

Developing Geographical Indication Protection in Indonesia: Bali Kintamani Arabica Coffee as a Preliminary Case¹⁾

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Introduction

The next year after releasing Law no. 15/2001 about Mark, which also containing geographical indication (GI) protection, ICCRI in co-operation with CIRAD started to establish a pilot project on the application of GI protection in Indonesia. ICCRI interested to start the pilot project because of its experience with Toraja coffee, a specialty coffee produced in the region of Tana Toraja highland of South Sulawesi Province. Toraja has been registered in Japan as a trademark of coffee originated from the region.

A few years ago several coffee exporters raised a question why Toraja coffee registered in Japan? It was not clear whether the registration as a constraint of their export business. However, due to the good reputation of Toraja coffee and its high price problem of counterfeiting was found. The effect was instability and inferior quality of Toraja coffee which has affected to the reputation of the coffee.

Efforts in developing GI protection system were initiated by a seminar on GI in Jakarta in 2001. Technical mission to implement the project was firstly carried out in 2002.

Kintamani highland of Bali was choose as pilot project after learning and considering two other location candidates of Tana Toraja highland in South Sulawesi and Baliem valley in Papua. The Kintamani pilot project is expected to be a model on the application of GI protection for other products in Indonesia, since the country consist of thousands island inhibited by hundreds of ethnic.

In case of coffee, Indonesia produces a number of specialty coffee with good reputation in the world market such as Java coffee (East Java), Mandheling coffee (North Sumatra), Taoraja coffee (South Sulawesi), Gayo Mountain coffee (Aceh) and Lintong coffee (North Sumatra). Quality reputation of the coffees already widely recognized by the consumer, that the producers should maintain the quality. GI protection is expected as a tool to do so.

This paper is aimed to inform the activities done in Kintamani highland of Bali as a pilot project of GI application in Indonesia. The information is began by the reason of why Kintamani coffee potential to be a GI product, then followed by activities done and it achievement.

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Bali-Kintamani Arabica Coffee: a Potential Product to be Protected by GI

After having preliminary study on the application of arabica coffee farming as well as the social aspects in Kintamani area, it could be considered that Bali-Kintamani arabica coffee is potential to be promoted as geographical indication product. Several aspects dealing with the potentials will be discussed below.

Reputation

Bali is one of the famous tourist destinations in the world. Bali coffee along with Java coffee has also been well known in the world market before the independence of Indonesia. David (1996) mentioned Bali coffee as one of “**coffee geography**” from Indonesia similar to Mandheling, Toraja, Lintong, Gayo, etc.

However, Arabica coffee planting in Kintamani highland was destructed by the eruption of Gunung Agung (volcano of Agung) in 1963. This eruption caused the quantity of arabica coffee from Kintamani drop significantly for almost 15 years. Government authority started to redevelop Arabica coffee in the of 1970's and early of 1980's, mainly by providing coffee seedlings to the farmers.

Reputation of the Bali coffee will be promoted again by applying fully wash process and introducing good manufacturing practices (GMP) during it processing. Recently, several buyers interested again to buy coffee from Kintamani. This is a good starting point to educate the farmers to produce best quality coffee and to maintain it during storage.

Planting materials

Most of Balinese Arabica coffee farmers grow S 795 and USDA 762 varieties as recommended by the Government. The two varieties are belonged to typica group, which are also widely grown by the planters to produce Toraja coffee in South Sulawesi and Java coffee in East Java. The two varieties are expected to perform unique distinctive characteristics under “terroir” of Kintamani, as a special quality sign or “tipicite” of the product. The effect of planting material to cup quality of Bali-Kintamani arabica coffee will be evaluated in the laboratories of CIRAD in Montpellier and of ICCRI in Jember.

Farmers organization

Arabica coffee farmers in Kintamani are, mostly, strongly organized through Subak Abian (SA), namely a traditional structure of farmer organization on upland areas in Bali. SA plays it important role not only on agriculture activities but also on religion ones. In Arabica growing area of Kintamani there are 58 SA at the moment.

