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BALINESE TRADITIONAL AGROFORESTRY AS BASE OF WATERSHED CONSERVATION

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Abstract. *Forests, traditional gardens and green spaces play an important role in regulating the water flow of an area. Along with the high demand for land in Bali for agriculture and tourism, many forest areas have been converted into hotels and settlements. Forest conversion has caused many problems such as erosion, soil fertility decreased, flora fauna extinction, floods, drought, global warming and the disturbing watershed, especially rivers for springs. The purpose of this study is the development of watershed conservation in Bali based on traditional agroforestry. The method that used is vegetation analysis. Calculation of the erosion amount using the USLE formula. Sampling was done by ten plots. The results showed that traditional agroforestry vegetation consisted of vertical and horizontal structures. The characteristic of traditional agroforestry is that dominant plants are distributed irregularly, thus creating a miniature structure like a forest. The vertical structure consists of trees, horizontal structure filled with species of garden plants and agriculture. Trees have roots spread intensively in the soil and reduce nutrient leaching. Land cover by vegetation protects the soil and erosion. The agroforestry has a role as an act of soil and water conservation. Traditional agroforestry land cover has a relatively low C coefficient (0.05-0.25) compared to other lands. The level of erosion hazard is low and moderate. Average erosion value of 55.01 t.ha*$^{-1}$*.yr*$^{-1}$*. This indicates that traditional agroforestry makes the soil have a higher ability to absorb water, thereby reducing surface runoff. Likewise, organic material that improves the water content capacity. In addition, water quality can be improved through the humus filter function. During a long dry season, there is a drought due to low rainfall, but rivers and springs were able to supply water for the peoples daily needs. This condition occurs because of the tree retentions in traditional gardens. Conservation actions need to be taken, namely maintaining trees vegetation, increasing reforestation, bench terraces use, mounds and mulch use. This condition also places traditional agroforestry as a sustainable land management system.*
Keywords: *Bali; conservation; vegetation; watershed; traditional agroforestry*

1. Introduction

Forests, traditional mixed gardens and green open spaces are important in regulating river flows. In accordance with the needs of land in Bali for agriculture and tourism, many forest areas have been converted into hotels and settlements. According to Anputhas *et al*. (2019), forest land conversion raises many problems such as erosion, decreased soil fertility, flora-fauna extinction,

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floods, drought, and even global warming thus disturbing river basins, especially rivers for water sources.

The sector of forestry, agriculture and plantation agroforestry activities are already familiar. Agroforestry is a form of soil and water conservation combining tree crops, or annual crops with other agricultural commodity crops which are planted together or alternately (Gintings, 1982). Planting trees, which are annual crops, can reduce soil erosion better than agricultural crops, especially seasonal plants. Selected annual plants should be of the type that can provide added value to farmers from fruit and wood products. Besides being able to produce faster and greater profits, agroforestry is also a very good system ecologically, economically and socio-culturally (Kalcic *et al.*, 2015). Knowledge interfacing and sharing towards co-producing collaborative products helps to clarify the performance-based indicators for effective payment for watershed services negotiation between potential sellers and buyers of ecosystem services (Cuvelier & Greenfield, 2016; Leimona *et al.*, 2015). Various agroforestry plant species in Bali, including coffee, *Albizia chinensis*, and the latest mulberry (Sasmita *et al.*, 2019), shallot *(Allium ascalonicum L.* especially in Kubu Tambahan Sub-district (Purba *et al.*, 2020), petsai (*Brassica chinensis* L.) evenly in Bali (Purba *et al.*, 2019).

Figure 1. Telajakan in Penglipuran, Bali Traditional Village, Bangli Regency, Bali (Tika, 2015).

Various regions in Indonesia have traditional agroforestry systems. One of them is in the province of West Java, a traditional agroforestry system that is commonly found in the form of *kebun-talun* and yard (Karyati *et al.*, 2017). In Bali, traditional agroforestry known as abian, kebon and telajakan are familiar to people who live in rural areas. . *Abian* is a dry land/field that is located far from the residential area (Figure 2). *Kebon* is a garden which is located not far from a residential area (Figure 2). *Telajakan* is part of the green open land around the settlement located on the main road or village road in front, beside or behind the yard of the house, including the road itself, sewer and drainage, yard and others (Figure 1). All three are related to the *Tri Hita Karana* concept in

Balinese Hindu beliefs (Kaler, 1983). *Tri Hita Karana* namely three harmonious relationships between humans with God, man with man, and humans with the environment described with the *Parahyangan, Pawongan, and Palemahan* (Windia, 2005). *Tri Hita Karana* concept lowered the *Tri Mandala* concept consists of: the main mandala as *Parahyangan* or holy place, *Madya Mandala* in the form of yards including buildings place to live and *natah*, meanwhile despicable *mandala* in the form of a backyard (*teba*) and the front yard (*telajakan*). Traditional Balinese landscaping uses *Tri Mandala* concept (Dewi, 2018).

