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EFFECT OF ENVIRONMENTAL DEGRADATION ON ANIMAL DIVERSITY IN BALI, INDONESSIA

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ABSTRACT

Bali is a small beautiful tropical island of Indonesia archipelago, lies between the continent of Asia and Australia, as well as the Indian and Pacific Ocean. As a tropical archipelago, many kinds of biodiversity can be found. The island of Bali in particular, there are typical animal diversity that could not be investigated beyond such island, such as, Bali cattle, Bali dog, Bali starling and others. As time goes on, the existance of such biodiversity decreases in both body weight and population number. Both global warming/climate change and land use change are the main factors affecting such phenomenon. This study has been conducted by employing field observation as well as literature study. It was found that, the quality of purebred Bali cattle species decreases genetically that could be notified of smaller bodysize for both male and female. Land use change of agriculture activity to the hotels, house of living, roads and other infrastructures are the main factors for Bali cattle existence. For typical famous bird of Balistarling, the problem is because of deforestation which cause natural habitat loss, due to land use change for agricultural activity and house building by local people. In case of Bali dog, the mad dog of rabies is just introduce and spreading over Bali island, whichis formerly the island of Bali has been recognised as free zone area of the rabies. As consequence, suffering dogs must be eliminated by mass killing cause decrease total number of such poor dog. Overall, it could be concluded that environmental degradations of land use change, deforestation and desease are the main causes of biodiversity decreasing number of the Bali cattle, Bali white starling and Bali dog respectively, beside global warming/climate change natural disaster.

Key words: Environment, Bali cattle, Bali starling, Bali dog, Bali island.

INTRODUCTION

World research on biodiversity have been done from long time ago up to now. For examples, Sanford (2012) on butterfly, Escobar, *et al.* (2010) on green iguanas. It was found that the potential loss of a habitat area and rerunning the reserve design analysis not only could identify the suite of potential sites to be protected under mitigation requirements, but also facilitate land-use planning negotiations among stakeholders. These conservation challenges and opportunities for the silverspot butterfly are exemplary of a large list of other imperiled species. Collectively, findings from this study provide important insights into future reserve design and conservation planning approaches for imperiled species that occur in patchy landscapes.

The Bali island as one of Indonesia archipelago has specific and particular animals whichis sometime used as a mascot of Bali, for examples: Bali cattle, Bali starling and Bali dog.

As time goes on, habitat of such animals also get worse as result of land use change as well as deforestation. Therefore, this study wascarried out in order to evaluate effect of environmental degradation of the animals on Bali island.

MATERIALS AND METHODS

This study has been conducted by employing field observation as well as literature study. Questionair sheet and personal communication were carried out to complete data.

RESULT AND DISCUSSION

Bali cattle (Bosjavanicusd'Alton). Study showed that the Bali cattle start losing habitat. Evidence could be approved by the fact that in some places in Denpasar and Badung regency clearly advised that in Cargo Street and Suwung dump site, Bali cattle feed whatever they found and available in such places (Fig. 1). Survey also showed population number of Bali cattle and buffalo decreased. In 2011 and 2013 it was found 639793 and 478706 heads respectively (decrease about 25.2 percent) (Fig. 2, BPS, 2015). This situation could be due to, land use change occurred recently from agricultural fertile land to infrastructure such as, housing, hotel, road etc.

Therefore, Bali cattle lose their habitat dramatically. The fact is in general agreement with Kasa (2012) who reported that as a consequence of habitat lost, then Bali cattle has been concentrated and found in Cargo street and Suwung dump site of Denpasar city. In addition, it was noted that number of land use change per year is about 800-1000 hectare (Bali Post, 2012). According to Arthana (2015), in 2013 land use change increase gradually in comparison to 2007. For examples, decrease number of paddy rice field in 2007 was 81482 hektare, meanwhile, in 2008 and 2013 were 81235 hektare and 81165 hektare respectively. Moreover, results could also be suported by decreasing number of farmers. For example, the data clearly proved that from 2003 to 2013 total population of farmers were incredibelly decreased about 16.98 percent from 491725 down to 408229 respectively (BPS, 2015). Such decreases was highest in the city of Denpasar (46.23 percent), meanwhile, the lowest was happened in Bangli regency (3.53 percent).

Figure.1. Bali cattle at Suwung Dump Site of Denpasar, Bali.

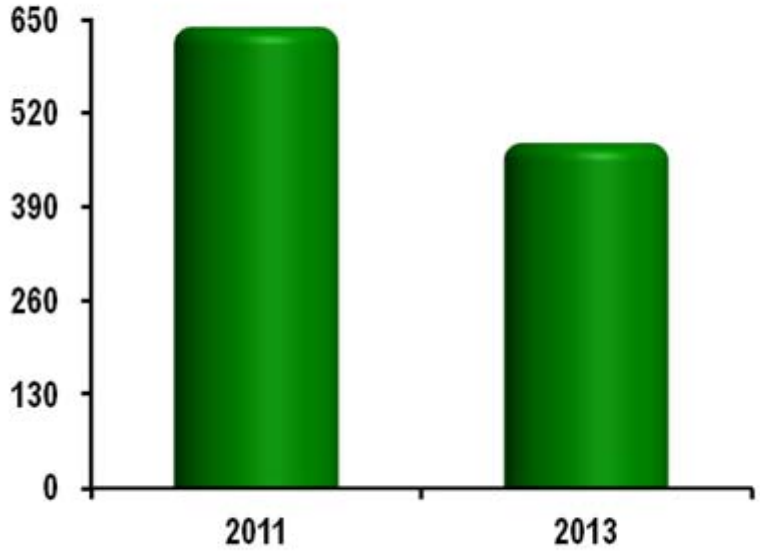

Figure 2. Total Population (thousands) of Bali cattle and Buffalo (BPS 2015).

