Food Preference Revisited – The Case of Grasshopper Eaters: Specific Reference in Gunung Kidul

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This article is aimed to add comprehensiveness in food security multi-disciplinary studies by using an international relations approach to address the relation between structure and agents; that is between regime, state, and individual. It proposes the case of Gunung Kidul urging the international community to revisit the term 'food preference' incorporated in the definition of food security in regard to social, cultural, and ethical dimensions. The absence of any guidelines in determining and interpreting 'preference' in defining food security under an international regime complex structure opens debates both in theoretical and practice, which in turn could make it more complex for said regime to achieve its goal: prosperity of human kind.

I. Introduction

The regime of food security came into formalization when the Food and Agriculture Organization of the United Nations (FAO) convened the 1996 World Food Summit in Rome to produce what was later known as the Rome Declaration on World Food Security. Under this declaration, the term 'food security' was agreed to revolve around the following dimensions:

> Food security exists when all people, at all times, have **physical** and **economic** access to **sufficient**, **safe** and **nutritious** food to meet their dietary needs and food **preferences** for an active and healthy life. In this regard, concerted action at **all levels** is required.[1]

Set against the definition above, there are several conditions needed to be met before the status of 'food-secure' can be granted to any given society. The first and foremost condition is the physical availability of the food that could sufficiently meet the demand of the people. The amount of food available should be equivalent to or satisfy the needs of the people. This physical availability is then followed by the economic access to have or possess the food in question. It refers to a condition where the food is available and the people are able to legally own or consume the food should they want to. The third condition is that the food should be safe and contain all the nutrients required by the human body to function or grow properly. In addition to be safe and nutritious, people or a society is considered to be 'food-secure' if they have 'preferences' over other foods that are equally safe and nutritious. This means that people would have other options of different meals which are also available, affordable safe and healthy. As the last condition needed for achieving 'food-security' status is that those elements above have to be all present simultaneously at all times. One cannot claim food security if their situation allows only partial elements or meeting them all but not in a constant manner.

The term 'food preferences' embedded in said prerequisites of food security above is especially intriguing. Preference is something highly subjective and diverse to begin with, and that makes the definition and limit of the concept of food preference particularly challenging. A fairly puzzling scenario in terms

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1 Rome Declaration on World Food Security, Rome, 13-17 November 1996, declared on13 November 1996.

of promulgating food security might occur if the element of food preference is used. This is due to the fact that people or societies' preferences may not have always been in accordance or the same with the preferences of others. Therefore, having more preferences does not automatically categorize people or society as food-secure, and conversely, having fewer preferences does not automatically constitute food insecurity, for a number of factors and variables indeed play roles behind such preferences. Adhering to the Rome Declaration, the term 'food preferences' refers to choices that are made out of 'legit' determinants, which are socially (that is sometimes economy[2] and health in nature), culturally, religiously and ethically acceptable.[3] Departing from this view, people having fewer food preferences can therefore still be deemed food secure if their limitation on food has been based on socially, culturally, religiously and ethically acceptable reasons.

Speaking of food preferences, around the area of Gunung Kidul, Yogyakarta, there are people who are accustomed to enjoy fried grasshoppers locally known as 'walanggoreng'. Classified into insects, fried grasshopper is an unusual culinary choice for most people in Indonesia, but famous as local treat in Gunung Kidul. The landscape of the region which is densely coated with woods without much rainfall has provided the brown grasshoppers (*Valanga nigricornis*) with an ideal breeding ground. It is estimated that millions of grasshoppers inhabited the coastwise area of Gunung Kidul last year. Once an unwanted pest, the grasshoppers have become a popular and most-sought food commodity in Gunung Kidul and its surrounding area.

The case of Gunung Kidul can be a good example of a situation where people have more food preferences. In addition to regular meals most people would normally have, the people of Gunung Kidul enjoy a flagship menu of fried insects. This, of course, is not an ordinary case which begs questions relating to the dimension of food security. It is intriguing to witness a case of food preference that is so different that one might wonder the suitability of this particular phenomenon to a globally-formed and internationally-supported regime of food security. This research is designed to take a closer look at this potential social collation and inquire about the aptness of the eating grasshoppers case towards the concept of food preference tabled by the food security regime. It is expected that the research could provide explanation as to how the case of Gunung Kidul fits in exactly within the dimension of food preference under FAO's food security concept.

