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Evaluating agricultural policies of local governments in Indonesia after the implementation of regional autonomy by principal component analysis

Tomohide Sugino

Japan International Research Center for Agricultural Sciences, 50 Phaholyothin Road, Ladyao, Chatuchak, Bangkok 10900, Thailand. E-mail: tosugino@jircas.affrc.go.jp. Tel: +66-2-561-4743, +66-2-940-5755. Fax: +66-2-940-5949.

Regional autonomy was implemented in Indonesia since 2001, in which most of the authority including agricultural policies was delegated to the local governments. This study evaluated the quality of the agricultural policies in local governments using principal component analysis. The survey was conducted with the local agricultural offices in 89 regencies in Indonesia to collect data of the office budgets, number of office staff and diversity of policies. The survey results showed that there was significant disparity of office budgets, number of office staff and diversity of polices among the regions. Several regencies succeeded in improving the quality of agricultural policies, especially by increasing the diversity of policies. Considering the difficulty of increasing revenue and personnel under the severe economic conditions, the most realistic way to improve the quality of local agricultural policies was improvement of personnel performance of the local governments so that they could develop the innovative ideas based on local resources for agriculture development by optimally using local resources.

Key words: Policy diversity, decentralization, local government revenue.

INTRODUCTION

In 2001, Indonesia implemented a policy of regional autonomy, which has resulted in various impacts on Indonesia's society and economy. Law Number 22, year 1999 on "Local Government" has devolved central government authorities and responsibilities to local governments for all the administrative sectors except security and defense, foreign policy, monetary and fiscal matters, justice and religious affairs. The authorities of Kabupaten (regencies) and Kota (municipalities) cover all the other sectors of administrative authority including agriculture. Local governments are supposed to take the initiative in creating more suitable public policies based on their better understanding about the needs of their communities. However, it is not certain whether this has been achieved in the regions yet. In the national medium term development plan during 2004 – 2009 (National Development Planning Board, 2004), the regional development gap such as between Java and Outer Java and between West (Sumatra, Java and Bali and the other western areas in Indonesia) and East Indonesia

(Kalimantan, Sulawesi and the other eastern areas in Indonesia) was mentioned as one of the greatest concerns for national development in Indonesia. Table 1 shows several economic indicators which reveal the economic disparities between the regions. The values of the respective indicators (poverty ratio, per capita gross regional domestic product (GRDP) and rice yield) show that the Java and West Indonesia regions are more economically advanced than the Outer Java and East Indonesia regions, respectively. Based on analysis of the coefficient of variation per capita GRDP trends during 1977 – 2002 in Indonesia, Sakamaki (2006) concluded that the regional economic disparities in Indonesia had been growing in this period and suggested that the modification of national development systems including the implementation of the regional autonomy is a possible cause of its widening disparities.

Regional autonomy provided more independent policy implementations to the local governments. However, it is not evident if the autonomy could improve business,

Table 1. Regional economic disparities in Indonesia.

Region	Poverty ratio (%) [a]	Per capita GRDP [b] (Million Rupiah/capita) [c]	Rice yield [a] (ton/ha)
Java	12.5	23.0	5.5
Outer Java	15.7	14.3	4.1
West Indonesia	13.6	17.7	4.5
East Indonesia	17.2	13.4	4.0

Source: By author, based on BPS (2009); Average of provincial data in the regions; a: As of 2009; b: Excluding oil and gas; c: As of 2008.

especially in the agricultural sectors. According to the Indonesian Center for Agriculture Socio-economic and Policy Studies (2003), 3,633 bylaws were implemented by the local governments from 1997 to 2002. After the implementation of regional autonomy in 2001, the local governments became more independent and many bylaws were formulated. The study found that 5.5% of the 3,633 bylaws were about the marketing of agricultural commodities and most of these bylaws aimed at increasing the income of the local governments through charging new taxes to the traders. There were hardly any bylaws which aimed at promoting local agriculture through the revitalization of agricultural trading. These bylaws might have contributed to the financial stability of local governments by increasing tax income. However, higher marketing costs due to the new local taxes might have resulted in negative impacts on the farmers, traders and consumers.

On the other hand, several local governments have successfully developed their local economy by making good use of the regional autonomy. Sragen regency in Central Java Province is one of the few cases which boosted its economy through unique local policies. Sragen is known as the first regency in Indonesia to have introduced the so called "one-stop" licensing services by using an online system. Under this system, the process for obtaining various licenses which are necessary for business activity in the regency could be completed at one office in no more than 12 working days, whereas it used to take months. These local policies had increased Sragen revenue from 155 million Rupiah in 2001 to 3 billion Rupiah in 2006 ("Central Java regency proves that good government service is possible" (The Jakarta Post, 8 April, 2007).