SA is a “unique” farmers’ organization in Indonesia or may be in other countries too, which is founded on the Hindu philosophy of ‘Tri Hita Karana’ means three happiness causes. The philosophy consists of the importance relation of human being to God, to other men to environment. Each SA established a written traditional rule, the so-called “awig-awig”, democratically.

SA can be stimulated to form a rural cooperative, for instance a motivated SA of Kerta Waringin has established a village cooperative.

Farming technique application relatively uniform

Farming techniques application on the “terroir” of Kintamani is relatively uniform. Arabica coffee farmers almost 100 % do organic farming by applying



organic manure for their coffee, and they produce the manure by themselves inside the farm (from cattle, chicken or pig). Pesticides is never applied on coffee farming.

Population of coffee ranges from 1111 plant to 3333 plants per hectare. Single stem system commonly applied by the farmers to prune their coffee bush, they cut their coffee at 180 cm height in order to facilitate harvesting. On this system cherries bearing depend on the branching management, the better branch pruning management is the more stable and the higher cherries production.

Traditional coffee farms are usually monoculture, however the farmers use shade trees such as Erythrina, Albizia, Gliricidea and Leucaena. Shading intensity on the traditional farming ranges from 30 % to more than 50 %. It has been proved in South America that the shaded coffee farming performs better cup quality.

In the early of 1990's, when the world coffee price got very low, several farmers cut their coffee to grow tangerine and orange. Apart of them grew tangerine after uprooting all coffee bushes, however most of them grew tangerine or orange between coffee rows. They diversify their coffee with tangerine or orange in order to maximize return from their land. Shading intensity given by tangerine to coffee perform only 25 % or even lower than it.

Type of farming system on "terroir" in Kintamani area such as organic farming, single stem pruning, shade trees application as well as diversification with tangerine is expected to be unique factor(s) influencing on "tipicite" of coffee taste produced from the mentioned geographic region.

Strong effort on quality improvement

Five years ago the Government authority has started to ask the farmers doing red (mature) cherries picking instead of immature one as traditionally carried out by them. Red cherries picking is one of critical points to have the best quality coffee. The authority did it in collaboration with PT Thirta Harapan Bali, the cherries buyer company. Price incentive given by the buyer has motivated the farmers to do red picking. However, the main limitation is the capacity of processing unit operated by the buyer only up to 1,500 t red cherries annually, or equivalent to 15 % of the total red cherries production in Kintamani area. The farmers won't to pick red cherries if the price only equal with the traditional picking.

Altitude

In Kintamani area Arabica coffee is grown on the altitude between 1000 m to 1500 m, however it mostly covers on the altitude 1200 m and up. The higher altitude is the better aroma and flavour formation.

Environment factor, genetic factor, and the interaction of both factors influence to the "tipicite" of coffee cup quality, which also defining the authentic of the coffee, however it won't perform its effect when the cherries harvesting as well as post-harvest handling are not carried out in the right way.

Activities Conducted in Developing GI Product for Bali-Kintamani Coffee

The main activities done in order to develop Arabica coffee from Kintamani highland of Bali to be GI protected product are mentioned as below.

Empowerment of Farmer's Organization

Farmer's organization will be an important key to develop GI product, therefore empowerment of the organization is an essential thing. Empowerment was



done by building of capacity at the farmer's levels such as training, equipment aid, capital aid and supervision of coffee expert as well as coffee quality control. Training is carried out continuously either in the villages or other places such as cup taste training for the farmer was done at ICCRI laboratory. At the beginning the topics of the training were emphasized on wet processing, quality improvement and social dynamic.

Equipments and capital were granted by the local authority of Bali and the expert supervision was provided by ICCRI.

Quality Improvement at the SA Level

Strong effort on quality improvement was commenced in 2002 in order to change from dry processing (DP) to be wet processing (WP). Quality improvement is one of the most important activities toward GI protected Bali Kintamani Arabica coffee.

On the DP the farmers usually do strip picking, which mainly dominated by yellow and green cherries, for the dry processed method, then the cherries sun dried for about two weeks over cement concrete or bare soil. Several farmers remove coffee husk soon after the cherries dried, however some of them store the dried cherries for several months.

