

## TABLE OF CONTENT

COVER .....	i
LEMBAR PENGESAHAN .....	ii
APPROVAL .....	iii
AUTHOR'S DECLARATION OF ORIGINALITY .....	iv
ACKNOWLEDGEMENT .....	v
TABLE OF CONTENT .....	vi
LIST OF FIGURES .....	x
LIST OF TABLES .....	xii
LIST OF ABBREVIATIONS AND SYMBOLS .....	xiii
ABSTRACT.....	xv
INTRODUCTION .....	1
1.1. Current Solid Waste Management in Indonesia.....	1
1.2. Existing Problems .....	5
1.3. Waste Bank Development .....	7
1.4. Research Objective and Questions .....	9
1.5. Research Contributions .....	9
LITERATURE REVIEW .....	11
2.1. Previous Researches .....	11
2.2. Literature Reviews on Recycling, Composting and Waste Bank Management .....	13
2.2.1 Recycling .....	13
2.2.2 Composting .....	15

2.2.3	Waste Bank Management .....	17
2.3.	Originality of This Research .....	22
RESEARCH METHOD.....		24
3.1	Type of Research.....	24
3.2	Policy Analysis (Eightfold Path).....	24
3.3	Focus of Research .....	28
3.4	Determinant of Location .....	29
3.5	Data Type and Data Source.....	30
COMMUNITY-BASED WASTE BANK (CWB) IN MAGELANG .....		32
4.1	Management .....	32
4.2	Past Performance .....	33
4.3	Social Bond Promotion .....	36
4.4	Economic Benefit.....	37
4.5	Technology Utilization.....	39
4.6	Educational Meaning.....	40
4.7	Discussions.....	41
HOLDING WASTE BANK (HWB) IN MALANG AS AN ADVANCED MODEL .....		44
5.1	Management .....	45
5.1.1	Malang Municipality as Governing Board.....	46
5.1.2	Power Company's Corporate Social Responsibility (CSR).....	48
5.2	Daily Operation .....	49
5.2.1	Operational Division .....	51

5.2.2	Production Division .....	53
5.2.3	Domestic and Empowerment Division .....	55
5.3	Economic Analysis.....	56
5.4	Performance and Capacity .....	60
5.5	Discussions.....	61
AN ADVANCED SOLID WASTE MANAGEMENT IN KYOTO CITY, JAPAN		
	.....	66
6.1	Separating System on The Source.....	66
6.2	Product Labeling System .....	71
6.3	Separation Promotion .....	73
6.4	Clean Center and Landfill Site Facilities .....	74
6.5	Discussions.....	77
6.6	Lesson Learned for Further Promotion of Waste Banks in Indonesia ...	80
	POLICY .....	82
7.1	Market for Compost Produced by CWBs .....	82
7.1.1	Defining the problem .....	82
7.1.2	Gathering evidences .....	82
7.1.3	Creating the options .....	83
7.1.4	Choosing the standards .....	84
7.1.5	Predicting the outcomes .....	85
7.1.6	Confronting trade offs .....	89
7.1.7	Making decision.....	91
7.2	Increasing HWB Revenue and Maintaining Its Sustainability.....	91

7.2.1	Defining the problem .....	91
7.2.2	Gathering evidences .....	92
7.2.3	Creating the options .....	93
7.2.4	Choosing the standards .....	96
7.2.5	Predicting the outcomes .....	96
7.2.6	Confronting trade offs .....	100
7.2.7	Making decision .....	100
CONCLUSION AND POLICY RECOMMENDATIONS .....		102
8.1	Conclusions .....	102
8.2	Policy Recommendations .....	104
References .....		109
Appendix A : Social Setting .....		I
A.1	Geography .....	I
A.2	Demography .....	II
A.3	Economy .....	IV
A.4	Environment .....	VI
Appendix B : Ngudi Raharjo Documentation .....		IX
Appendix C : Malang Waste Bank (BSM) Documentation .....		XII
Appendix D : 70 Types of Waste Received by Malang Waste Bank (BSM) .....		XV
D.1	Plastic .....	XV
D.2	Paper .....	XXII
D.3	Metal .....	XXIII
D.4	Glass .....	XXVI

