-7	0	-1
1987	1	3	-1
1988	-7	16	-1
1989	15	1	0
1990	-29	-1	-12
1991	-49	4	4
1992	-37	-11	16
1993	-35	n.a.	-13
1994	-35	-7	-5

Clearly, the use of annualised prices may hide significant seasonal or daily discrepancies but, as can be seen from Table 5 and Annex 2, in the case of potatoes and carrots there appears to be a large measure of spatial integration between the two markets, which are approximately 16 hours apart by truck. Here again, the pattern is not confirmed by tomatoes where, in most years, there appear to be opportunities for spatial arbitrage. That this does not happen may well be due primarily to the more perishable nature of the product or, alternatively, may be due to imperfections in the functioning of the marketing system. Again, further research would appear to be required.

The spatial arbitrage that is carried out does tend to be limited to a number of fairly non-perishable crops such as potatoes, onions and chilies. There is a thriving business in cabbages from N. Sumatra to Jakarta. As noted in the description of the operation of the marketing system in Chapter 2, many of the trading arrangements are based on long-term arrangements between buyer and seller, and sellers are thus unlikely to practice spatial arbitrage. In practice, it appears that any price-inspired movement of produce from one

region to another is carried out at the wholesale level, rather than as a result of traders, aware of price discrepancies, deciding to ship to the highest-priced terminal market.

5.4 Impact on Temporal Arbitrage

Although there is no doubt that some storage is carried out, this is limited because of the perishability of most vegetables. As many farmers are producing three crops a year on the same land, and using only short fallow periods, seasonal production fluctuations do not exist to the extent that they do in countries with only one or two harvests a year, so storage is unlikely to be economic.

While there are noticeable price fluctuations at terminal markets these do not necessarily follow predictable temporal patterns, making the identification of profitable temporal arbitrage possibilities difficult. While a good MIS is often held to open up possibilities for temporal arbitrage, this does not, therefore, appear to be too relevant in the Indonesian context.

5.5 Impact on Production Planning and Extension Advice

Price collectors receive training in the interpretation of price data. Most plot graphs of price movements and have these available for inspection by farmers. Some basic advice is given regarding planting schedules and crops to plant on the basis of this data. However, as noted in the paragraph above, seasonal price fluctuations, where they occur, are not entirely predictable and may be more the result of aberrations in the climate (e.g. an unusually long or an unusually short rainy season) than standard seasonal fluctuations. Moreover, seasons are not uniform in all production pockets and spatial arbitrage for non-perishable crops gives the opportunity to even out seasonal fluctuations in particular areas. During our brief visit we found little evidence that the MIS data has any significant impact on production planning.

Thus recommendations given to producers on the basis of longitudinal price data must be made with some care. We were, for example, concerned to note no evidence of any control for inflation on price series data used by field officers. The fact that it is unreasonable to expect sophisticated analysis from price collectors in the field adds weight to the argument that more attention needs to be paid to data analysis at national level. Moreover, high seasonal prices may superficially appear attractive but must be considered in light of possible lower yields and higher input costs (e.g. for pest control). There was little evidence that field officers fully understood these issues.

The price collectors would, nevertheless, appear to form the basis of a viable marketing extension service. They have good relations with farmers and could be used to provide advice on marketing-related issues such as post-harvest handling and for the identification of required market infrastructure improvements. The Sub-Directorate of the MOA in Jakarta in charge of the MIS also has a small Marketing Extension Unit and there are specific marketing extension officers in the regions and in the vegetable production pockets. An amalgamation of price collection and marketing extension activities may not be out of place.

6. CONCLUSIONS AND RECOMMENDATIONS REGARDING THE INDONESIAN MARKET INFORMATION SERVICE

The MIS in Indonesia functions well and provides a valuable service to farmers. However, the service has not significantly moved forward since the conclusion of German technical assistance and there would appear to be some scope for adjusting the service to changes that have taken place in the last ten years and for correcting limited weaknesses. Aware that changes and improvements frequently cost money, we have attempted to identify ways in which costs can be kept to a minimum or revenue may be generated.

6.1 Data Collection

Together with the daily dissemination of prices on the regional radio stations, this is the most important aspect of the MIS. It generally functions well, although there have been some recent cases where data has not been collected due to staff shortages. While Indonesia is far from being a poor country, it seems probable that Government ministries will face the same restrictions on spending that are afflicting ministries in many other countries and this may mean that price collectors who resign are not replaced. One way of overcoming possible budget constraints to the collection of data would be to integrate the price collection and market extension activities.