II. The Nexus of Food Security and Food Safety within the International Regime.

The concept of food security, which later became an integral dimension of human security, has been developed since the World Food Conference 1974 when it was introduced for the first time. In its early development, the main concern to be addressed by state and international society was limited in the supply of food to meet the national consumption demand.[4] In other words, food security was achieved whenever there was enough food for a country or region at a stable price.[5] In order to respond to this question, a country can produce and or import necessary goods to fulfil aggregate demand at national or regional level. This definition was first revised in 1983 by shifting the subject to the micro level and emphasizing access.[6] This definition was also employed by the Human Development Report in 1994, published by the United Nations Development Program (UNDP), in which food security was included as one of seven dimensions of the new human security approach.[7]

The second chapter of food security development emphasizes three aspects. First, the subject of food

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2 The term of economy here is different from the prerequisite of 'economic access' also laid in the Rome Declaration. Having fewer food preferences is indeed often caused by economic factor like weak purchasing power. Nonetheless, people under this condition could still afford foods or in other words, still having access to foods, though with fewer preferences. Not having economic access on the other hand is a totally different circumstance. Because of their economic condition, people living in this situation cannot afford foods completely, let alone having preferences.

3 Per Pinstrup-Andersen, "Food Security: Definition and Measurement", 1 *Food Security*(2009), pp. 5 *et sqq*., at p. 6.

4 World Food Conference 1974 stated that food security is the 'availability at all times of adequate world food supplies of basic foodstuffs to sustain a steady expansion of food consumption and to offset fluctuations in production and prices' (FAO, 2006).

5 FAO's Agriculture and Development Economics Division, *Food Security*, Issue 2, (FAO Agriculture and Development Economics Division), at p. 1.

6 Ibid.

7 United Nations Development Programme, *Human Development Report*, (Oxford: Oxford University Press 1994), at p. 24.

security changes from the state to the individual. This shift can be understood as a reflection of international political dynamics highlighted by the end of the Cold War. The focus of international politics and security studies shifted from inter-state conflict to intra-state conflict, in which individuals and groups emerged as actors in international arena. Thus, security is not exclusively entitled for the state but widened its coverage to human security, where an individual is free from fear and want. In this sense, fulfilling the human security of every individual in a country will be the guarantee of state security because conflict and insecurity sources come from within the country itself instead of external threats.

Second, it emphasizes individual or household ability to access, underlining the importance of equal distribution for all. The physical notion means it is important to ensure that food supply is available at sufficient quantity at least for basic human body need at any time. On the other hand, the economical notion focuses on the purchasing power of an individual to obtain food, preferably at a stable price. Furthermore, 'access' also embodied the idea of right to food, in which every individual irrespective of gender, ethnicity, political affiliation and economic position is entitled to food, whether by growing it on their own, buying it from the market, or taking advantage of the public food safety net provided by the state.[8]

The last aspect to be considered is food description. Based on the term 'basic need' used in this definition, food security is achieved whenever individuals at minimum are able to consume food sufficient enough to support their daily physical activity. This conception was interpreted as focusing on meeting the necessary daily calorie intake, leading global food policy to aim its programmes at increasing the production of staple foods.

The third chapter in food security development was marked by the World Food Summit in 1996 which agreed to revise the definition and dimension of food security. This multilateral forum agreed on a single perspective to understand food security as a situation when 'all people, at all times, have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life'.[9]An important development achieved in this stage is made in the food description, which not only limited it to basic needs in terms of calories, but also provided an additional description of sanitary, nutrition, and also socio and religious requirements to be categorized as secure. This definition is employed to provide an understanding of food security in the global discussion and policy making process.

Studies conducted by scholars on this theme have long developed and can be classified into two major related topics; the first discusses about policy approach and the second focuses on the agriculture aspect. The academic debate on food security policy approach in recent years is dominated by the debate of food sovereignty as opposed to food sufficiency. The debate advocating food sovereignty emerged in international discussion as concerns about the uncertainty in the global system rose following the global food and financial crisis in the first decade of the 21st Century. Different levels of national resilience affect the ability of governments to assure the fulfilment of food security for their citizens; the most vulnerable are those who depend too much on the international food market.

