I J A B E R, Vol. 14, No. 11, (2016): 7537-7557

COMMERCIALIZATION DETERMINANT OF MANGO FARMERS IN WEST JAVA- INDONESIA

Lies Sulistyowati[1]* and Ronnie S. Natawidjaja[1]

Abstract: *West java is the second largest mango (Mangifera indica L.) producer in Indonesia after East Java. Meanwhile, from the aspect of its demand, both from the domestic and export markets are increasing, from year to year. The statistical data from BPS data had shown that mango exported only 0.7 per cent of the total Indonesian production. This indicates that commercialization of mango farming is still low, because mango farmers cannot fully response upon its respected demand. The objectives of this study were to observe mango farmers' behaviour on production and its marketing. Therefore we would able to understand the level of commercialization and its respected determinants. The respondents consisted of 240 mango farmers which were sorted out by using cluster random sampling. Path analysis and descriptive methods were applied to analyse the data. The results of analysis had shown that: firstly, cropping pattern of mango farming in West Java 53 per cent were poly-culture (mixed) and the 47 per cent others monoculture. Mango farmers were in the process of transformation toward commercialization. The intermediate level of commercialization was 51 per cent and of high-level was 46 per cent. Factors of resources, technological complexity and output were directly affected upon the level of commercialization, where as institutional and technological factors were affected indirectly.*

Keywords: *Commercialization, factors, mango-farmers, Indonesia.*

INTRODUCTION

Background of the Study

Mango one of the superior commodities should be nationally developed since it hasa verygood prospect in its market. National mango development is given priority to some of renown producing provinces of East Java, West Java, Central Java, Bali, NTB, South Sulawesi, and NTT. The development of mango production during the last ten years was quite significant.The trend was increased by the average of 12 per cent annually. (Directorate General of Horticulture, 2014).

[1] Faculty of Agriculture, Padjadjaran University, Jl. Raya Bandung-Sumedang km.21. Bandung, Indonesia
* Correponding author, *E-mail: lies.sulistyowati@unpad.ac.id, liesindra@yahoo.com*

West Java as the second largest mango production center after East Java is intended to make mangoas one of superior commodities to be developed. The priority of mango district centers which potential for its development areas are Cirebon, Majalengka, and Indramayu. However, not all of the farmers in these center area conducted mangoas a commercial commodity. In the theory of stages on agriculture development from Mosher (1966); Mellor (1968) and Wharton (1969), itwas stated that there were two continum, namely traditional agriculture (subsistence) and dynamic commercial agriculture (modern). The stage between those continuum is called semi commercial or transitional agriculture.

Further more, Widodo (2008) summarized the characteristics that distinguish the continuum mentioned above, namelythe ratio of sold production, production goals, decision making process, the technology used, the proportion of total external inputs, income level, relationship among farmers, degree of relationship with the external, institutional,resource availability and share of the agriculture in the economy.From the eleven characteristics mentioned, the previous nine are internal and the next three characteristics are derived from external factors.

Transformation of traditional into commercial agriculture (modern) is also called transition toward a "market economy" where agriculture has been viewed as an industry and business. This point of view is then led to more thorough and extensive concept which consideragricultural commodityas a component of agriculture in a "system", known as agribusiness system. (Austin, 1981; Saragih, 1978; Sanim, 2000).

Commercialization is a very significant process to improve the competitiveness of mango, so that the farmer woul able achieve higher prices. Moreover,there has been a fairly significant increase in its demand in the last ten years. The improvement of domestic demand wascaused by the increase of people income and education, so that theawareness upon healthy living has also increased and brought impacts on the increasing demand for fruits, including mango. Similarly, foreign demand continues to increase, especiallyfrom the Middle East, Singapore and Hong Kong.

Nevertheless, the increasing trendsof the market demand, both domestic and international markets, have not been fully responded by the mango farmers. Only few of the mango farmers were responding to increase their production through the utilization of technology, post-harvest handling and business expansion. Those farmers who respond to market demand could be considered as those who lead to commercialization.

Sulistyowati *et al.* (2013) stated that the mango farmers were in the process of transformation from subsistence toward commercial. It was indicated by some mango growers who had actively started to conduct proper cultivation techniques, applied new technology and change their sales orientation to ward the modern and international markets.

In the theory of agricultural development, institution role is very important, as stated by Hayami and Ruttan (1985) with their model of Induced-Innovation theory which stated that transforming agriculture into modern agriculture (commercial) requiresan interrelationship between the four factors that interact and work together, namely: (1) technology, (2) resources endowment, (3) institutions, and (4) cultural endowment.

The study conducted by Agwu (2012) on the farmers in Abia State-Nigeria concluded that the level of commercialization ofthe farmers were still low. The factors determining the level of commercialization were family size, income, farmers experience, land size, market distance, institutional membership and financial access. Along with these findings, maize and cassava farmers in Ghana also had shown a low level of commercialization determined byoutput prices, land use, education and technology access, markets distance, and access to market information. (Martey, Edward *et al.*, 2012).

Various findings from the fields had shown that the mango farmers were already in a transition stage to wards commercialization and able to respond quickly to the changing market demand. In spite of the fact that the demand of modern market is still small in percentage,when it is compared to the situation of 10 years ago, in terms of quantity, quality, and cultivation technique, mango farmers are ready to seize opportunities to greater demand from the global market. Unfortunately, to conduct transformation process into commercial farmers, there were still many challenges to be overcome related to cultivation technic, post-harvest, social, economic, and institutional aspects.

