



UNIVERSITI PUTRA MALAYSIA

**MANAGEMENT PRACTICES OF THE INTEGRATED ORGANIC
FARMING SYSTEM IN GUNUNGKIDUL DISTRICT, INDONESIA**

ARIS SLAMET WIDODO

FP 2006 39



**MANAGEMENT PRACTICES OF THE INTEGRATED ORGANIC
FARMING SYSTEM IN GUNUNGKIDUL DISTRICT, INDONESIA**

By

ARIS SLAMET WIDODO

**Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia,
in Fulfilment of the Requirement for the Degree of Master of Science**

November 2006



Specially Dedicated To:

**My Parents (S. Triyanto and Marwiyah)
Parents in-law (H. M. Tofah and Hj. Jamilah)
Brother and sister (Hendri, Sulis, Rini, Titik and Indi)
Wife (Hasanah Safriyani)**

.....Who inspired, supported and encourage me to be a better person.



Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment
of the requirement for the degree of Master of Science

**MANAGEMENT PRACTICES OF THE INTEGRATED ORGANIC
FARMING SYSTEM IN GUNUNGKIDUL DISTRICT, INDONESIA**

By

Aris Slamet Widodo

November 2006

Chairman : Norsida Man, PhD

Faculty : Agriculture

An integrated organic farming system applies the concept of “*Low External Input Sustainable Agriculture*” (LEISA) and this system develops the livestock business and the crop business in one location or area using local resources to optimize inputs. This study is an attempt to analyze the management and economic characteristics of the integrated organic farming system in the Gunungkidul, Indonesia. The specific objectives of this study were: (i) to examine the socio-economic profile of farmers that practiced the integrated organic farming system, (ii) to evaluate the farm management practices, (iii) to determine the optimal allocation resources used in the integrated organic farming system.

The study comprises three components. The first was a study on the social economic profile of the respondents. The second was a study on the farmers’ management capability, based on the management functions of setting objectives, planning, controlling and decision-making. The third was a study on the optimal allocation of resources used in the integrated organic farming system.

The Likert Scale was used to measure the farmers' management capability. The Linear Programming method was used to determine the optimal allocation of resources. Descriptive analysis was also used to explain the integrated organic farming system that had been practiced in the study area. Primary data were collected from a farm survey and secondary data were obtained from relevant agencies.

The study found that the integrated organic farming system practiced is combination between integrated farming and organic farming. Organic fertilizers and bio pesticides were the organic materials always used in the farming practice. The farmers made a special bio pesticide from local materials.

The Gunungkidul farmers had applied the rotation system based on seasons in their farming practice. Paddy was planted in the rainy season, corn and peanut in the first dry season and in the second dry season, the farmers planted watermelons and inter cropped between corn and peanut. In the study area, the supply of organic fertilizer was from chickens, goats and cows. The supply of livestock fodder was from crop waste especially from paddy straw. Grass was also fed to cows and goats, especially to cows. Farmers also gave mineral concentrates that contained corn, waste from tofu and rice siftings.

The results of the analysis on management capability show that the farmers had a low level of management capability in setting objective and controlling but they had a middle level of management capability in planning and decision-making.

The Linear Programming (LP) analysis found that in the integrated organic farming system practiced in the Gunungkidul District, the farmers could maximize profits up to Rp 5,463,156. Paddy was the main crop planted on farmland of a maximum size of 0.3480 ha in the rainy season. The total income in the rainy season or Season One was Rp 1,591,904.04 which was from the sale of paddy, handicraft and compost.

In the first dry season or Season Two, intercropping between peanut and corn was more viable than the mono crop practice of planting peanut or corn on a maximum farmland size of 0.422 ha. The income in this season was Rp 2,326,069.431. The supply of paddy straw from the rainy season decreased the buying of straw in this season. The planting of watermelons (0.1849 ha) and intercropping between peanut and corn (0.2371 ha) were identified by LP to be the profitable crops that should be planted in the second dry season (Season Three). The contribution of these crops to income was Rp 1,545,182.96.

Based on the results, activities involving land, labor, handicraft, paddy straw, organic fertilizer, and farmer's income, it was concluded that only the paddy straw and organic fertilizer activities in Season One were at an optimal level. Based on these results, the farming practice generally was not at an optimal level in Jetis, Gunungkidul.