Until now the land use system of *abian, kebon* and *telajakan* has an important role as a source of fulfilling community needs. The benefits of *abian, kebon* and *telajakan* are as a source of daily food needs, a source of income and other environmental service benefits. *Abian, kebon* and *telajakan* as a traditional agroforestry system in Bali have not received the attention and recognition of various parties both the government and local government agencies, agriculture, forestry in the development and use of land in their area. This study aims to evaluate the value and benefits of traditional dry land use (*abian, kebon and telajakan*) in the Bali area.

Figure 2. Abian (left) and kebon (right) land in Bali

2. Methods

The study was conducted in 5 districts with 5 points and 10 research plots (Figure 3). Plot 1-2 in Tukad Ayung Gianyar (8 ° 21'28.0 "S 115 ° 16'21.1" E), plot 3-4 in Tukad Bangka Karangasem (8 ° 22'37.9 "S 115 ° 28'33.2" E), plot 5-6 in Tukad Jogading Jembrana (8 ° 18'03.1 "S 114 ° 39'18.4" E), plot 7-8 in Tukad Daya Buleleng (8 ° 13'56.8 "S 115 ° 13'21.3" E), and plot 9-10 in Tukad Penet Tabanan (8 ° 23'47.8 "S 115 ° 10'46.9" E). The main research location is the community's dry land near the forest near the watershed area, where land is found consisting of *abian*, *kebon* and traditional telecommunications. The research method used is vegetation analysis, in which vegetation was developed based on a floristic level. The next research method is the calculation of the percentage of erosion using the formula USLE (United Soil Loss Equipment). Vegetation analysis was carried out to describe the vertical and horizontal structures and the composition of traditional *abian*, *kebon* and *telajakan*. The time of the study conducted from October 2017 to September 2018.

Erosion prediction on land can be calculated using the model that Wischmeier & Smith (1978) developed by Arsyad (2012) with the formula A = R x K x LS x C x P. Rain erosivity factor is calculated using rainfall data in the last 10 years. Rain erosion in the study area was predicted using the formula proposed by (Arsyad, 2012) as follows EI = 2.21 $R^{1.36}$, with EI = erosivity index, R = monthly rainfall (cm).

The large classes of surface erosion in the study are known based on the level of surface erosion in Table 1.

Figure 3. Research location
A: plot 1-2 in Tukad Ayung Gianyar (8 ° 21'28.0 "S 115 ° 16'21.1" E),
B: plot 3-4 in Tukad Bangka Karangasem (8 ° 22'37.9 "S 115 ° 28'33.2" E),
C: plot 5-6 in Tukad Jogading Jembrana (8 ° 18'03.1 "S 114 ° 39'18.4" E),
D: plot 7-8 in Tukad Daya Buleleng (8 ° 13'56.8 "S 115 ° 13'21.3" E),
E: plot 9-10 in Tukad Penet Tabanan (8 ° 23'47.8 "S 115 ° 10'46.9" E) (source: Google Maps)

Erodibility factor (K) is determined based on analysis of soil texture, soil permeability, organic matter content and soil structure by the procedure proposed by Wischmeier & Smith (1978) as follows K = 1, 292 {2.1 M1.14 (10-4) (12-a) + 3.25, (b-2) + 2.5 (c-3)} / 100 with K = soil erodibility, M = particle size (% dust +% fine sand) (100 -% clay), a = percent organic matter b = soil structure class and c = soil permeability class. The length and slope factor (LS) can be searched using LS = √ (0.00138 2 + 0.00965 + 0.0138) with L = slope length (m), S = slope (%) (Arsyad, 2012). Factors of crop management and soil conservation (CP) can be seen in the table of crop management (C) and soil conservation factors (P) (Asdak, 2018).