Sragen regency is also famous for its local agriculture development by promoting chemical pesticide free rice promotion. The regency has started various supporting policies to boost chemical pesticide free rice since 2001. The production area increased from 700 ha in 2001 to 4,300 ha in 2008. These policies consist of the coordination of contract farming between farmers and traders, the establishment of a rice trading company which handles chemical pesticide free rice, and technical supports by extension workers who were assigned to

supervise specific villages (one extension worker to one village policy) (Sugino et al., 2009).

Other than these policies to promote chemical pesticide free rice, Sragen regency implemented various agricultural policies. According to the annual report published by the regency (Sragen Regency, 2007), there are three missions in its agricultural policies namely: (1) improving the quality of human resources, agricultural inputs and agribusiness; (2) developing appropriate technologies and environmentally friendly production systems and (3) increasing household income and welfare by empowering the local community. To achieve these missions, 31 activities under 12 programs were implemented by the local agricultural office in Sragen regency. In the annual report, the achievements of the respective activities were evaluated by quantitative indicators. Such agricultural policy schemes can be recognized as very unique and be a model case of local agricultural policies under the regional autonomy in Indonesia.

The purpose of the present study is to evaluate the quality of agricultural policies in the local governments in Indonesia after the establishment of regional autonomy in 2001, by comparing the local agricultural policies in regencies with the agricultural policies implemented in Sragen regency.

METHODS

The data were collected, using the questionnaire filled by the local governments (regencies) in Indonesia. The questionnaires were distributed by mail to the local agriculture offices (Dinas Pertanian) in 332 regencies.

Information about the factors which affect the quality of the local agricultural policies, the amount of annual budget, the number of staff members of the local agricultural office (staff number) and the diversity of the agricultural policies were asked in the questionnaire. Office budget is an indicator that shows the financial capacities to implement local agricultural policies. To measure the degree of financial independence, the source of the budget (regencies' own budget or transferred budget from central and provincial governments) was also asked. Staff numbers is an indicator that reflects the quantity of human resources used to implement policies. Diversity of policies indicates the degree of activeness of the local agricultural offices, whereas low policy diversity means the government does not use its resources effectively. The policy

Table 2. The standard policy options.

No.	Activities
1	Making radio/TV programs to deliver information to farmers.
2	Making leaflets/handbooks/other printing materials to deliver information to farmers.
3	Evaluation of extension workers to improve their performance.
4	Meetings/seminars/trainings for farmers to improve their farmings.
5	Meetings/seminars/trainings for extension workers to improve their extension abilities.
6	Providing budget to extension workers to support their extension activities
7	Comparative study for farmers/extension workers to visit advanced agriculture areas
8	Setting demonstration plots to disseminate new technologies/crops to farmers.
9	Collecting information about farmers' cooperatives to know the current situation of the cooperatives
10	Meetings/seminars/trainings for farmers' cooperatives to support collective activities by the cooperatives
11	Providing credit to farmers' cooperatives.
12	Providing credit to small scale agribusiness entities
13	Meetings/seminars/trainings for small scale agribusiness entities to support their activities
14	Providing fertilizer/pesticide to farmers with subsidized prices.
15	Providing high quality seeds/seedlings to farmers with subsidized prices.
16	Providing/lending agricultural machineries to farmers with subsidized prices.
17	Collecting information about fertilizer/pesticide shops to control quality/price of fertilizer/pesticide.
18	Construction/maintenance of irrigation facilities
19	Construction/maintenance of roads in farm areas
20	Construction/maintenance of storage/processing facilities for agricultural products
21	Survey to reduce post-harvest loss of agricultural products
22	Promotion of local products (for example, exhibition)
23	Construction/maintenance of facilities to produce/store manure
24	Providing manure to farmers with subsidized prices.
25	Providing farmers with credit especially for organic farming
26	Collecting information about financial situation of poor households in rural area to provide support.
27	Collecting information about dietary pattern in rural area to improve nutrient situations.
28	Formulation of production target (Sasaran luas panen/ productivitas) for agricultural products
29	Publishing annual report of the local agricultural office
30	Formulating annual/mid-term plan of local agricultural office
31	Making a website of local agricultural offices

Source: By author.

diversity was estimated by comparing the standard policy option with the policy options implemented by the surveyed regencies. The standard policy options were formulated from the activities implemented by the local agricultural office in Sragen regency. Thirty-one activities (Table 2) were selected from the activities implemented by Sragen regency to support local agriculture in 2008. The questionnaire asked if the respondents implemented similar activities as the standard. The respondents were requested to provide answers about the situations both in 2007 and in 2008.