Four strategies are recommended for accelerating the implementation of the integrated organic farming system based on the LP results. The first is to increase the availability of resources. The second is to introduce a new technology in the farm and livestock activities. The third is to increase the management capability and the fourth is to develop off farm activities, especially in handicraft making.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains

**PRAKTIK PENGURUSAN SISTEM PERTANIAN BERSEPADU ORGANIK
DI GUNUNGKIDUL, INDONESIA**

Oleh

ARIS SLAMET WIDODO

November 2006

Pengerusi : Norsida Man, PhD

Fakulti : Pertanian

Sistem pertanian organik bersepadu menggunakan konsep “*Low External Input Sustainable Agriculture*” (*LEISA*) dan sistem ini turut dibangunkan oleh perniagaan ternakan dan tanaman di sebuah lokasi atau kawasan yang menggunakan sumber-sumber tempatan untuk mengoptimalkan penggunaan input. Secara amnya, kajian ini menganalisis aspek pengurusan dan ekonomi sistem pertanian organik bersepadu di Gunungkidul, Yogyakarta, Indonesia. Objektif spesifik ialah: (i) untuk mengkaji profil sosio-ekonomi para petani yang mengamalkan sistem pertanian padi organik bersepadu, (ii) untuk menilai amalan pengurusan ladang, dan (iii) untuk menentukan sumber-sumber peruntukan optima yang digunakan dalam sistem pertanian padi organik bersepadu.

Kajian ini merangkumi tiga sub kajian. Sub kajian yang pertama merupakan kajian ke atas profil sosio-ekonomi responden. Yang kedua ialah kajian mengenai kebolehan pengurusan petani, berdasarkan fungsi pengurusan iaitu menetapkan matlamat, merancang, membuat keputusan dan mengawal. Sub kajian yang ketiga pula adalah kajian ke atas sumber peruntukan optima yang digunakan di dalam sistem pertanian padi organik bersepadu.



Skala Likert telah digunakan untuk mengenalpasti kebolehan pengurusan petani. Kaedah pengaturcaraan linear telah digunakan untuk menentukan sumber-sumber peruntukan optima. Analisis deskripsi juga digunakan untuk menerangkan mengenai sistem pertanian organik bersepadu yang diamalkan di kawasan tersebut. Data primer telah dikumpul dari bancian ladang manakala data sekunder diperolehi dari agensi-agensi yang berkaitan dapat digunakan sebagai maklumat tambahan.

Kajian ini mendapati bahawa pertanian organik bersepadu yang dijalankan merupakan gabungan di antara pertanian organik dan pertanian bersepadu. Para petani di Gunungkidul menggunakan sistem giliran berdasarkan musim. Padi ditanam pada musim hujan, jangung dan kacang tanah pula ditanam pada musim kemarau yang pertama manakala di musim kemarau yang kedua petani menanam tembikai dan pertanian campuran di antara jagung dan kacang tanah.

Baja organik dan bio pestisid merupakan bahan-bahan organik yang selalu digunakan dalam amalan ladang. Di kawasan kajian, bekalan baja organik diperolehi dari ayam, kambing dan lembu. Bekalan makanan untuk ternakan pula diperolehi dari jerami padi. Rumput juga turut diberikan kepada lembu dan kambing.

Hasil daripada kajian kebolehan pengurusan petani mendapati bahawa para petani kurang berkebolehan dalam menetapkan matlamat dan mengawal manakala dari segi merancang dan membuat keputusan, kebolehan pengurusan mereka berada di tahap yang sederhana.

Analisis pengaturcaraan linear mendapati bahawa para petani yang mengamalkan sistem pertanian organik bersepadu di kawasan Gunungkidul dapat memaksimumkan keuntungan sehingga Rp 5,463,156. Padi merupakan tanaman utama dan pada musim hujan, padi perlu ditanam di atas keluasan tanah yang maksima iaitu 0.3480 hektar. Jumlah pendapatan dari hasil jualan padi, kraftangan dan kompos pada musim hujan atau musim kesatu ialah Rp 1,591,904.04.