Table 1. Classification of Soil Erosion Rates

No.	Classification of erosion rates	Erosion rates ($t.ha^{-1}.yr^{-1}$)
1.	Very Low (VL)	<15
2.	Low (L)	15 – <60
3.	Medium (M)	60 – <180
4.	Heavy (H)	180 – <480
5.	Very Heavy (VH)	≥480

Source: Regulation of Directorate General of Watershed Management and Social Forestry, Ministry of Forestry, Republic of Indonesia Number: P.4/V-SET/2013

3. Results and Discussion

3.1. Rainfall in the Last Ten Years (Rf)

Most of the Balinese people are planted as small farmers with traditional farming patterns. The Balinese style of agricultural production is strongly influenced by climate change, especially natural cycles and rainfall. Therefore, the transition of seasons is one indicator that can be used to detect the dry season or the rainy season earlier, so that agricultural planning, especially the planting period and commodity types, can be arranged according to actual climatic conditions.

Climate is closely related to human activities, plays an essential role in economic development. It has even become an essential factor in the aspect of prosperity because increasing human needs will increase industrial activity, forest clearing, agricultural businesses, and households that release greenhouse gases. Bali is generally a tropical region, which is influenced by seasonal winds. There is a dry and rainy season interspersed with a transition season. From June to September, wind currents originate from Australia and contain little moisture, resulting in a dry season. While in December to March, wind currents provide a lot of water vapor from Asia and the Pacific Ocean, resulting in the rainy season.

The increase in average air temperatures, rising sea surface temperatures, changes in patterns and rainfall, shifts at the beginning of the dry season, or the rainy season are a series of impacts from global warming or climate change. There are two consequences of increasing temperature/temperature, namely a change in pressure, where air circulation causes wind speeds to be firmer, and there is evaporation, where water vapor accumulates above, causing a wet atmosphere, so the intensity of rainfall increases.

According to the Meteorological, Climatological, and Geophysical Agency (BMKG) Bali Region, as presented in Table 2, that when viewed from rainfall in each region of Bali, recorded the highest average rainfall occurred in January, reaching 371.10 mm. Conversely, the lowest rainfall occurred in August, reaching 36.62 mm.

Table 2. Conditions for Rainfall in the Last Ten Years (mm) in Bali

Month	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Mean
January	260.40	373.60	554.20	638.20	552.10	316.10	134.30	373.00	289.98	219.10	371.10
February	191.60	281.70	208.60	163.60	273.20	179.30	561.40	209.00	370.11	392.30	283.08
March	66.00	274.40	528.50	121.10	57.00	294.80	91.50	201.00	292.30	275.10	220.17
April	326.50	281.60	43.20	76.60	29.50	48.10	25.00	66.00	221.12	214.23	133.18
May	86.90	120.10	119.70	125.90	28.60	60.50	94.30	230.00	109.10	107.21	108.23
June	138.70	17.80	3.80	188.80	9.50	1.90	263.20	233.00	102.22	101.42	106.03
July	114.70	19.70	50.10	111.90	48.50	0.10	122.30	97.00	89.23	87.35	74.09
August	114.40	0	0	5.20	4.90	0	62.60	61.00	58.26	59.80	36.62
September	298.40	0	2.00	1.40	0	0.30	391.10	49.40	20.78	21.54	78.49
October	250.70	35.60	11.00	10.10	0..90	0	67.70	295.00	82.40	84.10	92.96
November	168.30	150.80	92.70	195.50	150.80	32.50	276.60	567.00	81.50	82.40	179.81
December	508.20	334.90	235.10	515.80	485.60	200.20	399.00	486.00	176.21	175.46	351.65

Source: Rainfall Observation Laboratories in Bali (data processed)

3.2. Rain Erosion Index (EI)

The Rain Erosivity Index (EI) is obtained using equations developed by (Arsyad, 2012). So the R-value obtained for the last 10 years is 1370.90 $t.ha^{-1}.yr^{-1}$ and can be seen in Table 3.