Price data broadcast by radio has much more of an impact than data written on notice boards. Some increase in the impact of selected notice boards in producing areas could be achieved if it were possible to update the local prices on an hourly basis. This would only apply to those locations where there is active trading all day, and not to areas where traders meet with farmers at specified times. Prior to trying this out on a pilot basis it would be necessary to verify the claims of traders that prices do in fact fluctuate significantly during the day.

6.2 Price Broadcasts

It would be interesting to conduct an evaluation of the audience for national price broadcasts. This could include an assessment of the extent to which consumers listen to and use the broadcasts. The value of these broadcasts is not immediately clear. As a first step RRI should be approached to see if it has conducted any surveys of listeners. If most of the audience for price broadcasts listens only to regional stations, it may make sense for those stations to also relay information presently provided only on RRI. Here, however, the limited time available on the local stations may be a constraint and there is also no purpose in having lengthy broadcasts of information most listeners do not require. Weekly broadcasts on regional stations of prices from other parts of the country may be one solution.

In the case of N. Sumatra, it could be valuable for the regional radio station to broadcast prices from the export markets in Singapore and Malaysia. This information is understood to be gathered by the Ministry of Trade, but not disseminated.

6.3 Liaison between Regions and Districts

The flow of information under the MIS is from the bottom to the top, i.e. starting with the

field collectors and ending at the MIS unit in Jakarta. There is only a limited flow of information in the other direction. The regional offices primarily function as data processors; receiving information from the field and forwarding it to the local radio station and the MIS unit in Jakarta. These offices appear to carry out little training and virtually no analysis.

As noted, one area where feedback could be improved would be if the weekly regional reports prepared by the provinces for submission to Jakarta could also be sent to the districts. This would enable district collectors to see how prices have been moving elsewhere and see how their colleagues in other districts of the same province have interpreted these price movements. As the results of their efforts are on the radio daily, price collectors hardly need to be convinced of the importance of their work. Nevertheless, if each district were to be supplied with a copy of the annual Vademekum this would help the collectors to see how they fit into the wider picture and also enable them to check on the accuracy of the data provided for their district.

6.4 Analysis of MIS data by MOA and Dissemination of Analysis

If resources permitted, more could be made of the data received from the production areas and markets. The annual Vademekum, although it is a well-prepared and valuable document, contains only statistics and charts. The monthly reports (now quarterly) had some limited analysis but this was primarily at the level of calculating percentage price changes rather than anything more detailed.

As the MIS has a vast database already on spreadsheets and has competent computer operators, there is considerable scope for carrying out more detailed analysis without involving significant extra time or cost. It would, for example, be interesting to adjust prices for inflation to see whether the real price of vegetables is changing. An analysis of margins, as carried out in paragraph 5.2 above, would be useful, as would an investigation into the extent of spatial integration, by comparing wholesale prices. Comparison of prices for the same crop in different districts within the same province may also produce interesting results. More sophisticated analyses should be left to the various research institutions in Indonesia, but basic analysis capable of highlighting possible problems with the functioning of the marketing system (such as those with tomatoes that are highlighted) should certainly fall within the mandate of the MIS unit. Some limited technical assistance to train staff in these subjects may be required.

Government regulations do not presently permit the sale of information. However, as previously noted, the time-series available in the MIS unit could well have a commercial value and there appears to be no reason why those who require detailed and comprehensive information should not pay for it. Instead of limiting data dissemination because of funding constraints, attempts could be made to generate revenue from the private sector and research agencies through the sale of reports and computerised data.

7. LESSONS FROM THE INDONESIAN MIS FOR OTHER COUNTRIES

In many ways Indonesia and its horticulture sector are not typical of most countries which may be seeking to establish an MIS or to develop an existing system. The country is heavily populated and has the resources which enable it to fund such a service. Horticultural production is widespread but largely concentrated in production pockets where clearly identifiable price formation takes place. Collection of producer prices is thus relatively easy and *relatively* inexpensive. Production is continuous, and while there are fluctuations in production levels, and hence prices, these are rarely considerable nor particularly predictable. Thus, in many ways, Indonesia cannot serve as a model for countries with limited resources, scattered production and only one or two harvests a year. On the other hand, there is much that can be learnt from the way the MIS in Indonesia was set up and from the way that it continues to function.