Pada musim kemarau yang pertama atau musim kedua, penanaman tanaman campuran seperti kacang tanah dan jagung di atas tanah seluas 0.422 hektar amat digalakkan berbanding menanam kacang tanah atau jagung sahaja. Hasil jualan dari kedua-dua jenis tanaman ini adalah sebanyak Rp 2,326,069.431. Keputusan analisis pengaturcaraan linear mendapati bahawa tembikai (0.1849 hektar) dan tanaman campuran di antara kacang tanah dan jagung (0.2371 ha) merupakan tanaman yang akan menguntungkan apabila ditanam pada musim kemarau yang kedua (musim ketiga). Hasil jualan tanaman ialah sebanyak Rp 1,545,182.96.

Berdasarkan kepada keputusan di atas, hanya aktiviti jerami padi dan baja organik sahaja yang optima pada musim pertama berbanding aktiviti-aktiviti lain yang belum optima seperti aktiviti tanah, pekerja dan kraftangan, dan pendapatan petani. Secara amnya, amalan pertanian di Gunungkidul masih belum optima.

Berdasarkan kepada keputusan pengaturcaraan linear, dua strategi telah dicadangkan untuk mempercepatkan pelaksanaan sistem pertanian organik bersepadu. Pertama ialah meningkatkan kemampuan tanah dan sumber-sumber yang lain untuk meningkatkan jumlah pendapatan bersih. Manakala yang kedua pula ialah memperkenalkan teknologi baru di dalam aktiviti pertanian dan ternakan.

ACKNOWLEDGEMENTS

First and foremost, my heartfelt thanks to Almighty Allah for giving me the strength, good health, and will power to complete my study.

It is my pleasure to express my sincere gratitude and appreciation to Dr. Norsida Man, lecturer in the Department of Agribusiness and Information System, Faculty of Agriculture, UPM, and chairman of my Supervisory Committee for his persistent guidance, patience, and encouragement and generosity whenever and whatever is needed in completing my study. My sincere appreciation and thanks also to members' of my Supervisory Committee: Associate Professor Dr. Zainal Abidin Mohamed, Head Department of Agribusiness and Information System, Faculty of Agriculture, UPM and Mr Alias Radam, lecturer in The Faculty of Economics and Management, UPM for their encouragement, kind assistance, and helpful suggestions in completing this thesis.

I am grateful to Muhammadiyah University of Yogyakarta (UMY) for giving permission and financial assistance to pursue my study. Special thanks also goes to all lecturers in the Agriculture Faculty of UMY for the support and motivation.

I also wish to thank the officers and staff at: Agriculture Department of Gunungkidul, Central Bureau Statistics of Yogyakarta province and Central Bureau Statistics of Gunungkidul District, for their permission and assistance in gathering data. Special thanks are also extended to the society Jetis village, Paliyan, Gunungkidul, Yogyakarta, for their cooperation and help in data collection.



I would like to express my thanks to the Head and staff members of the Department Agribusiness and Information System, Faculty of Agriculture, UPM, the Dean and staff of Graduate School Studies, UPM, for their generous help during the entire length of my study. Special thanks to my friends and colleagues in UPM: Dr. M. Saleh Mokhtar, M. Azarudin, Iing lukman, Abdul Rahman, Fatih H, Saeful B. P, Syamsudin Toha, Suryani and all my friends in the Department of Agribusiness and Information System and in the Indonesian Student Association, for their friendly, helpful, and moral support.

I am ever grateful to my parents S. Triyanto and Marwiyah and my parents-in-law H. M. Tofah and Hjh. Jamilah, and all my brothers. And special thanks also go to my lovely wife Hasanah Safriyani S.Psi., Psi. for her patience, blessings, and moral support to complete my study.

Lastly, special thanks are due do to all those whom I could not mention here who have contributed to the completion of this study through them physical, moral or spiritual support.

May Allah S.W.T. bless all who have kindly helped me!