Formulation of the Problem

Rapid improvement in the demand formango that might bring opportunities for the betterment of mango farmers' welfare, factually wide open. However, up until now, the local mango farmers had a low response and, if only, were still very limited. It was suspected to be strongly influenced by the level of commercialization among the farmers. On the other hand, the level of commercializationis strongly influenced by the technology, resources, cultureand institution. Partnership was suspected as one of the institutional factorthat may able to bridge the gap betwen the mango farmers and domestic market (modern and traditional) as well as the global markets.

Therefore, the problems of thisresearchwere formulated as follows:

- What was the pattern of mango cultivation and commercialization level of the respected farmers in West Java?
- What factors that drive transformation process of the mango farmers from subsistence towards a more commercial business?

- What was the relationship, between level of commercialization and farmers' decision to establish a partnership business?

LITERATURE REVIEW

Transformation of Agriculture Subsistence (Traditional) to the Direction of Agriculture Commercial (Modern)

In the theory of agricultural development stages (Stages in Agriculture Development), both of Hill-Mosher (1966); Johnston-Mellor (1968) and Wharton (1969), promoted to that there are two more or less similar continuum, namely:

1. Traditional Agriculture (subsistence),
2. Agricultural commercial (modern),
3. Meanwhile, the stage of which is called: Agriculture semi-commercial, or agricultural transitional.

Furthermore, Widodo, Sri (2008) summarizes the characteristics that distinguish the three phases, namely include: the ratio of production sold, the purpose of production, decision-making processes, the technology used, the proportion of the input from the outside to the total input, income level, the relationship among fellow farmers, the degree of relationship with the outside, institutional, resource availability has not termanfaatkaan and the share of agriculture sector in the economy. From the eleventh feature of the nine characteristics of the former is more internal, while the following threecharacteristics, derived from external factors. The transformation of traditional agriculture towards commercial agriculture (modern), also known as the transition towards the "market economy", agriculture has been regarded as an industry and business. Perspective is then led to the concept of a more thorough and extensive, which saw "Commodity agricultural" as a component of the farm as a "system", known as the agribusiness system. (Austin, 1981; Saragih, Bungaran, 1978; Sanim, 2000).

Commercialization is defined as an agricultural system that produces market-oriented; the use of technology in cultivation and post-harvest, and perubahansecara gradually from mixed farming systems (mixed cropping) is replaced by agriculture ter-specialization, for example, for certain commodities. One characteristic of the level of commercialization are: the opportunity cost of family labor (opportunity cost) increased karenapermintaan markets for food and other agricultural products. Family labor costs increased due to an increase in employment outside of agriculture (off-farm), while there was a positive shift in market demand or triggered by urbanization and trade liberalization (Pingali and Rosegrant, in Timmer, Peter; 2008).

Thus, commercial Agriculture also called modern agriculture, always responsive to new technologies, so that high productivity and efficient use of factors

of production, profit-oriented. At this stage, agriculture has been integrated very well with the market. According Sulistyowati *et al.* (2015), off-season technology adoption by Indonesia mango farmers is still low (17.92%). If compared between two biggest mango centre in Indonesia, West Java have higher impelementation level than East Java, that is 23.42% compared to 12.50%.

From the findings of the field, it can be concluded while that, mango farmers has been in a transition phase, towards commercialization stage, even a small portion has reached the commercialization stage.

Factors Affecting Transformation Process of Subsistence Farmers to Commercial

In the theory of agricultural development, the role of institutions is essential, as stated by Hayami and Ruttan (1985) with his theory Model of Induced Innovation: conclude that: to transform agriculture into modern agriculture (commercial) required linkages between the four factors that interact and work together, such as following:

1. Technology,
2. Resources endowment,
3. Institutions and
4. Cultural endowment. Agwu study, NM *et al.* (2012) on farmers in Abia State-Nigeria, concluded that farmers still low level of commercialization.

While the factors that determine the level of commercialization are: family size, income, experience of farmers, land area, distance to markets, institutional membership in and access to kredit. A Study agrees with these findings, corn and cassava farmers in Ghana, also shows the level commercialization low, while the factors that determine is: output prices, land use, access to education/ technology, distance to markets, and access to market information. (Martey, Edward *et al.*, 2012). Social and cultural factors, emerged as a factor that determines the level of commercialization in the Himalayas, India. From the study of Rahut *et al.* (2010), revealed that the level of commercialization of farmers is determined by: the gender of the household head, ethnic/tribal, land, livestock ownership, education, and location. In addition, an important factor that has contributed to the government policy, especially in market reforms and trade, infrastructure, institutional support and the rules of legal contracts between farmers and processors (industry).Based on theory and the results of previous studies, the relationship factors that influence the commercialization process, in the following Figure 1.