By 2001 the local authority of Bali facilitated four SA a set of pulp removal and huller machines to do WP. The machines were effectively operated in 2002 under supervision of ICCRI.

The WP is initiated by doing fully red (mature) picking then followed by inferior cherries sorting, removing coffee pulp, fermentation, washing, sun drying on the racks or cement concrete, removing coffee parchment and quality grading. This method is very important to extract the best cup quality of coffee mainly aroma, flavour, body and acidity.

The physical and cup quality result of the WP compare to DP as mentioned in Table 1 and Table 2, respectively.

Tabel 1. Average of physical analysis result of coffee bean based on defect value

Village of sample origin	Processing method	Number of defect beans	Percentage of defect beans	Grade of quality
Pengajaran	WP	4,92	1,97	1
	DP	53,66	3,74	4a
Catur	WP	2,12	1,37	1
	DP	154,45	9,88	6
Belantih	WP	7,46	1,43	1
	DP	35,80	7,70	3
Ulian	WP	5,93	1,12	1
	DP	87,85	8,70	5
Manikliyu	WP	13,90	2,37	2
	DP	102,89	5,42	5

Note: DP – Dry processing, WP – Wet processing.

Data on Table 1 showed that by doing wet processing in the right way the coffee farmers were able to produce green coffee grade 1 at their gate. Cup quality result as mentioned in Table 2 showed that all DP coffee having low aroma, flavour



and acidity. However, the WP coffee provided medium to medium-high of these characteristics. It's important to be noted that all DP coffees provide defect taste of ferment and earthy.

Table 2. Average score of cup taste parameter of green coffee from Kintamani (Bali)

Village of samples origin	Processing method	Average score of cup taste parameter *					
		Aroma	Flavor	Acidity	Body	Fermented	Earthy
Pengajaran	WP	3,19	3,29	3,10	3,65	0	-0.13
	DP	1,16	1,69	1,66	3,15	-1.63	-1.50
Catur	WP	3,44	3,48	3,33	3,79	0	0
	DP	1,69	1,62	1,69	2,99	-2.75	-0.63
Belantih	WP	3,42	3,41	3,30	3,64	0	-0.07
	DP	1,56	1,50	1,06	2,77	-0.75	-2.63
Ulian	WP	3,42	3,43	3,31	3,52	0	0
	DP	1,69	1,69	1,25	2,81	-1.63	-1.25
Manikliyu	WP	3,40	3,44	3,32	3,52	0	0
	DP	1,37	1,38	1,06	2,62	-1.81	-1.56

* Notes: 0 : nil; 1 : low; 2 : low – medium; 3 : medium; 4 : medium – high; 5 : high.
Defect taste characterized by negative sign (-).

In the first process the four SA only produced 12 tonnes of parchment beans or equal to 9 tonnes of green coffee grade 1. However, in 2003 the green coffee grade 1 increased significantly to be 62 tonnes produced by the six SA. Two additional SA involved in this program was decided by themselves. By 2004 the production of good quality coffee was not significantly increased to be 65 tonnes although followed by 10 SA, that was because coffee on the off season. Thirteen SA involved program in 2005 with the total good quality coffee beans to be 225 tonnes (Figure 1). The farmers intend to improve the quantity of the best coffee quality in the coming years, if they can get better price.