In promoting food sovereignty, a state should be independent in producing its own food, not only for the quantity but also on how and what to produce in respect with local biodiversity and socio-cultural preferences.[10] Opposition to the WTO approach in achieving food security through liberalization is also voiced in line with the promotion of food sovereignty, especially for developing countries, in which the WTO's Agreement on Agriculture (AoA) is criticized as it undermines the role of small-scale producers in the food trade supply chain.[11] In relation to food sovereignty, the notion of biodiversity is also raised as a topic of discussion to oppose global food homogenization through global standardization of food supply production, resulting in loss of crop species diversity at global level.[12] Demand to revisit WFS 1996 food security terminology has also been

8 Ibid.

9 FAO's Agriculture and Development Economics Division, *Food Security*, Issue 2, (FAO Agriculture and Development Economics Division), at p. 1.

10 Peter Rosset, "Food Sovereignty and Alternative Paradigms to Confront Land Grabbing and the Food and Climate Crises", 54 *Development* (2011), p. 21.

11 Kim Burnett and Sophia Murphy, "What place for international trade in food sovereignty?", 41 *The Journal of Peasant Studies* (2014), p. 1065.

12 T.C.H. Sunderland, "Food security: why is biodiversity important?", 13 *The International Forestry Reviews* (2011), pp. 265 *et sqq.*, at p. 267.

raised in the debate as scientists propose 'food and nutrition security' to emphasize the quality aspect of food security as an integral dimension of food security.[13]

In line with academic efforts to support the notions of food sovereignty and biodiversity, there have been developments in the literature in promoting alternative food sources in respect to indigenous or local food sources, including insects as a high protein micro-nutrient source. Debates on the position held by insects in food security were raised by Yen (2015, 2016) by challenging the conception of 'traditional food' by emphasizing the linkage between tradition and historic-culture. Yen proposed that insects such as crickets and grasshoppers have been regarded as traditional food in several countries in the Asia Pacific region, though that idea is still debatable in other societies. In accordance with Yen, Payne et al. (2016) argues that the idea of insects as food, in spite of limited scientific results supporting it, is still strongly attached to cultural values. Because of this reason, it is difficult to promote insects as a food resource in the European community and thus will require a change in legislation to encourage customer acceptance. Beside the question about the cultural aspect raised by Payne et al., Gjerris et al. (2015) tries to analyse the issue from an ethical perspective in respect to environmental impact, human and animal health, human preference and social acceptability, animal welfare and other animal ethics issues.

III. Grasshoppers/Insects For Food

1. History of Entomophagy

Entomophagy is described as a practice of eating insects. Borrowing words from FAO Forestry Paper (2013), it is reported that over the past decades, the practice of farming and processing insects as feed and food has been absent from agricultural innovations, due to its unconventional character.[14] However, in the past few years, there has been a significant amount of work done by international organizations, institutions and universities to research about developing insects as feed and food.[15]

According to McGrew WC and Sutton MQ in (Itterbeeck and Van Huis, 2012), entomophagy is an ancient habit, which is backed up by archaeological evidence and excavation with ethnographic studies of indigenous people.[16] Further, Harris (1985) in Tabassum-Abassi, Abbasi, and Abbasi (2017) stated that entomophagy has also been a part of many cultures, such as the Greeks and Romans.[17] In recent years, entomophagy has risen especially due to FAO's position regarding this issue. FAO started promoting the idea of including edible insects as a global food source in 2003. In doing so, FAO did the following things: 1) created publications, expert meetings, and a web portal on edible insects; 2) promoted edible insects as a food source through media (newspaper, TV); 3) established multidisciplinary interactions (stakeholders working with nutrition, feed and legislations-related issues; and 4) supported member countries by doing field projects.[18]

Within 2013 and 2014, there were two milestones regarding the global promotion of insects as food and feed by FAO. First, in 2013, FAO collaborated with the Laboratory of Entomology at Wageningen University in the Netherlands, releasing a book about the contribution of insects to the ecosystem, diets, food security and livelihoods across the world.[19] Second, in 2014, FAO and Wageningen University arranged the first international conference about insects as food that was attended by actors with multidisciplinary approaches, such as animal scientists, food entrepreneurs, medical scientists, psychologists, insect breeders, EU officials, and various food authorities.[20] Based on the aforementioned things, it is safe to say that FAO, as an international regime, has played a

13 Marzella Wüstefeld, "Food and Nutrition Security", presentation held at UNSCN Meeting of the Minds Nutrition impacts of food systems, Geneva, 25-28 March 2013.

14 Arnold van Huis, Joost Van Itterbeeck, Harmke Klunder, et al, *Edible Insects future prospect for food and feed security,* (Rome: FAO Publication 2013), at p. 1.