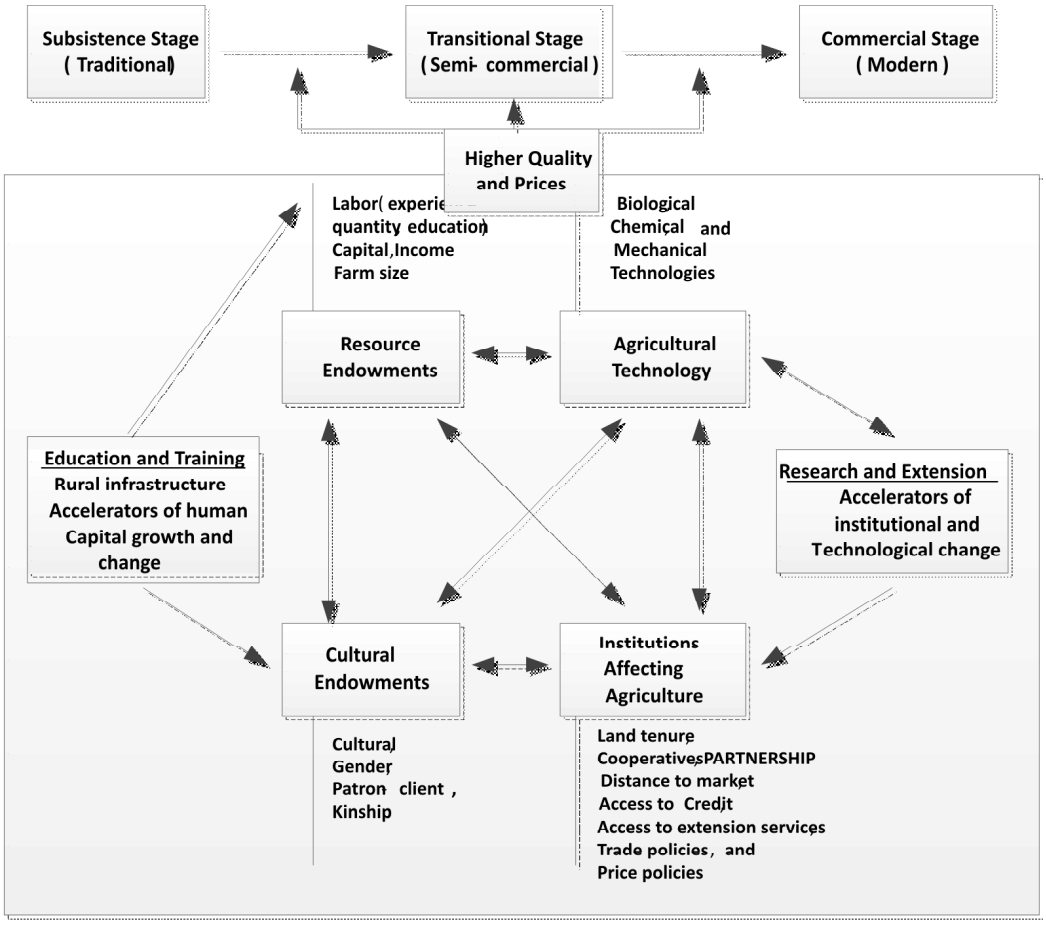

Figure 1: FrameworkFactorsInfluencingCommercialization
(*Source:* Robert D, Steven and CathyLJab are1988, modified)

METHODOLOGY

Design of the Study

The study was conducted through an explanatory survey, by applying multi-stage random sampling technique. The first stage wasselectingtwo districts of the largest mango producers namely: the district of Cirebon and Majalengka. From each district, one sub-district was selected namely the sub-district of Sedong in Cirebon, and Panyingkiran in Majalengka. Furthermore, from each of the sub-district, two mango village centers were choosen. Number of 60 mango farmers was randomly sorted out as respondents from each village so that the total number of respondents was 240 mango farmers.

Data Analysis

Firstly, the data were processed using descriptive statistics. The analytical tool used was the size of the central symptoms such as the average, median and mode. Furthermore, to take inference from the farm level of commercialization, the data are processed by using inferential statistics. Likewise, referring to Johnston, (1982), the commercialization stage of development could be explained as on the following Table 1.

Table 1
Mango Farmer Commercialization Level Criteria as Bound Variables

Characteristics	*Subsistence Farming*	*Transisional Farming*	*Commercial Farming*
1. Production Motivation	Inheritance from parents	Following friends/ neighbors/government	Own desire
2. Motivation in selecting the mango variety	Inheritance from parents	Following friends/ neighbors/government	According to market demand
3. Management Pattern	Diversification with food crops (poly-culture)	Half poly-culture and half mono-culture	Spesialized (mono-culture)
4. Market headed for	Local market	Traditional market and modern market	Traditional, modern and export market
5. Labor Sources	Family	Family and outside the family (< 1/3 needed)	Mostly outside the family (> 1/3)
6. The use offertilizer inputs.	Owned Procurement	Half owned procurement (1/3-2/3), half purchased	Purchased from other (> 2/3)
7. The use of pesticides input	Owned procurement	Half owned procurement (1/3-2/3), half purchased	Purchased from other (>2/3)
8. The use of PGR input	Owned procurement	Half owned (1/3-2/3), half purchased procurement	Purchased from other (>2/3)
9. Capital and Investment	Owned capital	Owned capital and borrowed a small portion	Owned capital and mostly borrowed
10. The use of technology	No techology	Simple technology	New technology
11. Income level	Low	Moderate	High

Source: Johnston, (1982); Widodo, Sri (2008)

Likert scale was used with the range total score of 11-33, and thenit was classified usingrange (max-min) divided by three. The range of commercialization classification were:

1. Low level of commercialization: 11-17
2. Medium level ofcommercialization: 18-25
3. Highlevel ofcommercialization: 26-33

Secondly, to analyze factors that influence upon farmers'commercialization, path analysis was used through the following steps:

(a) Building a theory based model: Creating the path diagram to declare a causal relationship between variables, as presented on Figure 2.