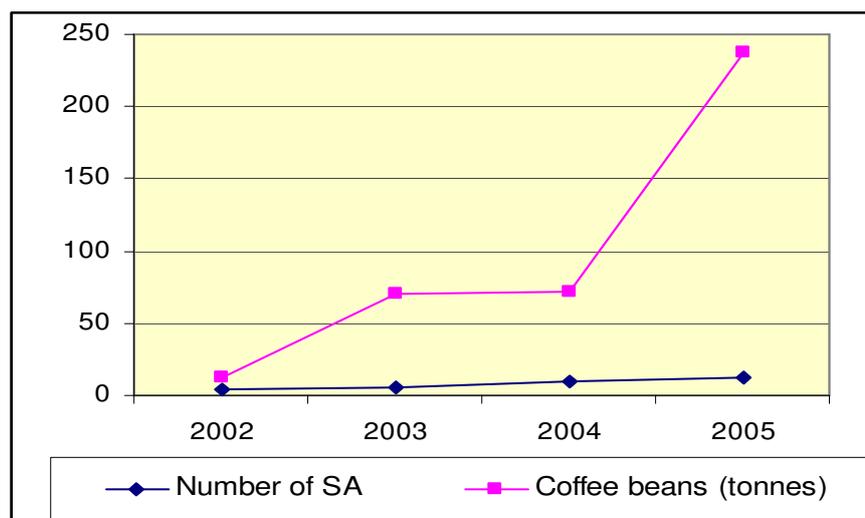


Figure 1. Progress on good quality coffee production and number of SA involved on the program.

Mature cherries picking influences coffee beans size. Table 3 demonstrated the proportion of small beans size in WP coffee was lower than that of DP coffees in all origin.

Table 3. Average of beans size percentage by different processing method

Village of sample origin	Processing method	% bean size			
		L	M	L + M	S
Pengajaran	WP	17,29	68,61	85,90	14,10
	DP	24,80	51,68	76,48	23,52
Catur	WP	28,89	63,42	92,31	7,69
	DP	34,85	52,22	87,07	12,93
Belantih	WP	20,36	66,50	86,86	13,14
	DP	13,82	57,98	71,80	28,20
Ulian	WP	19,91	65,60	85,51	14,49
	DP	23,87	60,00	83,87	16,13
Manikliyu	WP	21,66	64,13	85,78	14,22
	DP	11,00	61,10	72,10	27,90

Notes:

1. L (large), the beans retained by 7.5 mm screen.
2. M (medium), the beans pass through 7.5 mm screen but retained by 6.5 mm one.
3. S (small), the beans pass through 6.5 mm screen.

Quality is an essential thing on GI product, no GI product without any good quality. The effort of local authority together with ICCRI to improve coffee quality in Kintamani is expected as a supporting factor to promote the coffee from Kintamani highland to be GI protected product.

Marketing of Good Quality Coffee

Price incentive is a common question coming from the farmers if somebody asked them to apply new technology and/or to improve quality. The Arabica coffee farmers in Kintamani also did the same thing. Therefore, quality improvement of the coffee was not only a question of technology, but also a question of social change and marketing.

ICCRI has anticipated the question by making a partnership model. A coffee exporter was invited by ICCRI to meet with several SA to discuss partnership in producing high quality coffee, and for the next run to produce a GI coffee. ICCRI played its role as a mediator on the partnership, because by this model an efficient marketing chain can be established then the farmers receive better margin.

By using the model exporter provide buying guarantee to farmers, in contrast the farmers committed to deliver their coffee to the exporter based on a reasonable price according to the international market situation. Figure 2 showed the coffee price of unsorted green coffee obtained by the farmers in Kintamani region.

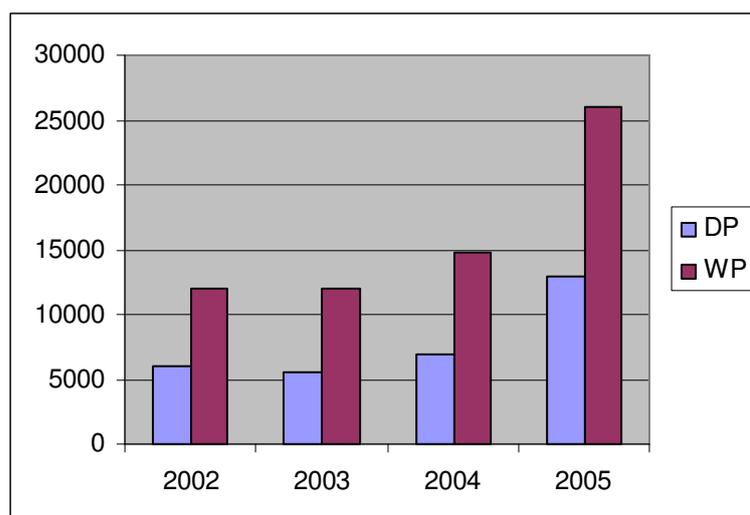


Figure 2. Price (IDR/kg) different and development of Arabica coffee by dry processing (DP) and wet processing (WP) in Kintamani (Bali).