The survey was conducted during the period of December 2008 to March 2009. Since the areas of the surveyed local governments were much diversified, the office budget per area was calculated for further analysis. Own budget ratio was calculated to show the financial independence of the local agricultural offices.

Office budget per area (rupiah/km^2) = Amount of office budget (rupiah) / Area of the regency (km^2).

Own budget ratio = Amount of office budget coming from the own regency / Amount of total office budget (including budget transferred by the central and provincial governments).

For the same reason, staff numbers per area were calculated for further analysis.

Staff numbers per area (person/ km^2) = Staff numbers (person)/ Area of the regency (km^2).

Policy implementation ratio was used to measure the diversity of local agricultural policy implementation.

Policy implementation ratio = Number of standard policy options implemented by the surveyed local government (maximum 31)/Total number of the standard policy options (= 31).

Regional disparities were analyzed according to Java and Outer Java, as well as West and East Indonesia classification. Principal component analysis (PCA) was used to formulate an indicator which showed the quality of local agricultural policies.

RESULTS

The total of respondents was 89 out of 332 regencies and

Table 3. Number of respondents by regions.

		Province	Number of respondents
Java		West Java	9
		Banten	1
		Central Java	13
		Yogyakarta	3
		East Java	9
Outer Java	West Indonesia	Nanggroe Aceh Darussalam	3
		North Sumatra	1
		West Sumatra	2
		Riau	3
		Jambi	1
		South Sumatra	1
		Bangka Belitung	2
		Bengkulu	2
		Lampung	3
		Bali	2
	East Indonesia	West Nusa Tenggara	2
		East Nusa Tenggara	2
		West Kalimantan	3
		Central Kalimantan	4
		South Kalimantan	5
		East Kalimantan	4
		North Sulawesi	1
		South Sulawesi	8
		West Sulawesi	1
		Maluku	1
		Papua	2
		West Papua	1
		Total	89

Source: Questionnaire survey (2009).

the recovery rate of the questionnaire was 27% (Table 3).

Office budget

The office budget per area in Java was significantly higher than that of Outer Java, both in 2007 and 2008 (Table 4). Though, the difference between the two areas became less in 2008 (2.5 times) than in 2007 (3.6 times), the disparity of the financial resources of the local governments for agricultural policies was still large. However, a similar disparity was observed between West and East Indonesia (Table 5). The total budget per area of West Indonesia was significantly higher than that of East Indonesia both in 2007 and 2008. Moreover, the difference between the two areas became less in 2008 (2.4 times) than in 2007 (3.0 times). The coefficient of variation of all the respondents in 2008 was lower than that in 2007 (2007: 1.16, 2008: 1.07), which indicated the

disparities of office budget among all the respondents that were narrowed between 2007 and 2008. The own budget ratio indicated that the regencies in Java were more dependent on financial support from the central and provincial governments than the regencies in Outer Java were. However, such differences were not observed between West and East Indonesia.

Staff number

The staff numbers per area in Java were significantly higher than those of Outer Java both in 2007 and 2008 (Table 6). The difference between the two areas was larger than that of the office budget and, unlike the office budget, the disparity increased in 2008 (5.9 times) from that in 2007 (5.1 times). The staff numbers per area in West Indonesia were also significantly higher than those of East Indonesia both in 2007 and 2008 (Table 7). The

Table 4. Office budget (Java and Outer Java).

	Java		Outer Java		Java/Outer	All respondents		
	Average	SD	Average	SD	Java	Average	SD	Cv
Office budget per area in 2007(Million rupiah/km^2)*	17.53	13.34	4.87	6.23	3.6	9.85	11.43	1.16
Office budget per area in 2008 (Million rupiah/km^2)*	13.67	9.60	5.45	7.60	2.5	8.68	9.31	1.07
Own budget ratio in 2007*	0.42	0.18	0.65	0.25	0.7	0.56	0.25	0.44
Own budget ratio in 2008*	0.54	0.17	0.64	0.22	0.8	0.61	0.21	0.34

Source: Questionnaire survey (2009); SD = Standard deviation, Cv = Coefficient of variation, *p < 0.05.