Table 3. Rain Erosion Index EI)

Month	Mean (mm)	Mean (cm)	2,21 x $(R)^{1,36}$ (mm)		$R (t.ha^{-1}.yr^{-1})$
January	405,23	40,52	2,21	153,63	339,52
February	288,17	28,81	2,21	96,63	213,56
March	215,37	21,53	2,21	65,03	143,72
April	107,04	10,70	2,21	25,12	55,53
May	100,68	10,06	2,21	23,12	51,09
June	88,27	8,82	2,21	19,33	42,72
July	59,81	5,98	2,21	11,38	25,16
August	24,97	2,49	2,21	3,47	7,67
September	83,50	8,35	2,21	17,92	39,61
October	80,13	8,01	2,21	16,95	37,45
November	175,21	17,52	2,21	49,11	108,55
December	375,69	37,56	2,21	138,60	306,31
Total					**1370,90**

Source: research data processed

The erosivity value can be an indicator of the occurrence of high surface runoff in the watershed area of Bali when it rains. This surface flow carries soil particles that result from damage to soil aggregates due to strong pressure rain because of the kinetic energy of the rain. According to Asdak (2018), if the amount and intensity of rain is high then the potential for surface runoff and erosion will also be high. Erosivity is affected by the fall of raindrops directly on the ground and partly because of the flow of water above ground level.

3.3. Land Use (LU)

At present, the Balinese agricultural sector is again in the public spotlight. Many observers and practitioners assume that agriculture can be a pillar supporting the economy of Bali. Nevertheless, Balinese agriculture is also faced with many obstacles. One of them is about land use and adjustment. Even in the last few years, land conversion from agricultural land to non-agricultural land has increased.

In general, land use is divided into agricultural and non-agricultural land uses. Potential land use is influenced by soil type, mineral resources, vegetation, topography, climate, and location. In 2016, agricultural land in Bali reached 353,491 ha consisting of 79,526 ha (22.50%) of paddy fields and 273,965 (77.50%) ha of non-paddy fields. In comparison, the non-agricultural land reaches 210,175 ha.

The use of non-paddy land in Bali during 2017 was mostly reserved for dry land and gardens totaling 123,774 ha or 37.63 percent of 328,908 ha of non-paddy land. The most common use of non-paddy fields is in Buleleng Regency, wherein 2017 it was 115,365 ha (35.08%), followed by Karangasem district with 53,043 ha (16.13%). Specifically for the use of paddy fields, Tabanan Regency still occupies the first position in 2017 with paddy fields reaching 21,089 ha. This is in accordance with the nickname of Tabanan as Balinese rice granary.

Table 4. The use of forestry land in Bali is in accordance with its function

	Area (ha)	Percentage (%)
Protected Forest	97,598.16	73.74
Conservation Forest	26,061.47	
Limited Pproduction Forest	6,825.82	5.16
Permanent Production Forest	1,872.80	1.41
Nature reserve	1,762.80	1.33
National park	19,002.89	14.36
Nature tourism park	4,154.40	3.14
Grand forest park	1,141.38	0.86
Total	132,358.25	100

Source: Regional Office of the Ministry of Forestry of Bali Province (2017)

The use of forestry land in Bali is in accordance with its function. According to its function, forests are divided into protected forests, production forests, nature reserves, tourist parks, and tourism forests presented in Table 4.

Local wisdom in Bali like *telajakan* play a role in maintaining environmental balance. Water infiltration land is still maintained by *telajakan*. It is formed, which also functions as a water catchment area. Groundwater reserves are still available with the help of *telajakan* as water absorption into the ground during the rainy season (Purba *et al*., 2020).

Specifically for the area of tourism forest based on its functions recorded in the Conservation Office and SDA Province, Bali covers five forest functions, namely Penelokan Nature Park, Batukahu Nature Reserve, Sangeh Nature Park, Lake Buyan Tamblingan Nature Park, and Mount

Batur Payang Hills Nature Park. The number of visitors to the location of the tourist forest experienced an increase of 80.36 percent, from 134,381 people in 2016 to 242,368 people in 2017. During 2017, visits to these tourist forest locations were more dominated by foreign visitors who reached 164,337 people (67.80 %) compared to 78,031 domestic visitors (32.20%).

3.4. Soil Erosion Rate (A)

Land use in the watershed area of Bali generally consists of four types, namely forests, mixed gardens, dry fields, and rice fields. Types of mixed garden land use as traditional agroforestry at 10 observation points on land with a slope of 0-25% obtained the average erosion of each type of land use is presented in Table 5.

Based on the classification of surface erosion in Table 5, the amount of erosion in the study area can be divided into 2 classes namely Low erosion (R) soil class with erosion rates ranging from 41.13 to 59.63 $t.ha^{-1}.yr^{-1}$. Being in the research plot 01, 03, 05, 06, 07, 09, 10. As well as low erosion class (S) with erosion ranging from 63.75 to 68 $t.ha^{-1}.yr^{-1}$ in the plot 02, 04 and 08.