## LIST OF FIGURES

Figure 1.1 Households behavior toward their waste profile in urban and rural area

Figure 1.2 Magelang Municipality solid waste management in 2015 (material balance chart)

Figure 2.1 Waste hierarchy

Figure 2.2 Composting diagram process

Figure 4.1 “Ngudi Raharjo” Organic Village unit’s relationship

Figure 4.2 Amount of waste accepted by “Ngudi Raharjo” waste bank

Figure 4.3 “Ngudi Raharjo” waste bank economic analysis

Figure 5.1 BSM co-operative enterprise organizational structure

Figure 5.2 BSM waste bank organizational structure

Figure 5.3 BSM waste bank client’s transaction process

Figure 5.4 Production division work scheme

Figure 5.5 BSM financial record analysis January 2014- October 2016

Figure 6.1 Kyoto City’s acceptable ways to separate and dispose of garbage and recyclables book

Figure 6.2 Example of product labeling

Figure 6.3 Waste bin facilities in Ritsumeikan University

Figure 6.4 Waste bin facilities in convenience store and vending machine

Figure 6.5 Hokubu clean center’s control rooms

Figure 6.6 Ecoland Otowa no Mori education facilities

Figure 8.1 Scheme of government supports for waste bank system applying composting and recycling function

Figure A.1 Magelang City location

Figure A.2 Magelang City population pyramid in 2015

Figure B.1 Ngudi Raharjo management on duty

Figure B.2 Land for organic plantation and nursery

Figure B.3 Depositing activities

Figure B.4 Hanging scale

Figure B.5 Unused organic waste crusher machine

Figure B.6 Composters (takakura, communal and hole)

Figure B.7 Handicraft product

Figure C.1 Picking up activities

Figure C.2 Sorting unit activities

Figure C.3 Production division activities

Figure C.4 BSM front office and show room

## **LIST OF TABLES**

- Table 4.1 “Ngudi Raharjo” waste bank contribution reducing waste
- Table 5.1 Performance and capacity comparison
- Table 6.1 Kyoto city household waste category
- Table 6.2 Japan and Indonesia education and income level comparison 2015
- Table 7.1 New price for compost
- Table 7.2 The outcomes (waste reduction) comparison
- Table 7.3 Additional budget and waste purchasing estimation/year for schools and agencies
- Table 7.4 Additional budget and waste purchasing estimation/year for districts
- Table 7.5 Comparing cost and waste purchasing estimation/year from three options
- Table 8.1 Local government programs and waste reduction projection
- Table A.1 Population in Magelang City
- Table A.2 Environment Quality Index (EQI)

## LIST OF ABBREVIATIONS AND SYMBOLS

3R	Reduce, Reuse and Recycle
ABS	Acrylonitrile Butadiene Styrene
BSM	Bank Sampah Malang/ Malang Waste Bank
CD	Compact Disk
COGS	Cost of Goods Sold
CSR	Corporate Social Responsibility
CWB	Community-based Waste Bank
EPA	Environmental Protecting Agency
EQI	Environment Quality Index
GDP	Gross Domestic Product
HDI	Human Development Index
HWB	Holding Waste Bank
ICOR	Incremental Capital-Out put Ratio
OECD	Organization for Economic Co-operation and Development
OPP	Oriented Poly Propylene
PET	Poly Ethylene Terephthalate
pH	potential of Hydrogen
PP	Poly Propylene
PS	Poly Styrene
Qty	Quantity
RGDP	Regional Gross Domestic Product
SME	Small Medium Enterprise



US	United States
USA PATRIOT	Uniting and Strengthening America by Providing Appropriate Tools Required to Intercept and Obstruct Terrorism
WD	Waste Reduction
\$	Dollar
Rp	Rupiah
¥	Japanese Yen
cu yd	Cubic yard
kg	Kilogram
L	Litter
lb	Pound
m <sup>3</sup>	Meter cubic