Table 5. Office budget (West and East Indonesia).

	West Indonesia		East Indonesia		West/East Indonesia
	Average	SD	Average	SD	
Office budget per area in 2007(Million rupiah/km^2)*	13.81	13.03	4.54	5.57	3.0
Office budget per area in 2008(Million rupiah/km^2)*	11.59	10.46	4.79	5.57	2.4
Own budget ratio in 2007	0.44	0.24	0.34	0.21	1.3
Own budget ratio in 2008	0.37	0.19	0.33	0.21	1.1

Source: Questionnaire survey (2009); SD = Standard deviation, *p < 0.05.

Table 6. Staff number (Java and Outer Java).

	Java		Outer Java		Java/Outer Java	All respondents		
	Average	SD	Average	SD		Average	SD	Cv
Staff number per area in 2007 (person/km^2)*	0.18	0.16	0.03	0.06	5.1	0.09	0.13	1.46
Staff number per area in 2008 (person/km^2)*	0.19	0.17	0.03	0.06	5.9	0.09	0.14	1.48

Source: Questionnaire survey (2009); SD = Standard deviation, Cv = Coefficient of variation, *p < 0.05.

Table 7. Staff number (West and East Indonesia).

	West Indonesia		East Indonesia		West/East Indonesia
	Average	SD	Average	SD	
Staff number per area in 2007 (person/km2)*	0.14	0.15	0.03	0.04	5.1
Staff number per area in 2008 (person/km2)*	0.14	0.16	0.02	0.03	6.2

Source: Questionnaire survey (2009); SD = Standard deviation, *p < 0.05.

difference between the two areas was larger than that of the office budget and, unlike the office budget, the disparity increased in 2008 (6.2 times) from that in 2007 (5.1 times). However, no significant difference was observed in the coefficient of variation of staff numbers per area between 2007 and 2008.

Policy diversity

The difference of policy implementation ratio between Java and Outer Java was not as large as that of the office budget and staff numbers. The policy implementation ratio in Java was slightly higher than that in Outer Java both in 2007 and 2008 (Table 8). Also, the difference between West and East Indonesia was not as large as that of the office budget and personnel. The policy implementation ratio in West Indonesia was slightly higher than that in East Indonesia both in 2007 and 2008. However, the difference was not statistically significant in 2008 (Table 9). There was no significant difference

Table 8. Policy diversity (Java and Outer Java).

	Java		Outer Java		Java/Outer Java	All respondents		
	Average	SD	Average	SD		Average	SD	Cv
Policy implementation ratio in 2007*	0.71	0.19	0.56	0.19	1.3	0.62	0.20	0.32
Policy implementation ratio in 2008*	0.69	0.19	0.54	0.17	1.3	0.60	0.19	0.32

Source: Questionnaire survey (2009); SD = Standard deviation, Cv = Coefficient of variation, *p < 0.05.

Table 9. Policy diversity (West and East Indonesia).

	West Indonesia		East Indonesia		West/East Indonesia
	Average	SD	Average	SD	
Policy implementation ratio in 2007*	0.66	0.21	0.57	0.17	1.2
Policy implementation ratio in 2008	0.63	0.21	0.57	0.17	1.1

Source: Questionnaire survey (2009); SD = Standard deviation, *p < 0.05.

Table 10. Principal component analysis results.

Principal component	Total initial eigenvalue	Cumulative (%)
	In 2007	
1	2.024	67.5
2	0.767	93.1
3	0.208	100.0
	In 2008	
1	1.970	65.7
2	0.813	92.8
3	0.217	100.0

Source: By author, based on questionnaire survey (2009).

between the coefficient of variation of policy diversity in 2007 and 2008.

Quality of local agricultural policies

Office budget per area, staff numbers per area and policy implementation ratio both in 2007 and 2008 were used as observed parameters for PCA. Table 10 indicated the eigenvalues and their cumulatives. The first component was the only one in which the eigenvalue was more than 1 in the analysis of both 2007 and 2008 survey results. Therefore, the first component was used as the indicator to show the quality of the local agricultural policies.