Community activities that cause forest land to be damaged, conversion to agriculture and tourism activities in upstream areas can cause sedimentation in downstream areas. The pattern of agriculture that does not follow the conservation method in the upstream watershed area with commodity crops and horticulture results in the downstream part of the watershed narrowing and shallowing of the river flow. Based on the results of the analysis of the erosion level at the study sites with medium and low categories, it is supposed that the area around the watershed is a conservation area with the main function as a catchment area. Land use in the upper watershed can be tolerated with agroforestry patterns such as traditional gardens. The agrotechnology pattern developed and implemented in the form of traditional agroforestry must meet the rules of soil and water conservation (Cuvelier & Greenfield, 2016; Molla & Sisheber, 2017).

Table 5. Soil Erosion Rate (A)

Plot Sample	R	K	LS	CP	A	TBE
Land unit 01	1370,90	0,12	2,8	0,1	46,06	Low
Land unit 02	1370,90	0,15	3,1	0,1	63,75	Medium
Land unit 03	1370,90	0,15	2,9	0,1	59,63	Low
Land unit 04	1370,90	0,16	3,1	0,1	68,00	Medium
Land unit 05	1370,90	0,12	2,5	0,1	41,13	Low
Land unit 06	1370,90	0,11	2,9	0,1	43,73	Low
Land unit 07	1370,90	0,14	3,1	0,1	59,50	Low
Land unit 08	1370,90	0,15	3,2	0,1	65,80	Medium
Land unit 09	1370,90	0,12	2,9	0,1	47,71	Low
Land unit 10	1370,90	0,16	2,5	0,1	54,84	Low
Mean					55,01	Low

Source: research data processed

3.5. Traditional Agroforestry (TA)

Although the definition of a traditional garden is a plot of land on which there are stands of trees and types of cultivated plants (Herri *et al*., 1985), in reality, it also includes areas around which no trees grow. Thus it can be said that what is meant by traditional gardens is to cover the whole land as a whole (with trees and not trees), which is owned by someone either in the vicinity of the residence (Home gardens) or state forest land (Forests gardens). The area of traditional gardens in Bali varies greatly, from the smallest less than 0.5 ha to as large as 5.0 ha and there are even some that are wider. The distance to the garden has generally located some distance between 1 to 5 km from the settlement and can be reached on foot.

Table 6. The vegetation stratification of traditional agroforestry in Bali based on the vertical structure

No	Vegetation Stratification	Vegetation
1	Upper stratum (height > 5 m): diameter of the tree above 40 cm	The diameter of the tree more than 40 cm *are dominated by* Bingin (*Ficus benjamina*), Intaran (*Azadirachta indica*), Nangka (*Artocarpus integra*), Pule (*Alstonia scholaris*), Teja (*Cinnamomum iners)*, Ancak (*Ficus rumphii*), Gegirang (*Leea aculeata*), Tingkih (*Aleurites moluccana*), Kapuk (*Ceiba pentandra*), Majegau (*Dysoxylum caulostachyum*), Poh (*Mangifera odorata*), Kesambi (*Schleichera oleosa*), Maoni (*Swietenia mahagoni*), Buluan (*Castanopsis argen*tea). The diameter of the tree less than 40 cm *are dominated by* Medori (*Calotropis gigantea*), Tiying (*Gigantochloa apus*), Cempaka (*Michelia alba*), Jepun (*Plumeria acuminata*), Sandat (*Cananga o*dorata), Nyuh (*Cocos nucifera)*, Dadap (*Erythrina variegata*), Nagasari (*Mesua ferrea*), Jebugarum (*Myristica fragrans*), Kelor (*Moringa oliefera*), Tulak (*Schefflera elliptica*), Cengkeh (*Eugenia aromatica*), Tebu (*Saccharum officinarum*), Pokat (*Persea americana*), Juuk (*Citrus maxima*), Sotong (*Psidium guajava*), Wani (*Bouea macrophylla*), Lontar (*Borassus flabellifer*).
2	Middle stratum (height 1-5 m): stakes and piles vegetation	Lambon (Manihot esculenta), Ratna (Gomphrena globosa), Landep (Barleria prionitis), Gemitir (Tagetes erecta), Teleng (Clitorea ternatea), Base (Piper betle), Sugih (Pleomele angustifolia), Endong (Cordyline fruticosa), Biu (Musa paradisiaca), Flower shoots (Hibiscus rosa sinensis), Croton (Codiaeum variegatum), Sisih (Phyllanthus buxifolius), Mica (Piper nigrum), Coriander (Coriandrum sativum), Curing (Codiaeum variegatum), Mica (Piper nigrum), Pare (Momordica charantia), Bligo (Benincasa hispida), Waluh (Cucurbita pepo), Tanjung (Nymphaea sp), Basil (Ocimum basilicum).
3	Lower stratum (height < 1 m): annual plants such as palawija plants and shade-resistant herbs	Sela bun (Ipomoea batata), Temu ireng (Curcuma aeruginosa), Kesuna (Allium sativum), Onion (Allium cepa), Tebya (Capsicum annuum), Kunyit (Curcuma aeruginosa), Kunyit (Curcuma domestica), Check (Kaempferia galanga), Isen (Alpinia galanga), Taro (Caladium bicolor), Bangle (Zingiber purpureum), Bawang merah (*Allium ascalonicum* L.), Gamongan (Zingiber amaricans), Jae (Zingiber officinale), Barak (Vigna unguiculata), Undis (Cajanus cajan), Gamongan (Zingiber amaricans), Kedele (Glycine max), Petsai (*Brassica chinensis* L.), Kacang tanah (*Arachis hypogaea* L.), Kacang hijau (*Vigna radiata*)