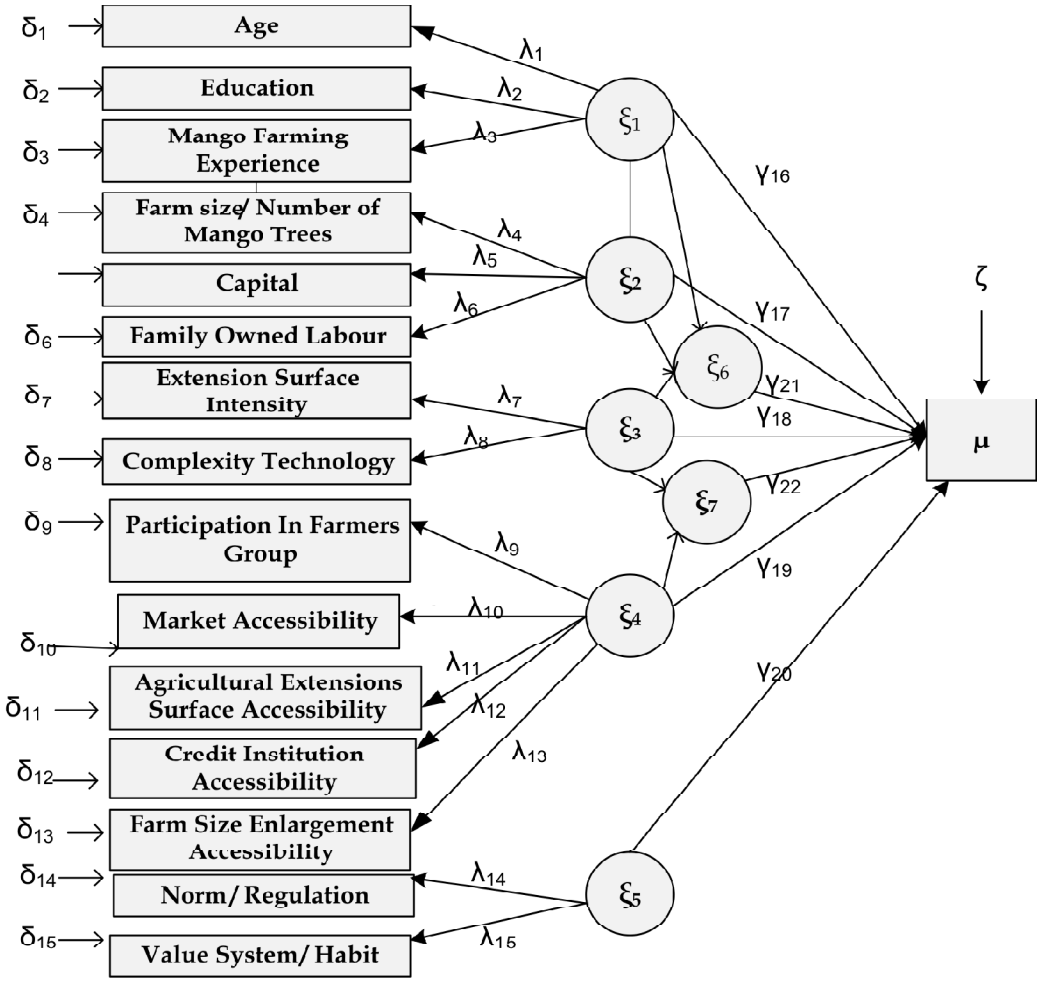

Figure 2: Path Diagram Model of Factors that Influence Level of Commercialization Among The Mango Farmers

Figure 2 can be expressed in structural equation as follows:

$$\mu = \gamma_{16}\xi_1 + \gamma_{17}\xi_2 + \gamma_{18}\xi_3 + \gamma_{19}\xi_4 + \gamma_{20}\xi_5 + \gamma_{21}\xi_6 + \gamma_{22}\xi_7$$

The intermediate variable equation :

$$\xi_6 = \xi_{23}\,\xi_1 + \gamma_{24}\xi_2 + \gamma_{25}\xi_3$$

$$\xi_7 = \gamma_{26}\,\xi_3 + \gamma_{27}\,\xi_4$$

Note :

λ = weight of laten variable

δ = error measurement of indicator exogenous latent variable

ε = error measurement ofindicator endogenous latent variable

γ = direct coefficient of Exogenous Latent Variable and Endogenous Latent Variabel.

(b) Transforming path diagram to the structural model equations and model specification

Instructural equation, there was a causal relationship between some latent variables of both endogenous and exogenous latents. Equation measurement model (Hair, *et al.*, 2006).

Exogenous Constructs Endogenous Constructs

$$X = \Lambda x\xi + \delta \qquad Y = \Lambda y\eta + \varepsilon$$

(c) Hypothesis testing

Ho: $\gamma_{1\cdot i} = 0$; Factors of personal, farmers' resource, technology, institution, culture, prices and partial production quantities factors do not influence the level of commercialization

Ha: $\gamma_{1\cdot i} \neq 0$; Factors of personal, farmers' resource, technology, institution, culture, prices and partial production quantities factors influence the level of commercialization

The statistic test used: $t = \dfrac{\hat{\gamma}_i}{se(\hat{\gamma}_i)}$

Note : γ = path coefficient, *se* = standar error

Thirdly, relationship between business partnership and the level of commercialization were analyzed by using test of independence *i.e.* Chi-Square.

RESULTS AND DISCUSSION

Description of Mango Farmers in West Java

Mango is one of superior fruit commodities in West Java which is highly demanded besides as source of foreign exchange for the country as it is able to penetrate international market. Mango is an excellent commodity because it has acomparative as well as competitive advantage. Mango is commodity that can be expected as the main sources of income for the respected farmers and also as a source of nutrition since it contain vitamins A and C.

Table 2 shows that the largest mango producing area on 2012 were Indramayu, Cirebon, Majalengka, and Kuningan. During the period of 2010–2011 mango production fluctuated due to various factors such as extreme weather and caterpillar pest attack. However, on 2012 the production of mango was back to normal and even better.

Mango's cropping pattern conductedby the farmers varied, either in the froms of poly and mono-culture.