The principal component score (PCS) of the first component in each year is indicated in the formula below:

$$PCS_i \text{ (in 2007)} = 0.443x_{i1} + 0.453x_{i2} + 0.304x_{i3}$$
$$PCS_i \text{ (in 2008)} = 0.875x_{i1} + 0.470x_{i2} + 0.588x_{i3}$$

Where

i: Regencies,
x_{i1}: Standardized office budget per area in i-regency in respective years,
x_{i2}: Standardized staff number per area in i-regency in respective years,
x_{i3}: Standardized policy implementation ratio in i-regency in respective years.

All the regencies were sorted by their PCS both in 2007 and 2008 respectively. As indicated in Figure 1, most of the regencies in Java got higher PCS and were ranked higher both in 2007 and 2008; thanks to the higher office budget per area, staff numbers per area and policy implementation ratio. On the other hand, it should be noted that there were several regencies that greatly improved their ranking between 2007 and 2008. This indicated that even in a short period, it was possible to improve the quality of the local agricultural policies.

In more detail at the regencies that improved their PCS rankings (Table 11), it was observed that most of these
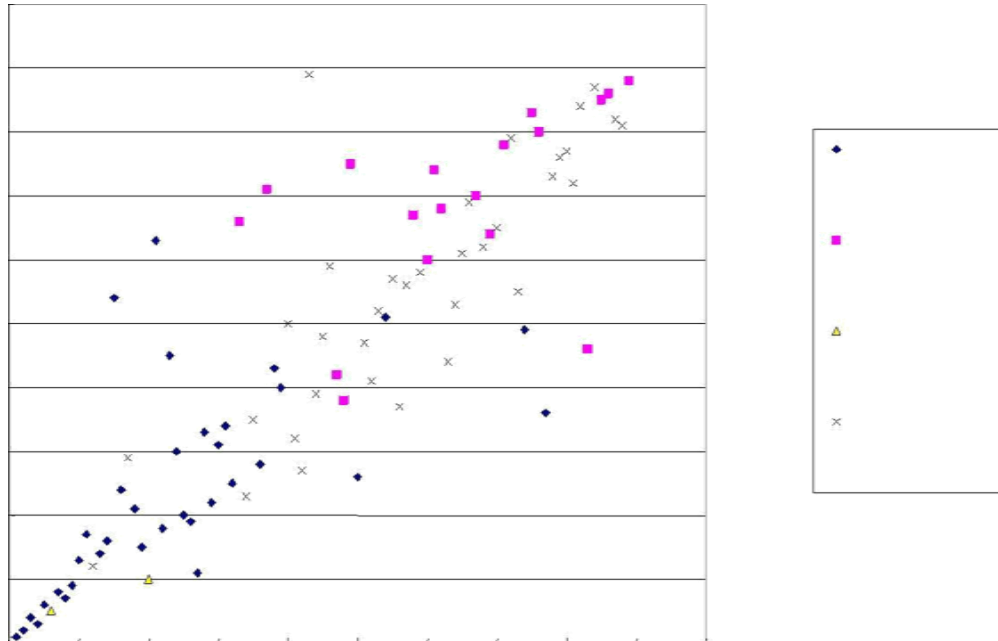
Figure 1. PCS ranking in 2007 and 2008 of the respondents. The regency which got the highest PCS was ranked in the first place, while the regency which got the lowest PCS was ranked in the last place (the 89th).
Source: By author based on questionnaire survey (2009).

Table 11. Regencies which best improve the policy quality ranking between 2007 and 2008.

Regency	Province	PCS ranking in 2007	PCS ranking in 2008	Change of PCS ranking 2007-2008	Change of office budget per area 2007-2008 (%)	Change of staff number per area (%) 2007-2008	Change of policy implementation ratio (%) 2007-2008
L.M	East Java	77	36	-41	-37	-38	567
B.T.	Bangka	83	46	-37	-13	0	175
B.Y.	East Java	74	49	-25	-25	-7	50
C.M	West Java	50	26	-24	180	-3	27
B.G.	East Kalimantan	56	37	-19	27	5	22

Source: By author, based on questionnaire survey (2009).

regencies increased the policy implementation ratio, while their office budget and staff numbers were stable or decreased. The results showed that the diversification of policy options was an important tool to improve the quality of local agricultural policies.

DISCUSSION

A centralized governing system will be more suitable than a decentralized one in order to provide common public services, such as pension and health insurance, which can benefit all the nationals. However, Oates (1977) suggested that if the preference and demand is different in respective regions, a decentralized governing system can increase the satisfaction of the whole society more than a centralized system in which a central government provides equalized public goods and services. Based on this viewpoint, it is quite rational that the local governments in Indonesia had more authority for agricultural

policy implementations after the regional autonomy in 2001.