Defining Unique Characteristic

Defining unique and specific characteristic of a product is very important in order to develop a GI protected product.

Preliminary study on cup taste analysis by CIRAD and ICCRI showed that Arabica green coffee from Kintamani having particular characteristics as follow: **medium body, medium acidity, less astringent, fruity (lemon taste) and good aroma quality**. Sensory specialist at CIRAD and ICCRI performed their high preference to the coffee.

The study will be continuously carried out that the unique and specific characteristics can be identified well to characterize Kintamani coffee, since quality is always determined by several aspects. However, the unique characteristics of Arabica coffee from Kintamani is lemon taste (fruity). Based on the cup taste analysis, Arabica coffee from Kintamani can be justified to be GI protected.

Table 4. Profile of cup taste characteristic of Arabica from Kintamani (Bali)

Sensorial parameter	Average value
Body	2.7
Acidity	3.1
Bitterness	2.2
Astringency	2.1
Fruity (lemon taste)	1.6
Green	0.4
Aroma quality	2.8
Preference of CIRAD	3.5
Preference of ICCRI	3,4

Notes: 0 : nil; 1 : low; 2 : low – medium; 3 : medium; 4 : medium – high; 5 : high.

Remote Sensing Study

Remote sensing study has provided information on estimated area of coffee Arabica (Table 5), distribution of Arabica growing area (Table 6) and distribution of each Arabica coffee-based agrosystem (Table 7).

Table 5. Estimated areas of Arabica coffee planted areas, per agro-system and in general, per slice of 100 m from 1000 m to 1800 m altitudes.

Area in hectares	A	B	C	D	E	F	G
Arabica without shade trees	2.1	1.8	2.3	0.2	0.3	0	6.6
Arabica under tangerine	234.2	445.0	599.4	259.5	98.8	22.5	1659.3
Arabica under large trees	579.5	461.6	346.5	150.1	98.1	31.1	1666.8
Arabica under clove	41.1	17.4	3.6	0.5	0	0	62.7
Total areas with Arabica	856.9	925.7	951.8	410.3	197.1	53.6	3395.4
Total area of the region	3,842.9	4,560.3	415.5	1,836.3	131.2	807.1	16,513.6

Note: A: 1,000 – 1,100 m; B: 1,100 – 1,200 m; C: 1,200 – 1,300 m; D: 1,300 – 1,400 m; E: 1,400 – 1,500 m; F: 1,500 – 1,800 m; G: 1,000 – 1,800 m.

Table 6: Distribution of Arabica coffee planted areas, per agrosystem and in general, per slice of 100 m from 100 m to 1800 m.

Area in percentage	A	B	C	D	E	F	G
Arabica without shade trees	31.2	26.7	35.1	2.9	4.0	0.0	0.0
Arabica under tangerine	14.1	26.8	36.1	15.6	6.0	1.4	10.0
Arabica under large trees	34.8	27.7	20.8	9.0	5.9	1.9	10.1
Arabica under clove	65.6	27.8	5.8	0.9	0.0	0.0	0.4
Total areas with Arabica	25.2	27.3	28.0	12.1	5.8	1.6	20.6
Total area of the region	23.3	27.6	25.5	11.1	7.9	4.9	

Note: A: 1,000 – 1,100 m; B: 1,100 – 1,200 m; C: 1,200 – 1,300 m; D: 1,300 – 1,400 m; E: 1,400 – 1,500 m; F: 1,500 – 1,800 m; G: 1,000 – 1,800 m.

Table 7: Distribution of each Arabica coffee-based agrosystem relative the whole area planted with Arabica coffee, per slice of 100 from 1000 m to 1800 m.