I certify that an Examination Committee has met on 26th September 2006 to conduct the final examination of Aris Slamet Widodo on his Master of Science thesis entitled “Management Practices Of The Integrated Organic Farming System In Gunungkidul District, Indonesia” in accordance with Universiti Pertanian Malaysia (Higher Degree) Act 1980 and Universiti Pertanian Malaysia (Higher Degree) Regulations 1981. The Committee recommends that the candidate be awarded the relevant degree. Members of the Examination Committee are as follows:

Mad Nasir Shamsudin, PhD

Professor
Faculty of Environmental Studies
Universiti Putra Malaysia
(Chairman)

Md. Ariff Hussein, PhD

Professor
Faculty of Agriculture
Universiti Putra Malaysia
(Internal Examiner)

Mohd. Mansor Ismail, PhD

Associate Professor
Faculty of Agriculture
Universiti Putra Malaysia
(Internal Examiner)

Nik Fuad Nik Mohd. Kamil, PhD

Associate Professor
Faculty of Economics and Management
College of Science University and Technology Malaysia
(External Examiner)



HASANA H. GHAZALI, PhD
Professor/Deputy Dean
School of Graduate Studies
Universiti Putra Malaysia

Date: 21 DECEMBER 2006

This thesis submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Master of Science. The members of the Supervisory Committee are as follows:

Norsida Man, PhD
Lecturer
Faculty of Agriculture
Universiti Putra Malaysia
(Chairman)

Zainal Abidin Mohamed, Ph.D
Professor
Faculty of Agriculture
Universiti Putra Malaysia
(Member)

Alias Radam
Lecturer
Faculty of Economics and Management
Universiti Putra Malaysia
(Member)



AINI IDERIS, PhD
Professor/ Dean
School Graduate Studies
Universiti Putra Malaysia

Date: 16 JAN 2007

DECLARATION

I hereby declare that the thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at UPM or other institutions.



ARIS SLAMET WIDODO

Date: 29 November 2006

TABLE OF CONTENTS

	Page
DEDICATION	ii
ABSTRACT	iii
ABSTRAK	vi
ACKNOWLEDGEMENTS	ix
APPROVAL	xi
DECLARATION	xiii
LIST OF TABLES	xvii
LIST OF FIGURE	xx
LIST OF ABBREVIATIONS	xxi
CHAPTER	
1 INTRODUCTION	1.1
1.1 Background	1.1
1.2 Problem Statement	1.7
1.3 Objectives of Study	1.9
1.4 Significance of Study	1.9
2 GENERAL FEATURE OF GUNUNGKIDUL AGRICULTURE	2.1
2.1 Geographical Location	2.1
2.2 Population	2.6
2.2.1 Population Density	2.6
2.2.2 Population in Terms of Their Gender	2.7
2.2.3 Population in Terms of Their Age	2.9
2.3 Agriculture Structure	2.10
2.3.1 Agriculture Lands	2.10
2.3.2 Husbandry/ Livestock	2.15
2.3.3 Fishery	2.16
2.3.4 Irrigation & Drainage	2.17
2.4 Economical Structure	2.19
2.4.1 Sector Roles	2.19
2.4.2 Development of GRDP by Sector	2.20
2.4.3 Income Per-Capita	2.21
2.5 Farming Practices in Integrated Organic Farming System	2.22
2.6 Group Farming as Management Body	2.29
2.6.1 The History of Group Farming	2.29
2.6.2 Organizational Structure and Membership	2.31
2.6.3 Programs and Activities	2.33
2.6.4 The Group Farming Assets	2.37
3 LITERATURE REVIEW	3.1
3.1 Studies in Management Farming	3.1
3.2 Studies in Integrated Organic Farming System	3.6
3.2.1 Organic Farming	3.6
3.2.2 Integrated Farming System	3.8
3.3 Studies in Linear Programming	3.12
	xiv