Bali starling (Lencopsar rothcshildi). The Bali starling is showed in Fig. 3. Formerly, such beautiful bird lived in flock of up to 20 birds. Nowadays, study revealed that in nature total number of the bird decrease gradually. The fact is in general agreement with Craig and Feare (2010) who found that, by 1990 illegal poaching had reduced Bali starling numbers to just 15 individuals, and by 2001 only 6 wild individuals remained (BirdLife International, 2013). The only suitable habitat of the bird is small area of natural forest at west part of Bali island. The range area is now reduce tremendously due to human activity. Additionally, decreased number of beautiful bird is caused by some factors such as, land use change, deforestation, and fire hunting. Unfortunately, the recent Bali's forests and savannah are no longer safe to shelter for birds that had become the mascot of Bali province. Land clearing for agricultural fields and make the tree difficult to find. In fact, the Bali Starling could not adapt to nest in other places, in addition to woodpecker nest holes. Uncontrolled hunting, setting traps, and illegal shooting continue to whack Bali Starling. Insects and fruit-eating animals area also threatened with extinction. This situation is supported by IUCN Red List (2014), who pointed out that the Bali starling is endemic to the island of Bali, Indonesia. Formerly, this nonmigratory species (del Hoyo *et al*., 2009) was found throughout a strip of land along the north-western third of the island, but its range has since declined drastically, and now only includes a 60-kilometre-squared area within the Bali Barat Nature Reserve (Craig and Feare, 2010).

Subsequently, Bali starling has typical places for nesting during certain season. This phenomenon is in general agreement with BirdLife International (2011) who reported that, the Bali starling often builds its nest in an abandoned woodpecker hole or other natural tree hole, usually between four and ten metres above the ground, using dry twigs to line the nest. Moreover, the Bali starling can typically be found in dry, open lowland forests (BirdLife International (2011), usually with a grassy understorey (del Hoyo *et al*., 2009). During the breeding season, this species tends to favour areas of fire induced open shrub savannah and adjacent tropical moist deciduous forest, usually below elevations of 175 metres. It often disperses to open forest edges and flooded savannah woodland outside of the breeding season. The

Bali starling has also been known to occur in coconut groves near villages (BirdLife International, 2013).

Some efforts have been carried out to avoid threatening of Bali satarling. Fig. 4 showed the Governor of Bali release such endangered species to nature. As an endemic species, Bali starling is classified as Critical Endangered and is listed on Appendix I of CITES (IUCN Red List, 2014). Several factors has also been recognized to threat Bali starling e.g. illegal trading etc, therefore, its population declined dramatically since its discovery. In more detail it was reported that, such declined mostly as a result of the illegal collection of birds for the captive bird trade (Craig and Feare, 2010). Additionally, despite the entire Bali starling population being within a national park, illegal trapping of this species continues, a threat which is further compounded by habitat destruction, interspecific competition, natural predation and disease (BirdLife International, 2013).

Figure 3. Bali White starling (*Lencopsar rothcshildi*) (BirdLife International. 2013).

Figure 4. The Governor of Bali Release Bali Starling to Nature.

Balinese dog (*Canis lupus familiaris*). Balinese dog is shown in Fig. 5. Meanwhile Fig. 6 showed, a mass killing of street Balinese dog. Before 2008 Bali island has been declared as the island of rabies free. As time goes by, total number of Bali dog declined due to many factors. The fact is in gentle agreement with BAWA (2015) who stated that, in 2008 the dog population was estimated to be approximately 600,000. With the outbreak of rabies and the ensuing mass culling, the number dropped to approximately 150,000 dogs. If numbers continue to drop, the Bali dog will be at risk of extinction. Aside from organised culling, hundreds of dogs'

lives are lost every week to the dog meat trade, acts of cruelty, disease, motor vehicle accidents and basic neglect. The situation is dire and the magnificent animal that is Bali's heritage dog is under threat.

In more depth, the fact is supported by Wikipedia (2012) who clearly reported that, an outbreak of rabies in dogs began in Bali, Indonesia, in November 2008. More than 100 people have died from rabies in Bali since the outbreak began. Human and animal rabies cases were confirmed near popular tourist destinations throughout the island during the outbreak. Efforts have been made to control the outbreak, including vaccinating dogs for rabies. These efforts have substantially reduced the number of cases associated with the outbreak on the island.

Importation of many pedigree dogs are probably the main cause of rabies emerged in this island. According to Winn (2014), importation of cats and dogs has always been against the law in Bali. However, many pedigree dogs were smuggled in the island, for expats and also for Balinese who may consider it as a status symbol. As the expat population increased over the last several years and because of a greater demand for these pedigree dogs, more dogs are being imported in Bali (Charlton, 2015).

Figure 5. Balinese dog of Kintamani.

Figure 6. Street dog killing due to rabies.

Overall, it could be concluded that animal biodiversity of Bali (Bali cattle, Bali starling and Bali dog) are all threatened because of environmental degradation such as, land use change, deforestation and diseases.

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