Area in hectares	A	B	C	D	E	F	G
Arabica without shade trees	0.2	0.2	0.2	0.0	0.1	0.0	0.2
Arabica under tangerine	27.3	48.1	63.0	63.2	50.1	42.0	48.9
Arabica under large trees	67.6	49.9	36.4	36.6	49.8	58.0	49.1
Arabica under clove	4.8	1.9	0.4	0.1	0.0	0.0	1.8

Note: A: 1,000 – 1,100 m; B: 1,100 – 1,200 m; C: 1,200 – 1,300 m; D: 1,300 – 1,400 m; E: 1,400 – 1,500 m; F: 1,500 – 1,800 m; G: 1,000 – 1,800 m.

Coffee agrosystem maps alone do not allow in determining any limits to the “terroir” of the region of Kintamani. It has to be correlated to ancillary data. However, it is a very useful tool to understand the spatial relationship between crops, dwellings, topography, hydrographical network (reached by forest following rivers) and so on.

The map also provides quantitative information about the surfaces planted with Arabica coffee or any crop systems, giving accurate statistical data as mentioned in Table 5, 6, 7.

It is also constitute an efficient support for superimposition of any other kind of data as long as they own a geographical reference, allowing in establishing a Geographical Information System (GIS) dedicated to the “terroir” of Kintamani analysis.



Relation between agrosystems map and sensory (cup taste) quality has been identified as below.

Arabica coffee berries were sampled in the region of Kintamani in 2003 in different locations agrosystems and cultivars. Sensory analysis was carried out in order to classify these samples in term of aroma quality, acidity, body, bitterness, astringency, green, fruity and preferences. This analysis leads to the definition of 3 sensory quality groups (SG) which can be considered to schematically correspond respectively to the good (SG 1), the average (SG 2) and the bad (SG 3).

Statistical analysis was done on these data in order to extract the respective characters of the different groups and to correlate them to factors like altitude, variety, type and density of shading. It appears that the sensorial group classes are not clearly dependent on the type or amount of shade, but much more to the coffee plant vigour, which is related to several other cropping practices also. Altitude seems to be an important factor of quality as more samples coming from higher altitudes (> 1350 m) were found in the SG 1 that that of in the other groups, the less of them being found in SG 3. These relation, however, seem to depend on the considered cultivars, which do not behave identically. Establishing correlations between geographic factors and sensory quality on the only basis of sampling data thus seem difficult.

Remote sensing provides with the opportunity to analyse these results in an integrative spatial analysis. Indeed, the GIS based on the agro-system and the agro-region maps is a very useful tool to analyse spatial and topographical distributions of these samples, in order to correlate geographical factors to sensorial quality and try to delimitate the Arabica “terroir” of Kintamani. The plots where coffee beans were sampled are plots over the agro-region map, providing with the values of preference, fruity and acidity characteristics.

At first sight, it is obvious that the SG 1 (the good) coffees are all located inside the agro-region dominated by citrus shading, even if they are cropped under large trees. They are all found above 1100 m. One can observe that the lowest samples, located at 1100 m, have though been given a very high values of preference (4.25) and fruity (3.0).

Two thirds of SG2 (the average) coffees are found in this same agro-region and the lasting third in areas of agriculture dominated by large trees shading. They are scattered in almost of the region, grown down to 1000 m, except in the vicinity of Catur and Belantih villages where only SG1 coffees are found.

The SG3 (the bad) coffees are only grown bellow 1100 m in large trees shading and in food crops region, except for one unique sample located at 1150 m inside the citrus-dominated agro-region. Although, this latest sample has been given a high value of preference and it has probably been discarded from SG1 because of a very low fruity characteristics (0.8). These bad coffees are found on both slopes of the mountain.

This representation thus confirms the quality analysis results about the dependence of quality with altitude. Good coffees are only grown at highest altitudes (> 1100 m) in areas where agriculture is strongly dominated by citrus association. In addition, it helps understand the way good and average coffees are distributed inside this agro-region. Average coffees are only found at the East of a diagonal line going from Ulian village at South to Dausa village at North the agro-region where good and average coffees are mixed, while only good coffees are grown at the West of this line.