4	METHODOLOGY	4.1
	4.1 Conceptual and Theoretical Framework	4.1
	4.1.1 Farm Management	4.1
	4.1.2 Development of Linear Programming	4.3
	4.2 Research Design	4.14
	4.2.1 Population and Sampling Design	4.14
	4.2.2 Types of Data and Data Collection	4.15
	4.2.3 The Survey	4.15
	4.2.4 Data Analysis	4.17
5	RESULTS AND DISCUSSION	5.1
	5.1 Socio-Economics Profile of the Farmers	5.1
	5.1.1 Gender	5.1
	5.1.2 Age	5.3
	5.1.3 Education	5.5
	5.1.4 Experience	5.7
	5.1.5 Secondary Jobs	5.9
	5.2 Management Capabilities	5.10
	5.2.1 Validity and Reliability of Data	5.11
	5.2.2 The Function of Management	5.13
	5.2.3 The Level of Management Capability	5.18
	5.3 Linear Programming Result	5.20
	5.3.1 Optimal Solution	5.20
	5.3.2 Slack and Dual Prices	5.28
	5.3.3 Objective Coefficient Ranges	5.33
	5.3.4 Right Hand Side Ranges	5.37
	5.3.5 Comparison of the LP Result with the Farming Practices	5.42
6	SUMMARY, CONCLUSIONS AND POLICY IMPLICATIONS	6.1
	6.1 Summary and Conclusions	6.1
	6.1.1 Socio-Economics and Farming Practices	6.1
	6.1.2 Analysis of Management Capability	6.3
	6.1.3 Results of Analysis Using LP Model	6.5
	6.2 Policy Implications	6.9
	6.2.1 Increase the Available of Resources	6.10
	6.2.2 Introduce the New Technology in the Farming System	6.11
	6.3 Limitation of the Present Study	6.16
	REFERENCES	R.1
	APPENDICES	A.1
	BIODATA OF THE AUTHOR	V.1



LIST OF TABLES

Table	Page
1.1 Land Utilization and the Extensive (Ha), Gunungkidul District, 2003	1.3
1.2 The Plants Productivity, Gunungkidul District, 2003	1.4
2.1 Geographical Location of the Gunungkidul District	2.4
2.2 Number of People, Area Width and Population Density Per-District in D.I. Yogyakarta Province, 1980, 1990 and 2000	2.6
2.3 Population by Gender in Yogyakarta Province, 2000	2.8
2.4 Population of children and Adult by Sex in Gunungkidul District, 2004	2.9
2.5 Land Utilizations by Type in Gunungkidul District, 1997-2000 (Ha)	2.11
2.6 Production of Farm Food Crops by Kind, 1997-2001 (Ton)	2.12
2.7 Production of Vegetables from 1997-2001 (Ton)	2.13
2.8 Production of fruits Plants, 1997-2001 (Ton)	2.14
2.9 The Production of Land and Ocean Fishery in Gunungkidul District (2002 - 2003)	2.16
2.10 Areas of Wetland and Dryland in Gunungkidul District (Ha) (1998 – 2003)	2.17
2.11 Gross Regional Domestic Product (GRDP) at Current Market Price by Industrial Origin, 1997 – 2001 (Million Rupiahs) in Gunungkidul District	2.20
2.12 Combination Material of Organic Fertilizer in Jetis, Gunungkidul District, 2005	2.25
2.13 Material Combination of Bio Pesticide in Jetis, Gunungkidul District, 2005	2.27
2.14 Physical Asset of the Group farming “Cipto Makaryo”, Gunungkidul District, 2005	2.37
4.1 A Linear Programming Tableau	4.7
4.2 The Objective function of The Linear Programming Problem in The Integrated Organic Farming System in Gunungkidul District, 2005	4.40
4.3 The Constraints of Linear Programming in the Integrated organic Farming System in Gunungkidul District, 2005	4.41

5.1	The Gender Distribution of Farmers in Jetis, Gunungkidul District, 2005	5.1
5.2	The Cross Tabulation between Gender and Income of Farmers in Jetis, Gunungkidul District., 2005	5.2
5.3	The Age Distribution of Farmers in Jetis, gunungkidul, 2005	5.3
5.4	The Cross Tabulation between Ages and Income of Farmers in Jetis, Gunungkidul District, 2005	5.4
5.5	The Education Level of Farmers in Jetis, Gunungkidul District, 2005	5.5
5.6	The Cross Tabulation between Education and Incomes of Farmers in Jetis, Gunungkidul, 2005	5.6
5.7	The Level of Farmers Experience in Jetis, Gunungkidul District, 2005	5.7
5.8	The Cross Tabulation between Experience and Income of Farmers in Jetis, Gunungkidul, 2005	5.8
5.9	The Kinds of Secondary Jobs in Jetis, Gunungkidul, 2005	5.9
5.10	Name of Constructs, Number of Items and Estimates of Reliability Coefficients (Alpha)	5.11
5.11	Setting Objective Capability in the Integrated Organic Farming System, Gunungkidul District, 2005	5.13
5.12	Planning Capability in the Integrated Organic Farming System, Gunungkidul District, 2005	5.15
5.13	Decision Making Capability in the Integrated Organic Farming System, Gunungkidul District, 2005	5.16
5.14	Controlling Capability in the Integrated Organic Farming System, Gunungkidul District, 2005	5.17
5.15	Management Capability in the Integrated Organic Farming System, Gunungkidul District, 2005	5.19
5.16	The Value of the Variable (Activities) in the Integrated organic Farming System in Gunungkidul, 2005	5.21
5.17	The Maximum Profit of Season One in the Integrated Organic Farming System in Gunungkidul District, 2005	5.23
5.18	The Maximum Profit of Season Two in the Integrated Organic Farming System in Gunungkidul District, 2005	5.25
5.19	The Maximum Profit of Season Three in the Integrated Organic Farming System in Gunungkidul District, 2005	5.27