7.1 Design and Establishment of the MIS

The Indonesian MIS was only set up after considerable research into the needs of the potential users and design and implementation of the Service accordingly. The wisdom of this approach is shown by the fact that the service continues to be of significant value to at least one target group, the farmers. It was probably this approach which led to the decision to collect price information in the producing areas, although most existing price information services had tended to concentrate on wholesale prices in major markets. Also resulting from this approach was the decision that fruits were not a priority and, initially at least, that the MIS should concentrate on vegetables rather than fruits and on a relatively limited range of vegetables.

The technical assistance provided by GTZ lasted for seven years and subsequently several follow-up missions were mounted. Given the size of the MIS established in Indonesia, such a level of assistance was probably justified and fully illustrates the benefits of long-term technical assistance. However, at the present time most donors, whether for philosophical or pragmatic reasons, are moving away from long-term assistance and few countries will be able to avail themselves of such detailed help in future. Nevertheless, it must be stressed that an MIS should only be introduced after detailed research and after a full examination of all likely costs and benefits. Such an examination takes time.

While there were inevitably limited financial and other benefits for the Indonesia counterparts working with the GTZ team, these were clearly not so great that the project collapsed on GTZ's departure. In other countries, Government counterparts have been paid salary supplements to ensure the success of the "project," only for activities to be jeopardised once the supplements were no longer available.

7.2 Collection of Data

The decision to collect prices at local markets or, indeed, close to the farm gate, while undoubtedly the correct one, inevitably meant that costs of operating the MIS were going to be high. Indonesia is fortunate in that it has the resources to sustain such a detailed service. Most other countries will be unable to sustain such inputs, unless price information collection is seen as just one activity of extension workers.

However, in the case of many countries, price collection at source may not be so relevant nor, indeed, feasible. Where farmers are scattered over a large area and sell to traders at the farm gate or at very small assembly markets on an irregular basis, the local price may be both difficult and prohibitively expensive to collect. The MIS in Indonesia encounters problems in production areas because traders allege that prices fluctuate so much within a few hours that broadcast prices, or those posted on the Notice Boards, are already out of date. In other countries collection of prices on less than a daily basis (e.g. where there was a market twice a week) would lead to similar problems and in areas where production is scattered, collection of farm gate prices would be meaningless because of wide variations in marketing costs. Under such circumstances, it may be preferable to broadcast wholesale market prices and, through the extension services, assist farmers to interpret them. However, as noted above, this needs to be considered in detail at the design stage.

The Indonesian MIS is of value to farmers because it provides prices on a daily basis. Even if other MIS do not provide production area prices, they should try to emulate Indonesia's daily provision of information. An MIS for horticultural crops is required precisely because prices fluctuate rapidly. To establish an MIS which does not take account of this fact by monitoring and disseminating prices as frequently as possible would be pointless.

In reviewing the Indonesian MIS we were struck by the attitude of the staff, which showed commitment to and enthusiasm for the service, although the salaries paid are not very high. This commitment stems, in part at least, from the fact that the work they do is clearly appreciated by the farmers and by the fact that the results of their work are on the radio daily. This contrasts strongly with the experiences of some other MIS where it has been difficult to achieve reliable data collection. Often this is because data collectors do not hear or see the results of their work and their resulting alienation encourages the temptation to take short cuts. The Notice Boards used by the Indonesian MIS can therefore be seen as having two functions: on the one hand they disseminate data and on the other they maximise the involvement of the field collectors by requiring them to listen to the radio every day in order to obtain the information to update Boards.

7.3 Transmission of Data

The GTZ project provided Indonesia with radios to transmit data from the districts to the provincial capitals and from the provinces to the MIS unit in Jakarta. To a certain extent these have been superseded by fax machines and these, in time, are likely to be overtaken by the use of electronic data transmission.

Even relatively poor countries are often well provided with sophisticated telecommunications, and the quality of communications is increasingly becoming less of a constraint than the quality of the people doing the communicating. Where possible, communication should be in written form in order to minimise the risk of error in data transmission. Thus, unless absolutely essential, countries establishing an MIS are not recommended to install radio networks and instead should aim for fax or electronic data transmission.

7.4 Dissemination of Data by Radio

Daily radio broadcasts are an essential component of the impact of the MIS in Indonesia. They require a considerable commitment by the staff of the MIS to ensure that the texts of the radio broadcasts reach the radio stations every evening. While time availability on the radio is a slight constraint, Indonesia does not presently encounter the problems faced by many other countries where radio stations require large payments in order to carry MIS broadcasts. Any country wishing to establish an MIS should, from a very early stage, ascertain the willingness of the media to carry market information, and the likely costs involved.