Table 2
Mango Commodities Production in West Java by District (Ton)

Kabupaten	*2008*	*2009*	*2010*	*2011*	*2012*
Bogor	44.104	19.011	1.651	13.656	39.380
Sukabumi	179.960	418.578	2.659	7.770	62.054
Cianjur	19.816	93.920	1.518	12.558	81.126
Bandung	8.449	17.122	791	2.697	33.507
Garut	700.626	260.851	13.779	19.764	175.281
Tasikmalaya	8.177	37.658	826	4.658	45.539
Ciamis	29.424	58.913	1.287	2.989	50.475
Kuningan	944.759	90.472	5.528	44.868	393.765
Cirebon	495.925	370.545	13.078	55.982	620.533
Majalengka	896.813	481.727	16.431	43.281	485.213
Sumedang	189.420	403.270	17.534	21.170	290.084
Indramayu	499.347	1.131.837	35.827	63.058	685.059
Subang	133.197	297.180	8.276	26.792	159.705
Purwakarta	24.713	19.122	2.118	1.642	23.425
Karawang	178.710	150.124	6.931	19.451	138.066
Bekasi	15.219	63.365	3.883	6.846	64.073
JAWA BARAT	4.368.659	2.781.858	1.747.5	347.182	3.347.285

Source : http://www.diperta.jabarprov.go.id/2014

Number of mango trees cultivated by the farmers on their farm land (Table 3). The average ownership of a mango tree growers are 184 trees/farmer, with variations in the number of ownership of mango tress, is very large.

Table 4
Mango Farmers' Characteristics Based on Ownership Status

	Total	
Ownership status	*Freq.*	*Percentage*
Owner operator	142	59
Combination: owner – rental	84	35
Rental	14	6
Total	240	100

Table 3
Farmers' Distribution Based on Number of Cultivated Mango Trees

Deskriptif	*Total*
N (people)	240
Average (tree)	184
Std. Dev. (tree)	267
Min. (tree)	5
Max (tree)	1600

Status of the mango trees managed by the farmers was divided into several ownership categories namely owner operator, rental farmers, and combination of these two. Comparison of ownership status of the mango trees farmers can be presented on the Table 4.

Among themango famers,based on their ownership status, owner operator was quite dominant, *i.e.*. 59 percent, they managed theirownedmango trees. But, there are also farmers who rentor hire their mango trees from the others.

Success of Indonesian mango (*Mangifera indicaL.*) being export to international market indicating a good progress of this farming business.It was certainly related to the pattern of mango cultivation management in West Java, especially in the district of Cirebon and Majalengka. And these were indicated by the extensification development of the mango trees in those two districts (BPS West Java, 2015).

The increase of mango production was followed by the increase of its cultivated area of mango along with the willingness of consumers to consume mango, either domestically and or abroad. Additionally, with a better cultivation management, mango was able to improve the farmers'welfare due to the relatively high of its economic value. Unfortunately,the economic potential of mango had not been fully optimizedyet because there were a lot of technical and non-technical obstacles which, at national level, resulted on the relatively low mango production and unstable quality. (Natawidjaja *et al*, 2013).

Table 5
Mango Farmers Distribution Based On Their Cropping Patterns

	Total	
Y_1	*Freq.*	*Percentage*
Mix farming (poly-culture)	127	53
Mono-culture	113	47
Total	240	100

This would occur because there were still a large numbers of conventional mango cultivators (mango backyard) which rely on the product without any effort in maintenance. But along with the development, current farmers have started to realized large potential benefit from mango trees. By the development of domestic demand and export markets, mango was developed by the farmers as "anintensive commercial farming" by utililizing mango on semi-permanent area or as intercropping crop on rice fields. Most of the farmers started to replace other agricultural crops with mango (replacement), or as an additional crop on their farm land, either on wet or dry land.

Table 5 shows that the farmers inpartnership business (55 per cent) chose to perform poly-culture of various kind mangoes, while the rest 45 per cent to chosemono-culture. Those farmers who were not ina partnership (51 per cent) chose to use a poly-culture pattern and 49 per cent others chose mono-culture.

From Table 6, capital sources on mango cultivation could be based on farmers' owned capital, loan in the form of formal and informal credits. Most of mango farmers use their owned capital (45 per cent), where as from the loan in the form of formal credit from bank and informal credit from the collector agents, money lenders, or families were 24 and 31 per cent respectively. From the view points of farmers' group, those who arrange partnership business with the collector agents, money lenders or families were accounted to 53 per cent. The rest of 47 per cent others were not.

Table 6
Financial Sources of Mango Farming

	Total	
Y_2	*Freq.*	*Percentage*
Loan capital from middleman and others	74	31
Capital loan from the bank	58	24
Owned capital	108	45
Total	240	100

In general, mango harvest sale system was conducted in two ways, harvested by the farmers and then sold it by themselve or harvested by traders as middlemen through the buy up all system. Selling system which was carried out by mango farmers and growers of non-partnership and in-partnership was almost the same (Table 7).

Table 7
Mango Harvest Sales System

	Total	
Y_3	*Freq.*	*Percentage*
Buy up all (*tebasan*),	69	29
Harvest and sell mango by farmer	171	71
Total	240	100

In general, most of the farmers harvested their mango and sell it by themselves (71 per cent) while the rest of 29 per cent, was carried out by the middlemen through the system of buy up all (*tebasan*) of mango produced. For more detail, most of the partnership and non-partnersip farmers harvested their own mango by themselves, each 76 and 67 per cent respectively.The farmers who conducted the system of buy up all of their mango produced were strongly related to their ability to manage their mango farming.

Mango Farmer Commercialization Level

According to Pingali and Rosegrant, in Timmer(2008), commercialization was defined as agricultural system that produce commodity based on its market-orientation, by using technology in cultivation as well as in its post-harvest. Besides, there was a gradual transformation from mixed farming systems (mixed cropping) toward specializedagriculture for a certain commodity. One of the characteristic of commercialization isthe increasing cost of family labor due to market demand for food and other agricultural products. Family labor cost was increased due to the increase in off farm employment. On the otherhand, there was a positive shift in market demand caused by urbanization and trade liberalization. (Pingali and Rosegrant, inTimmer, Peter; 2008).