5.20	The Slack and Dual Prices of the Constraints in the LP Result of Integrated Organic Farming System in Gunungkidul, 2005	5.28
5.21	The Objective Coefficient Ranges in the LP Result of Integrated Organic Farming System in Gunungkidul, Indonesia. 2005	5.33
5.22	The Right-hand Side Ranges in the Linear Programming Result of Integrated Organic Farming System in Gunungkidul, 2005	5.38



LIST OF FIGURES

Figure	Page
2.1 The Map of Indonesia	2.2
2.2 The Map of Gunungkidul, Yogyakarta, Indonesia	2.3
2.3 The Crops Planting Rotation in Jetis, Gunungkidul, 2005	2.23
2.4 The Integrated organic Farming System in Jetis, Gunungkidul 2005	2.23
2.5 The Organizational Structure of the Group farming “Cipto Makaryo” in Jetis, Gunungkidul, 2005	2.31
3.1 The Framework of Management by Giles and Stansfield	3.2
3.2 Structure Diagram of Integrated Farming System (Li Wenhua, 2001)	3.7
4.1 A Two Dimensional Representation of the LP Logic	4.8
4.2 Graphical Solution of Farm Problem	4.9



LIST OF ABBREVIATIONS

AFTA	ASEAN free trade area
BKD	<i>Bank Kredit Desa/ Village Credit Bank</i>
BPR	<i>Bank Perkreditan Rakyat/ People Credit Bank</i>
C	Celsius
EM (EM4)	Effective Micro Organism
FFTC	Food and Fertilizer Technology Center
G (g)	Gram
GBHN	<i>Garis-Garis Besar Haluan Negara/ the Guidelines for State Policies</i>
GDP	Gross Domestic Product
GRDP	Gross Regional Domestic Product
Ha	Hectare
IPM	Integrated Pest Management
Kg	Kilogram
Km	Kilometer
L	Liter
LEISA	Low External Input Sustainable Agriculture
LP	Linear Programming
M (m)	Meter
Mm (mm)	Millimeter
NGO	Non Government Organization
OIFS	Organic Integrated Farming System
PSA	<i>Pusat Standardisasi & Akreditasi/ Central of Standardization & Accreditation</i>
RHS	Right Hand Side
RP	<i>Rupiah (Indonesian Money)</i>
SNI	<i>Standard National Indonesia</i>
SRF	Sex Ratio Feminism
SRM	Sex Ratio Masculine
UNDP	United Nation Development Programmed
USD	United State Dollar
USDA	United State Development Agriculture
WTO	World Trade Organization



CHAPTER 1

INTRODUCTION

1.1 Background

The guidelines for state policies (GBHN) of Indonesia, 1999-2004, have stated that the economic sector is a priority in national development. The development plans focus on the agricultural and industrial sectors and the balancing of the economic structure between industry and agriculture. This policy has targeted at efforts to increase the value of agriculture products and the country's ability to absorb employees into the agricultural sector.

According to Gunawan (2003), the agriculture sector has played a major role in developing the Indonesian economy for the past three decades. In 2001, the agriculture sector contributed 16.35% to Indonesian's Gross Domestic Product (GDP). At the same time, it absorbed 45.3% or 40.7 million of the total work force in the country. In addition, the agriculture sector was the lifesaver during the 1997 - 1998 financial crisis, during which, it maintained its role as the engine of growth for the Indonesian economy and continued to be so even after the crisis. As such, the agricultural sector continues to play a vital role in the economic development of the Republic of Indonesia.