Training on GI

Training on GI application is very important for the Indonesia, because the protection system is a new tool for the country. Training on sensory analysis and GI protection system had been conducted by a researcher from ICCRI.

Training session had also been conducted by CIRAD scientist and INAO specialist in Denpasar (Bali) in order to socialize the concept of GI protection. The participants of the training were government officials, lectures from the university, research institute and private sectors.

Training session at the farmer's level had been carried out too. The training was attended by chief of SA and member. The farmers perform strong willing to produce GI Kintamani coffee. Other trainings should be arranged at the farmer's level to make better understanding on GI product.

Preparing GI Managing Group at Kintamani Region

GI Managing Group (GIMG) will play an important role in establishing GI protected product for Arabica coffee from Kintamani. The group basically consists of actual actors and supporting structure.

The actual actors consist of coffee producers (SA and big cherries processors) and marketing chain institution (exporters, roasters, traders, etc). Institution should involved as supporting structure such as central government (legal frame and GI registration), provincial government (financial support for small producers and promotion of the product), Estate Crops Development Authority of Bali (extension service, supervision) and ICCRI in cooperation with CIRAD and INAO (technical support, marketing).

Preparing Specification Book

Content of the propose book of specification are (1) name of the product, (2) product description (on farm, post harvest handling, physical quality, cup quality), (3) producing and processing methods (planting material, crop management, harvesting method, wet processing method, storage, green coffee preparation, roasting method), (4) production area (natural criteria, human criteria), (5) traceability (using test kits, using traceability document), (6) link with the geographical origin (history, specific coffee characteristics, specific geographical characteristics, traditional know how, farmer's organization), (7) inspection structure (internal verification, external verification).

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Table 1. Arabica coffee growing, processing and marketing in Bali province: opportunities and constraints

Opportunities	Constraints
<ul style="list-style-type: none"> • In the Bali Arabica coffee producing area, farmers already grow coffee organically, by recycling animal manure. • Farmer groups are efficiently organized according to the traditional Subak Abian structure. • Dinas Perkebunan, the official body in charge of agricultural extension, closely and efficiently supervises some farmer groups. • Some farmer groups are involved in two processes aimed at producing a high quality coffee: <ul style="list-style-type: none"> - By selling fresh cherries to an exporter, who processes coffee (PT THB); - By carrying out full wet processing and then selling parchment bean or green coffee to a foreign buyer through an exporter. - The farmers involved in both approaches currently receive better prices. • Arabica coffee properly processed by the wet method and exported to some specific markets can help: <ul style="list-style-type: none"> - Farmers to obtain better prices; - Exporters to increase their profits. • In Bali, Arabica producers are also coffee drinkers, so they can more easily be made aware of quality requirements. The Subak Abian Kerta Waringin has started marketing ground roasted coffee. • Bali island is a famous tourist destination: “Bali” identification could provide Arabica coffee with an attractive image. 	<ul style="list-style-type: none"> • The international coffee price is structurally volatile: it is currently very low so farmers are turning to other crops (such as tangerine). • Farmers are not convinced that they could obtain better prices from traditional local traders by improving coffee quality. Consequently, most farmers stick to the conventional dry processing method. • Farmers are traditionally used to storing dry coffee beans at home so that they can sell them only when they need money. This practice could be an obstacle to the extension of fresh cherry collection. • The involvement of farmer groups in coffee marketing is limited by the lack of working capital. • The extension of wet processing induces some specific constraints: <ul style="list-style-type: none"> - Some expensive equipment has to be acquired. - Conventional wet processing requires large quantities of water, which is rare in some areas; however, the use of new and appropriate machinery can help in radically reducing water consumption. - Workers who operate the wet processing system must be carefully trained. • Wet processing only leads to a good quality coffee if it is carried out properly. Fresh cherries have to be collected very quickly and pulped less than six hours after picking. Consequently, wet processing requires a sufficient means of transport and adequate roads.