In line with this view, Sokoni (2007) stated that commercialization was a process of change (transformation) from producing for their owned needs towards producing to meet the market demand. Furthermore, Johnston (1982) and Widodo, S. (2008) provide more detail measurement, *i.e.* viewed from motivation to produce, motivation to select plants (varieties), objective market, land status, source of production inputs (fertilizers, pesticides and growth hormone, the use of capital, technology applied and income level). The analysis results could be shown as in the following Table 8.

Table 8
Commersialization Level of Mango Farmers in West Java

	Total	
Level of commercialization	*Freq.*	*Percentage*
Percentage		
Low	5	2.08
Moderate	123	51.25
High	112	46.67
Total	240	100.00

In Table 8, it appears that the mango farmersin West Java, factualy were in a process of transition from subsistence towards commercialization. From the view of its percentage, majority of mango farmers were at a moderate level of commercialization (51 per cent), where as the high commercialization rate is 47 per cent and only 2.08 per cent had a low level of commercialization. This condition was quiet satisfying since it indicated that the mango farmers in West Java had an experience of rapid development.

Factors that MayAffect Mango Farmers Commercialization

Based on the results of data processing, the formulation is as follows:

$$Y = -0{,}054X_1 - 0{,}32X_2 - 0{,}24X_3 + 0{,}10X_4 + 0{,}092X_5 + 0{,}018X_6 + 0{,}15X_7$$

The intermediate variable equation:

$$X_6 = -0{,}18X_1 + 0{,}083X_2 - 0{,}033X_3$$

$$X_7 = -0{,}32X_3 + 0{,}11X_4$$

Note :

Y = Level of commercialization

X_1 = Farmers characteristics factor

X_2 = Resource factor

X_3 = Technology factor

X_4 = Institutional factors

X_5 = Cultural factors

X_6 = Price factor

X_7 = Mango output (production) factor

Level of significance of the model is presented on the following Figure 3. (the red color indicates in significant of the t value).

Figure 3: The Level of Significance of IndependentVariables

Based on Figure 3, the list of beta coefficients or path coefficients and their significance levels are presented on the following Table 9.

Table 9
Path Coefficients and Level of Significance

Variable	*Path Cooficient ($\rho_{x15,xi}$)*	*Level of Significance*	*Comment (α = 0.05)*
The influence of the 7 variable on the level of commercialization (Y)			
X_1	–0,05	–1,04	Insignificant
X_2	–0,32	–5,13	Significant
X_3	–0,24	–2,83	Significant
X_4	0,10	1,85	Insignificant
X_5	0,09	1,47	Insignificant
X_6	0,02	0,24	Insignificant
X_7	0,15	2.05	Significant
		R^2 = 0,25	
Theeffect uponprice factor (X_6)			
X_1	–0,02	–0,39	Insignificant
X_2	0,08	1,63	Insignificant
X_3	–0,33	–5,45	Significant
		R^2 = 0,16	
Theeffect uponmango output factor (X_7)			
X_3	–0,32	–5,04	Significant
X_4	0,11	2,22	Significant
		R^2 = 0,14	

The results of analys indicated that resource factor (X_2), complexity of technology (X_3) and mango output (X_7) had a direct effect upon the level of commercialization. Where as institutional factor (X_4) along with the complexity of technology (X_3) indirectly affected upon the level of commercialization through the mango output (X_7).

Resource factor (X_2) had a negative effect on the level of commercialization (Y) with a path coefficient of –0.32 or at –32 percent. In fact, the higher the resource factors owned by the mango farmers (number of trees, owned capital and labor in the family), the lower the level of their commercialization. How ever,what was measured in this study, the percentage of resource used (mango trees, capital and labor) from the family to the total resources used. The results suggested that the less the percentage of family resources used, the more farmers used outside family resources and the higher the level of their commercialization.

Commercial mango farmers have an ability to expand and to develop their business. When they feel that the market is prospective in the sense that the demand is high andthe price is right profitable, the farmers would try to multiply number of their mango trees by raising the outside capital and hired more non-family labours. These all would be conducted by the commercial farmers as long as economically feasible to be developed (B – C ratio > 1). Their mango trees could be coupled by renting in from the other mango tree owners. The more mango trees to be cultivated the higher its respected cost, either for maintenance (fertilizing, pruning, spraying) and or harvesting. The increasing total costs of mango farming may certainly hard be avoided and would be difficult to be fullfilled by the farmers owned capital. And for these reasons, the farmers would motivate to borrow additional capital from their relatives, neighbors, middlemen, banks or their business partners.

Similar things may happento labor. Commercial farmers whoincreased number of their cultivated mango trees would require more labor for maintenance (fertilizing, pruning, spraying) and harvesting.And this certainly could not be fulfilled by their owned family labor which accounted to only 2-3 people per family farmers. For the commercial farmers, this situation was not becoming obstacles as long as the total cost of labor, including cost of hired labor, could becovered by the additional revenue from their mango sold. Thus,the smaller the percentage of the resource used, the greater the use of external sources of capital and labors, and the the level of commercialization would be higher.

This was in line with Sharma *et. al.* (2012) which stated that access to land, labors especially women labor, credit andmarket as determining factors in commercial agriculture. Furthermore, the study conducted by Chapoto *et. al.* (2013)

concluded that the farmers whoincrease the area of †their agricultural land tend to make their products more commercial.