The main objectives of the agricultural development policy in Indonesia are to increase agricultural productivity and to improve the welfare of farmers. Agricultural development in Indonesia for several decades has focused on increasing the supply

of staple foods, particularly rice, in order to eliminate food shortages. The technology used in the implementation of the policies had emphasized mainly on the manufacturing of chemical fertilizers to help produce high-yielding varieties.

The government policy to increase agricultural productivity and to improve the farmers' welfare has concentrated on the wetlands by improving the irrigation system. This provides greater opportunities for success in the paddy intensification programme compared to upland farming. The paddy intensification programme was widely supported by the government which meets the farmers' needs by providing amenities such as irrigation, supply of chemical fertilizers, pesticides, and other technology. On the other hand, the development of upland farming faces problems of productivity, stability, sustainability and equitability that generally is low. As a result, the areas dominated by dry land farming have low returns for the farmers (Achmad, 2003).

Accordingly, the greater attention given to the wet lands in the form of better irrigation systems has given rise to a widening gap in the productivity between the wetlands and uplands. The gap has resulted in higher income and better welfare for farmers in the wet lands compared to those farmers in the uplands.

The Gunungkidul District, located in the Yogyakarta Province of Java Island, falls within the national economic development plan. Topographically, Gunungkidul is hilly and the terrain is sometimes very steep. About 5% of its lands is wet land with the rest distributed as yard land, forest, ponds and agriculture estates. In this area, water is an urgent problem for peoples' consumption and agriculture activities. The



kinds of soil found are 15% *volcanic lateristic*, 10% *margalite*, 35% *latosol*, and 40% *limestone*. Land utilization is highest in the dry lands (55.58%) with the wet lands contributing only 5.43%. Table 1.1 shows land utilization and extensive (Ha) in the Gunungkidul District.

Table 1.1. Land Utilization and the Extensive (Ha), Gunungkidul District, 2003

No.	Utilizing of Lands	Extensive (Ha)	(%)
1.	Wet land	80.65	5.43
2.	Dry land	825.56	55.58
3.	Yard land	244.93	16.49
4.	Forestry (Government)	121.20	8.16
5.	Pond	0.74	0.05
6.	Individual Forest	12.03	0.81
7.	Critical land	112.10	7.55
8.	Other kinds of land	88.15	5.93
	Total:	1,485.36	100.00

Source: Agriculture Department of Gunungkidul Regencies, 2004.

In the Gunungkidul district, availability of natural resources has become a serious problem in agricultural development especially with 65% of working population engaged in the agricultural sector. According to The Central Bureau of Statistic, the agricultural sector GRDP (Gross Regional Domestic Product) of Gunungkidul is the highest, accounting for 40.38 % of the total sum in spite of some scarcities of natural resources. Some of the major production constraints are attributed to the weather, topography, and poor soils of the region.

According to Winarso (2002), the prosperity of a certain area is commonly measured by various indicators. One of them is income per capita. Income per capita especially reported in a chronological context can illustrate the changes in prosperity per person in that area. For example, in 2001, the income per capita of the Gunungkidul people



is Rp 3,229,356 which shows a decrease from the 2000 figures (Rp 3,317,434). The figures would generally describe the region as having a low prosperity. The low prosperity of the Gunungkidul District could be a consequence of low farmers' income in the uplands. The low productivity of dry paddy (Table 1.2.) also plays a part in constraining farmers' income.

Table 1.2. The Plants Productivity, Gunungkidul District, 2003.

No.	Plants	Productivity (Ton/Ha)
1.	Wet paddy	4.702
2.	Dry paddy	3.197
3.	Cassava	13.145
4.	Corn	1.686
5.	Peanut	0.851
6.	Chili	2.405

Source: Agriculture Department of Gunungkidul Regencies, 2004.

In addition, the agricultural program to increase the paddy productivity has to contend with problems of marginal land and scarcity of water. The specific conditions in the Gunungkidul District require a good agriculture system of production which can tap on the potential of natural resources.

Literate of Central Bureau of Statistics, Gunungkidul (2004), notes that the Gunungkidul District has potential for livestock production. Data obtained reveal livestock figures to be the rearing of cows (106 thousands), goats (118 thousands) and sheep (10.107 thousands). These populations are supported by the 244.93 ha of yard land and 133.23 ha of grassland that supplies feed for the livestock.