7.5 Printed Dissemination

As noted above, the Indonesian MIS is weaker in the way it treats information for publication in printed form than in the way it handles information for immediate dissemination. This contrasts strongly with many other countries, where the commercial nature of market information provision tends to get overlooked as the MIS becomes solely a bureaucratic, data-gathering exercise.

Nevertheless, all Market Information Services, in the course of carrying out their prime function of providing up-to-date information to farmers and traders, will generate much information which will subsequently be of use to policymakers, planners and researchers. Attention needs to be paid to the presentation of this data, both for ease of use by the recipient and for maximum visibility of the MIS. The Indonesian "Vademekum" is a good example. As neither policymakers nor planners have time to carry out their own analysis of the data presented, the MIS should assist them by preparing publications which provide simple analysis of market information.

References

ADINUGROHO B. and LANDES A., (1982), "Marketing of Secondary Food Crops and Vegetables in South Sulawesi, Survey Report for the Establishment of an Agricultural Market Information Service in South Sulawesi". Indonesian-German Technical Cooperation Project ATA 85/86.

CASLEY, D.J. and LURY, D.A. (1982), "Monitoring and Evaluation of Agricultural and Rural Development Projects".

CASLEY, D.J. and KUMAR, K. (1987), "Project Monitoring and Evaluation in Agriculture", a joint study of the World Bank, the International Fund for Agricultural Development and the Food and Agriculture Organization of the United Nations.

CASLEY, D.J. and KUMAR, K. (1988), "The Collection, Analysis, and Use of Monitoring and Evaluation Data", a joint study of the World Bank, the International Fund for Agricultural Development and the Food and Agriculture Organization of the United Nations.

DIREKTORAT BINA USAHA TANI DAN PANGOLAHAN HASIL (1995), "Vademekum, Pemasaran 1984 - 1994". Jakarta, Indonesia.

FAO (1993), "Compendium of food consumption statistics from household surveys in developing countries, Volume 1: Asia".

FAO - ADB (1984), "Indonesia, Fruit and Vegetables Production and Marketing Project Preparation Mission". Rome, Italy.

FERRARI M.F. (1994), "20 Years of Horticulture in Indonesia: The Vegetable Sub-Sector", The CGPRT Centre, Bogor - Indonesia, Working Paper No. 15.

GTZ (1988 a), ZOPP in brief 1/88.

GTZ (1988 b), ZOPP, an introduction to the method 3/88.

HAERAH, A., GANI, R., SCHUBERT, B. and ZEHRFIELD, E-H. (1979), "Manual of Operations for an Agricultural Market Information Service", Indonesian - German Technical Cooperation Project ATA 85/86 Publication No. 7, March 1979.

HAYAMI Y, ET AL. (1991), "Marketing Innovation for Vegetables: Conditions of Diversification in Upland Farming", The CGPRT Centre, Bogor - Indonesia, Publication No. 8.

HAYAMI Y, ET AL. (1987), "Agricultural Marketing and Processing in Upland Java, A Perspective From A Sunda Village", The CGPRT Centre, Bogor - Indonesia, Publication No. 25.

NAINGGOLAN K. and SIMATUPANG P. (1990), "Agricultural Marketing Information

Systems in Indonesia". Paper prepared for the Regional Workshop on Agricultural Marketing Information Systems in ASEAN, 3-4 September 1990.

RAMM G., SCHUBERT B., ZEHRFIELD E-H. (1980), "Effects and Impacts of Establishing a Price Information Service - findings of a survey conducted with 254 producers".

SCHUBERT B., ZEHRFIELD E.H., and JUNTERMANS G. (1988), "Agricultural Market Information Services, Guidelines for the Design and Management of Market Information Projects", BMZ-GTZ Rural Development Series.

THE WORLD BANK (1994), "Assessing Development Activities, Evaluation in the World Bank and International Finance Corporation".

UNITED NATIONS (1995), "World Urbanization Prospects, The 1994 Revision".

Annex 1 Development of Gross Trade Margins (GTM) (in Rp/kg at constant 1980 prices)
and Farmer's Share, for Selected Vegetables in West Java, 1980-94

Annex 2 Differences in wholesale prices between Jakarta and Surabaya (based on Jakarta prices, in Rp/kg and percentages), 1981-94

end