Similar with the resource factors, technology complexity factor (X_3) also has a negative effect upon the level of commercialization (Y) with a path coefficient of –0.24 or at –24 percent. It means that the higher the complexity or the difficulty of the technology, the lower the level of commercialization of mango farming. In other words mango farmers were still not so familiar with complicated technology. However, in sipte of applying lower technology, the mango farmers were still get more benefit, and more farmers were interested to adopt this technology to push commercialization on their mango farming. This had evidently occurred due to intensive interaction among the farmers. They interacted and exchanged information and experiences about mango almost everyday, including mango cultivation technology.

Thus,the farmers find it easier to use technology, even not complicated but seemingly appropriate, such as in the use of insecticides and growth hormone during off season. Considerable amount of money may certainly be required, but for the farmers were still permissible along with significant increased in their revenue. Although mango cultivation initially was carried out as a heritage from the elderly, however, through grafting technology, the farmers were able to convert traditional mango varieties that are less demanded in the market (*e.g. mangga kopek*), with the higherdemanded others, such as *gedong gincu*and *harum manis*.

Meanwhile, mango output (X_7) had a positive effect on the level of commercialization (Y) with a path coefficientof 0.15 or at 15 percent. It means that the higher the mango output, its quality and or quantity products, the higher the level of mango commercialization. These were happensincethe mango consumers were able to be satisfied, either in terms quantity and quality of mango. And these would certainly increase farmers'revenues andthe abilityin using more advance and modern technology. They also have a better ability to take a better bargaining position since they were able to arrange direct sales system after harvest. For the quality in particular, the higher the quality of mango that were able to penetrate the modern and export markets. In return mango price offerredwould be much higher than those marketed in the traditional market.

According to the estimation model,there was an interesting results obtained that institutional factors (X_4) give a positive effect on mango output factor (X_7) while technological complexity factor (X_3) has a negative effect upon the mango output factor (X_7). This may imply that if the quality and quantity of the mango products (mango output factor) were improved,we must improve the institutional factors. The farmers should be actively participate in the institution, expanding

market access and facilitate access to more advance and complicated technology through training and education.

Institutional indicators (X_4), farmers'participationwith in the farmers'group, through frequent discussions and sharing information would help the mango farmers to overcome the problems related to the cultivation and marketing.These had enforced the quantity and the quality of mangoes produced. It was suggested that the dissemination of technology must be intensified. By doing so, the technology whichwas initially complicated and difficult to be implemented by the farmers would become more simple and easier to be applied by them. The next institutional indicators (X_4) was access to extension services and markets. Higher access upon extension services and markets will improve commercialization level of the farmers. In fact, the accessibility of the most mango farmers to modern and export markets were mediated by their partners, either the companies and or middlemen. And it had provided benefit to mango farmers because some times the partners provide information on how to produce mango according to the standarda nd a desired quality of modern and export markets. Therefore, the institutional partnerships should be further developed, because it provided benefit, either to the farmers and their partners as well.

Meanwhile, the results of analysis indicated the low coefficient value of determination in this estimation model (R : 25 percent). It implied that there were many other factors may determine the rise and fall of mango commercialization, other than the factors used in the model (75 percent). The factors that were included used in this estimation model were derived from themango farmers as producers (supply side). Thus, it was possible that the level of commercialization just exactly determine by or her factors wich were not included in the model. And it might be such as if derived from the demand side (consumer or market) and other treatments at harvest and post-harvest. From the demand side may include the increased of consumer income, changes in consumption patterns, migration, demographic composition of population, the growth of export opportunities for the high-value of agricultural commodities and others (Sharma *et.al*, 2012). Whereas the treatment on harvest and post-harvest may include staging, inspection, packing, washing with warm or hotwater, cooling, labeling, quality control, sorting, storage and others (Sargent *et.al*, 2008).

CONCLUSION AND RECOMMENDATION

Conclusion

- Ingeneral, 53 percent of mango farmers in West Java cultivate their mango in poly-culture (mixed cropping) and the rest of 47 percent as mono-

culture. This proportion was not much different when compared between farmers who is in-partnership with farmers who were not. Farmers who were in partnership, 55 percent, chose to conduct poly-culture pattern (mixed cropping), whereas the rest of 45 percent chose mono-culture pattern of mango. And for the mango farmers who were not arranged in partnership, 51 percent chose poly-culture and 49 percent of mono-culture.

- Factors of resources, technology, institutional, cultural, output and prices, all together affected the process of transformation from subsistence toward commercialization. And a dominant effect came from the factor of resources and technology complexity.Mango output was the factor that directly affected upon level of commercialization. While institution and technology had an indirect effect upon level of commercialization, and this through mango output.
- There was a significant relationship between the level of commercialization and business partnership institution. The more mango farmers involved in the business partnership, the higher the level of commercialization.

Recommendation

- Institutional support to improve farmers' access to capital, technology and markets is needed to improve commercialization of mango farmers. Government intervention and an active role of the private sector are required to realize such support in order to increase competitiveness of mango and the respected farmers' income.
- Financial facility with an affordable interest rate should be provided by the government particularly to finance mango farmers in applying appropriate technology on cultivation in accordance with GAP (Good Agricultural Practices). Or in there juvenation of the old mango trees which no longer productive.
- Competency and intensity of agricultural extension services for mango should be improved, especially related to climate change and plant protection from pest and disease.
- Socialization of harvest and post-harvest technology of mango from the related department (Department of Agriculture or the Department of Cooperatives and SmallIndustries) should be intensified, so that the farmers are able to improve mango quality to meet export quality standard. In addition, there should be an effort to take advantage from those of under standard or rejected mango to market.
- The government has to facilitate adequate information system for mango agribusiness development. The required information include the aspect

of demand (local, regional and export), production, marketing, price and its processing. Those who were involved on the agribusiness of mango should be able to arrange accurate planning about the activities to be carried out.