15 Segenet Kelemu, "Insects: an overlooked food source", 35 *International Journal of Tropical Insect Science* 2015, pp. 1 *et sqq.,* at p. 1-2.

16 Joost V. Itterbeeck., Arnold van Huis., "Environmental manipulation for edible insect procurement: a historicalperspective", 8 *Journal of Ethnobiology and Ethnomedicine* 2012.

17 Tabassum-Abbasi, Tasneem Abbasi, S.A Abbasi., 'Reducing the environmental impact on livestock production: the minilivestock option', 112 *Journal of Cleaner Production* 2016, p.1754-1766.

18 Food and Agriculture Organization of the United Nations, Insects for food and feed, available on the internet at <http://www.fao.org/edible-insects/en/>, (last accessed on 09 October 2017).

19 Arnold van Huis, Joost Van Itterbeeck, Harmke Klunder, et al, *Edible Insects, supra* note 14 at p. 3.

20 Anna Jansson and Åsa Berggren., *Insects as Food: Something for the Future?*, (Uppsala: Swedish University of Agricultural Sciences, 2015), at p. 10.

major role in promoting the idea of insects for food and feed in today's globalized world.

2. The Debate of Insects for Food

a. The Ethical Debate on Eating Insects

BBC posits that ethics is a system of moral principles, which can be derived from culture, religions and philosophies. In addition, BBC explains that ethics affects the way people make decisions and lead their lives, hence ethics is an important part of human life.[21] In relation to the ethical debate on eating insects, Waltner-Toews and Houle stated that Jeffrey Lockwood, did some work about human and insect relationship.[22] Based on his work, it is known that there are at least two reasons why insects deserve our moral consideration. First, insects are capable of suffering (this statement is backed up by empirical evidence stating that insects can feel pain and suffer). Second, he stated that 'insects as conscious beings have future (even if immediate) plans with regard to their own lives, and the death of insects frustrate these plans'.[23]

Apart from the scientific-related fact about the ethics of eating insects, the practice of eating insects was mentioned in some religions. Those are Christian and Islam. In the Bible, specifically in the book of Leviticus, locusts with reference to the desert locust were deemed as food.[24] Furthermore, in Islam, there is a hadith stating that 'it is permissible to eat locust' (Shahih Muslim 21.4801).[25] In regard to FAO's position about the ethical issue of the edible insects, this study believe that FAO has given a significant amount of moral consideration towards these insects. This can be seen in FAO's continuous efforts to research about the edible insects themselves, including the possibility to farm insects. These efforts prove that, in promoting insects as food and feed, FAO has also taken into account many factors to ensure the sustainability of these insects.

Another thing that affects ethics is culture. Mela (1999), in FAO (2013), mentioned that 'culture, under the influence of environment, history, community structure, human endeavour, mobility and politico-economic system define the rules on what is edible and what is not'. The aforementioned definition could explain Western countries' perspective of the practice of eating insects. DeFoliart (1999) in FAO Forestry Paper (2013) explained a few things that may have influenced it. First, the domestication of plants and animals, leading to the modernization of the agriculture world, which enabled the food supply to be more stable, partly because of storage. Moreover the crucial change of food production, combined with the uncertain availability of insects (since they are seasonal) is possibly one of the reasons why there was a decreasing interest in insects as food.[26]

Second, people in most Western countries associate the practice of eating insects with primitive behaviour.[27] Moreover, they also view entomophagy with the feeling of disgust (Rozin and Fallon, 1987 in FAO 2013).[28] Borrowing words from Fessler & Navarette (2003) in FAO (2013), disgust then leads people to form a basis of moral judgement, and plays a major role in people's rejection. However, there is a possibility that Western people's views of entomophagy might change. In his work *Why we still don't eat insects: Assessing entomophagy promotion through a diffusion of innovations framework*, Matan Shelomi (2015) stated the belief that insects are only food for the poor or primitive (Looy et al 2014 in Shelomi 2015).[29] He said that this view can change, and he took an example of lobster which was deemed as unworthy but now is seen as an expensive dish.[30]

Furthermore, there have been attempts by researchers pertaining to the Western people's view of entomophagy. In *Could new information influence attitudes to foods supplemented with edible insects?*, conducted in Belgium, Barsics et al. (2017) suggest that consumers perception of insects-based products

21 BBC, "Ethics: a general introduction", 2014, available on the internet at <http://www.bbc.co.uk/ethics/introduction/intro_1.shtml>, (last accessed on 14 October 2017).