(Source: research data by authors)

The distinctive feature of traditional gardens as a model of traditional agroforestry was dominant plants are distributed irregularly, thus creating miniature structures such as natural forests. The spatial structure of mixed gardens consists of horizontal and vertical structures. The horizontal structure of the garden is related to the number of trees in one land, in terms of stand density and canopy cover level. As we get closer to settlements, there is a tendency for vegetation to decrease regarding the types of cultivation and the number of tree populations in the stand. The vegetation stratification of traditional agroforestry in Bali based on the vertical structure is presented in Table 6.

In general, large trees with a diameter of more than 100 cm are not found in traditional gardens owned by individuals, the number of trees is relatively evenly distributed throughout the diameter class. This is because the age of traditional gardens is relatively young. Because of that, the trees that grow in traditional gardens belonging to the community besides being of medium diameter, are generally also species that have been cultivated. In addition, to stand density and canopy cover in traditional gardens, there are several forms of plant stand layout. There are three types of traditional gardens in Pinge Tabanan Village, namely stands in a hilly area, stands on the edge of a river and stands near a settlement. Different layouts have specific purposes and objectives including to shorten the road to the work area in the fields and fields, close to finding water sources, as well as functioning to protect against erosion and landslides.

The vertical structure of traditional gardens in Bali is arranged based on plant height and the need for ethnobotany. The height of the tree is then based on the combination of Agroforestry including the types of plants that are suitable for the agroecosystem, the types of plants that are suitable for their functions, and the types of plants that are resistant to shade (tolerant). Stratification of vertical structures in mixed gardens is more complex because it consists of annual and perennial plants. The tree species is the upper stratum, while the middle and lower strata are mostly filled with food and medicinal plants.

With a structure similar to natural forests, traditional gardens have important ecological chains. This view is based on the experience of the population, observations during the study and review of several references clarifying the positive effects of traditional land-use systems. Annual plants in traditional gardens have relatively greater leaf cover area in holding the kinetic energy of rainwater so that water reaching the ground in the form of streamflow and throughfall does not produce a large erosion effect. The application of traditional agroforestry on land with steep or rather steep slopes can reduce the level of erosion and improve soil quality, compared to if the land is bare or only planted with annual crops (Arévalo-Gardini *et al*., 2015; Tomer *et al*., 2015).

4. Conclusion

The characteristic of traditional agroforestry is that dominant plants are scattered irregularly, thus creating miniature structures like natural forests. The structure of vegetation is filled with types of trees, and types of food plants. The relationship between rainfall and water storage function determines the flow of river water in an area. Land cover by vegetation protects the soil from erosion. The role of traditional agroforestry in Bali as an act of soil and water conservation has a relatively low C coefficient (0.05-0.25). The level of erosion hazard is low and moderate. The average erosion value of 55.01 $t.ha^{-1}.yr^{-1}$ indicates that traditional agroforestry makes the soil have a higher ability to absorb water, thereby reducing surface runoff. Low erosion occurs because people plant and maintain trees in the traditional garden area. Conservation actions maintain tree vegetation, increase reforestation, use of bench terraces, ridges and use of mulch as one of the watershed conservation efforts. Traditional agroforestry as a sustainable land management system indicates that watershed conservation activities are going well.

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