One of the anticipated outcomes from the regional autonomy would be the narrowed economic disparities in the regions. However, Matsui (2003) suggested that as for the income distribution among the local governments, the regional disparities had been widening after the implementation of regional autonomy in 2001. After a decade has passed, the question would be if the regional economic disparities in Indonesia, especially between the regions of Java and Outer Java, and West and East Indonesia have been narrowed.

This study reveals that there were disparities in the amount of financial and human resources and in the diversity of policies among the regions. The indicator that was formulated by PCA indicates that some regencies succeeded in improving the indicator between 2007 and 2008. There were no significant changes in the office budget and staff numbers, but the increased diversities of local agricultural policies greatly contributed to the improved indicator.

Saad (2001) reveals that local governments at the regency and municipality level had received an allocation of funds from the central government that exceeded their routine expenditures. However, this level of funding was substantially less than the total transferred into the regions during the period before regional autonomy. If the local governments are funded less by the central government after the implementation of regional autonomy, it means that without fund raising efforts by the local governments themselves, the financial disparities among the local governments cannot be narrowed. As this study indicated, there are disparities of the local agricultural office budgets between Java and Outer Java and West and East Indonesia. This study reveals that in Java, the local agricultural office budget funded by the central government and provincial government formed a higher percentage than that in Outer Java. Therefore, it is necessary for the central government to introduce systems of fund allocation that can provide more financial resources to the less developed regions than to the more developed ones. Since the implementation of regional autonomy, Indonesian local governments receive general allocation funds (DAU) from the central government, which can be used according to the local governments' own priorities. According to Saad (2001), the amount of DAU allocated to the specific local government was determined by the formula which used the local needs (size of the population, the number of people living below the poverty line, the total area of physical size, etc.) and the local potential (the number and the scale of industrial activities operating in the particular regency, which relates to the capacity of regencies to raise revenues through taxes and levies from existing economic activities) . The former is used as a positive factor (the more factors there are, the more DAU allocated) and the latter is used as a negative factor to reduce the DAU allocation. Even

though the formula contains various factors concerning the administrative needs and self-funding potential in the regions, the existence of the financial disparities between the local agricultural offices indicated that it would be difficult to reduce the financial gaps of local governments through DAU allocation alone.

This study also reveals that the staff numbers in the local agricultural offices in Java and West Indonesia were higher than those in Outer Java and East Indonesia respectively. Since the transportation network in the latter is less developed than in the former, more personnel are necessary to provide an appropriate level of administrative services to the local farmers. However, the survey results indicate that this was not the case for the local agricultural offices. The lack of appropriate numbers of staff can be a serious constraint for the Outer Java and East Indonesia regions to develop their agriculture. After the implementation of the regional autonomy, some local governments were criticized for using most of the budget for staff salaries and only a small amount of the budget was used for regional development projects. However, considering that there are still discrepancies in the human resources in local governments, the allocation of an appropriate budget to hire sufficient numbers of staff for effective policy implementation should be encouraged. The disparities of the policy implementation ratio were not as large as those of the office budget and staff numbers. It can be concluded that the local governments in Outer Java and East Indonesia maintained the diversities of local agricultural policy implementation in spite of the limited budget and personnel. On the other hand, it should be noted that only a smaller amount of resources can be used for the respective policy options and this may negatively affect the outcome of the policy implementations.

According to the observed changes of ranking based on the indicator to show the quality of the local agricultural policies, the diversification of the agricultural policies was the practical way to improve the performance of the local agricultural offices. The indicator was formulated by PCA and consisted of the three factors which indicated financial resources, human resources and policy diversities in the local agricultural offices. Considering the difficulty of increasing office expenditure and personnel under the severe economic conditions, it is quite natural that some local governments achieved the improved policy quality by policy diversification. However, policy diversification is not an easy way at all. To realize the well diversified policy options, the staff members in the local agricultural offices are required to have more competences. They should have identified the current problems in their local agriculture and propose the appropriate solutions which can be compatible with the specific conditions in the regions. Sufficient knowledge about the natural and social conditions in the area as well as creativity is definitely required to increase the varieties of policy options. Considering the greater competition

among the regions and international markets, there is no "one size fits all" approach for local agricultural policies. It is important for the local governments to nurture competent personnel in the local governments so that they can realize the innovative ideas to develop local agriculture by optimally using their own local resources.

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