22 David Waltner-Toews and Karen Houle, "Biophilia on the Dinner Plate: a Conversation about Ethics and Entomophagy", 1 *Food Ethics* (2017), pp. 157 et sqq., at p. 161.

23 Ibid, p. 161.

24 Arnold van Huis, Joost Van Itterbeeck, Harmke Klunder, et al, *Edible Insects, supra* note 14 at p. 40.

25 Ibid.

26 Arnold van Huis, Joost Van Itterbeeck, Harmke Klunder, et al, *Edible Insects, supra* note 14 at p. 35.

27 Ibid.

28 Ibid, p. 34.

29 Matan Shelomi., 'Why we still don't eat insects: Assessing entomophagy promotion through a diffusion of innovations framework', 45 *Science Direct: Trends in Food Science and Technology*, pp. 311*et sqq.,* at p. 313.

30 Ibid.

could change due to information that they receive about it. Therefore, such perception could be used by food industry to develop strategy of product communication to target consumers.[31] The movement to familiarize entomophagy to the Western countries is also done by businessman. In 2012, Patrick Crowley was the first to launch Chapul, a cricket protein bar in the U.S.[32] By the end of 2014, Chapul successfully earned almost $400.000 from sales, food co-ops, and at Central Market, a gourmet chain.[33]

On the other side of the world, the practice of eating edible insects has been more acceptable, specifically in some countries in South East Asia, such as Laos and Indonesia. In Laos, it is a common thing to collect insects and use them for home consumption or sale, in which this practice is mainly backed up by their traditional knowledge, beliefs, and experiences.[34] In order to support and improve this practice into a more sustainable one, FAO conducted a field project with the aim to introduce the farming of insects, document the knowledge and practices of edible insects in Laos, and develop a sustainable practice of harvesting insects from their natural habitat.[35]

In Indonesia, entomophagy has been done by some groups of people in at least two regions. First, in the eastern part of Indonesia, the Kamoro tribe who reside in Papua Province are used to consume the caterpillar which is usually harvested from the Sago Tree.[36] Second, related to this research, people in the district of Gunung Kidul have consumed *brown grasshopper*, either for home consumption or sale. However, the availability of grasshoppers depends on the season. For example, in the wet season, the grasshoppers are easier to be harvested than in the dry season, when they are more expensive.[37] As for the way people in Gunung Kidul harvest the grasshoppers, they rely on their experience and use conventional equipment, that is, a butterfly net.[38]

b. The Health Aspect of Insects/Grasshoppers

Speaking of consuming insects, we cannot overlook the health aspect of it. Many questions are raised regarding the safety of eating insects. Rumpold & Schlüter (2012) mentioned that edible insects (depending on the species) contain nutrients, high fat, protein, and minerals. As previously mentioned, the nutrients contained in insects vary, depending on the species. For example, consuming 100g of caterpillars provide 76% of the daily required protein.[39]

With regard to grasshoppers, to start off, 13% of the most commonly consumed insects globally is Orthoptera which consists of grasshoppers, locusts and crickets.[40] Pertaining to its cleanliness, grasshopper is deemed as one of the cleanest animals due to its clean eating habits.[41] In addition, a 100 g serving of fried grasshopper contain 61.1g of protein, whereas a portion of beef with the same serving amount only contains 22.3g of protein.[42]

Furthermore, Ssepuuya, Mukisa and Nakimbugwe (2016) reported that *Ruspolianitidula*, a species of grasshopper found in Uganda, is very nutritious, with 36-40% of daily protein value. This type of grasshopper has not been uncommon for the Ugandan people, as they, and other East African tribes, consume *nsenene* (*Ruspolia nitidula*) as their delicacy.[43]

31 Fanny Barsics, Rudy Caparros Megido, Yves Brostaux, *et al*'Could new information influence attitudes to foods supplemented with edible insects?',Vol. 119 Issue: 9 *British Food Journal*,pp.2027*et sqq.,* at p. 2027

32 Brooke Borel., 'The Rise of The Incredible Edible Insect', *Popular Science*, 2015 May, pp 44 *et sqq.,* at p. 47

33 Ibid.

34 Yupa Hanboonsong and Patrick B. Durst, *Edible insects in Lao PDR: building on tradition to enhance food* security, (Bangkok: FAO Publication 2014), at p. 1.