Acknowledgement

The outhors are thankful to the Ministry of Education and Culture, Republic of Indonesia has provided research funding through PUPT scheme, Number of contract: 304/UN6.R/PL/2014.

Reference

Anugrah, Iwan Setiadji. (2009), Mango Commodities as a Regional Superior Product in A Agribusiness System Policy: An Efforts to Unite Institutional Support for the existence of Farmers. PSEK-Bogor.

Agwu, NM, C.I. Anyawu and E.I. Mendie. (2012), Sosio-Economic Determinat of Commercialization among Small Holder Farmers in Abia State, Nigeria. Greener Journal of Agricultural Sciences. Vol. 2(8). pp 392-397. Desember 2012.

Chapoto, A., A. Mabiso and A. Bonsu. (2013), Agricultural Commercialization, Land Expansion, and Homegrown Large-Scale Farmers, Insights from Ghana. International Food Policy Research Institute.

Gebremedhin, Berhanu and Jaleta, Moti. (2010), Commercialization of Smallholders: Is Market Participation Enough? Contributed Paper presented at the Joint 3rd African Association of Agricultural Economists (AAAE) and 48th Agricultural Economists Association of South Africa (AEASA) Conference, Cape Town, South Africa, September 19-23, 2010.

Hayami, Yujiro and Vernon W. Ruttan (1988), Agricultural Development, An International Perspective. The John Hopkin University Press. Baltimore, London.

Johnson T.David (1982), The Business of Farming, A guide to Farm Business Management in the Tropics. The Maxmillan Press Ltd. London.

Martey, Edward; Ramatu M. Al-Hassan and John K.M.Kuwornu. (2012), Commercialization of Smallholder Agriculture in Ghana, A Tobit Regression Analysis. African Journal of Agricultural Research, Vol. 7(14), pp 2131-2141, April 12, 2012.

Meier, Gerald M. (1989), Leading Issues in Economic Development. Oxford University Press. New-York.

Natawidjaja, J.M. Latican. (2009), Lingking Mango Farmers to Dynamic Market Through Transparent margin-partnership Model. Changing Agrifood Markets in Southeast Asia : Impact on Small-Scale Producers. SEARCA

Natawidjaja *et al.*, (2009, Mango Value Chain Key Informant Interview Synthesis. Access to Modernizing Value Chains by Small Farmers in Indonesia. USAID AMA CRSP Project.

Natawidjaja, Ronnie S., Lies Sulistyowati, Zumi Saidah. (2013), Socio-Economic Factors Affecting Mango Farmers in Business Managing and Using Technology. LPPM-Unpad, Bandung.

Pender, John and Dawit Alemu, (2007), Determinant of Smallholder Commercialization of Food Crops, heory and Evidence from Ehtiopia. IFPRI Disccusion Paper. Desember 2007.

Rahut, Dil Bahadur, Ivan Velasquez Castellanos and Pravakar Sahoo. (2010), Commercialization of Agriculture in The Himalaya. Institute of Developing Economics, Discussion Paper no. 265. Desember 2010.

Robert D. Steven and Cathy L Jabora. (1988), Agricultural Development Principle, Economic Theory and Empirical Evidence. The John Hopkin Press Ltd. London.

Sa'id, Gumbira (2000), Business Opportunity in Agriculture. A Papar in interactive conference: "Agribusiness as an future business opportunity for youth". Bandung 3 Juni 2000.

Sanim, Bunasor (2000), Government Policy for Agribusiness Development. MMA-IPB. Bogor.

Saragih, Bungaran (1998), Agribusiness, New Paradigm in Agriculture based Economic Development. CV. Nasional. Jakarta.

Sargent, S. A., M. A. Ritenour, and J. K. Brecht. (2008), Handling, cooling, and sanitation techniques for maintainingpostharvest quality. SP170. Gainesville: University of Florida Institute of Food and Agricultural Sciences.

http://edis.ifas.ufl.edu/document_cv115.

Sharma, V. P., D. Jain and S. De (2012), Managing Agricultural Commercialisation for Inclusive Growth in South Asia. Global Development Network: New Delhi.

Sokoni, C.H. (2007), Commercialization of Smallholder Production in Tanzania: Implications to Sustainable Resources Management. Draft Paper presented at the workshop 71 on Resource Management and Sustainable Development: White Sands Hotel, Dar es Salaam,13-17th Aug. 2007. Available on: www.gla.ac.uk/media/media_42369_en.pdf [Accessed on 05.10.13].

Sulistyowati, Lies (2009), APPM (Asosiasi Petani dan Pedagang Mangga) Roles in Manggo Marketing, Case study in Desa Bebedilan, Kabupaten Cirebon. Faculty of Agriculture, Padjadjaran University.

Sulistyowati, Lies (2010), Partnership Development Of Coffee Farmers Group In Facing The Global Market (Case Study on the Coffee Farmers Group "RahayuTani", Bandung, West Java). Proceedings of theInternationalSeminar, Padjadjaran University-Bandung.

Sulistyowati, Lies (2012), Socio-economic Factors Influences Mango Farmers Decision to Involve in Informal System with Merchant. Sociohumaniora Journal, ISSN 1411-0911, Vol. 15 (3), pp 284-292.

Sulistyowati, Lies. Ronnie S.N., Boby Rahmat. (2015), Adoption of Technology and Economics Efficiency of The Small-holder Mango Farmers in Indonesia. International Journal of Applied Business and Economic Research. Volume 13, Number 7. ISSN: 0972-7302. Serial Publication PVT. LTD. New Delhi. India.

Widodo, Sri. (2008), Campur-sari Agro-ekonomi. Liberty Publiser. Yogyakarta. Indonesia.