35 Ibid, *p. 2.*

36 Ramadhanny, F., "Makan Ulat Sagu, Biarkan Lumer di Mulutmu", 2013, available on the internet at <https://travel.detik.com/destination/d-2205150/makan-ulat-sagu-biarkan-lumer-di-mulutmu>, (last accessed on 19 January 2018).

37 Hamim Thohari., 'Belalang Goreng ala Gunungkidul, Gurihnya Mirip Udang Goreng...', 17 August 2015, in *Kompas*, available on the internet at: http://travel.kompas.com/read/2015/08/17/103100127/Belalang.Goreng.ala.Gunungkidul.Gurihnya.Mirip.Udang.Goreng, (last accessed on 09 October 2017).

38 Suryanto, Asita DK, "Pernah Coba Belalang Goreng? Rasanya Gurih...", 2012, available on the internet at: <http://regional.kompas.com/read/2012/09/12/07342849/twitter.com>, (last accessed on 15 October 2017).

39 Birgit A. Rumpold, Oliver K. Schülter., 'Potential and Challenges of Insects as an innovative source for food and feed production', 17 *ScienceDirect: Innovative Food Science and Emerging Food Technologies*, 2013 p.1 *et sqq.,* at p. 1 and 5.

40 Arnold van Huis, Joost Van Itterbeeck, Harmke Klunder, et al, *Edible Insects, supra* note 14 at p. xiii.

41 M. Premalantha, Tasneem Abbasi., Tabassum Abbasi., *et al*, "Energy-efficient food production to reduce global warming and ecodegradation: The use of edible insects", 15 *Elsevier: Renewable and Sustainable Energy Review* 2011, pp. 4357 *et sqq.,* at p. 4358.

42 Ibid, *p. 4359.*

43 Geoffrey Ssepuuya., Ivan M. Mukisa., Dorothy Nakimbugwe, 'Nutritional composition, quality, and shelf stability of processed Ruspolia nitidula (edible grasshoppers)', 5 *Food Science and Nutrition* 2016, pp. 103*et sqq.,* at p.103.

Another type of grasshopper, the one that can be found in Mexico named *Sphenarium purpuracens Ch,* also contains a high amount of protein.[44]

Despite abundant studies stating the high amount of protein in grasshopper, or insects in general, Cianferoni and Spergel (2009) in Tabassum-Abbasi, et al. (2016) mentioned 90% of allergic reactions in humans are also caused by widely consumed products, such as milk, peanuts, walnuts, eggs, and fish, particularly cod and bass.[45] In regard to the type of grasshopper in this research, Gemala Anjani, SP, M.Si, PhD, a professor from Nutrient Science Major in Diponegoro University, suggested that there should be more laboratory tests to find out specifically about the content of nutrients in the brown grasshopper (*Valanga nigricornis*), and other substances inside it, such as toxins or allergens (if any). This is an essential part to ensure the safety of eating brown grasshoppers.

c. The Environmental Aspect of Insects/Grasshoppers

As for the environmental aspect, van Huis (2013) in Tan, Berg and Stieger (2016) proposed the idea that insects can substitute meat, with some advantage since they have short life cycle, low space requirements, nutritious, and lower greenhouse gas production.[46] Nevertheless, Rumpold & Schlüter (2013) stated that the environmental aspect regarding the possible impact of insects mass breeding has to be evaluated, and unfortunately, currently there is not much data about it.[47] However, insects are one of the species that help to improve the fertility of soil through waste bioconversion.[48]

A study conducted by Ramos-Elroduy (2006) revealed that there was a case of edible insects overexploitation in Tulancalco, Mexico. The threatened species were *escamoles, gusanosblanco y rojodel agave*, the *botija*, the *xamues*, the *ahuahutle* and *axayacatl*, the *vinitos* and the *avispa negra.* One of the examples of the overexploitation was the case of the *escamoles*. Ramos-Elroduy (2006) explained that the gatherers who did not have sufficient knowledge to catch *escamoles*in a sustainable way usually would collect abundant of *escamoles*, and they would not take into account the condition of the nest in the process. This activity caused *escamoles* to decrease their productivity.[49]

In regard to the brown grasshopper in this research, in July 2017, Sukir (one of the fried grasshoppers sellers) stated that there has been some difficulties in harvesting those grasshoppers in Gunung Kidul, hence, he had to buy from surrounding cities such as Kulonprogo, Cilacap, and Kebumen.[50] Although the cause of the decrease in brown grasshoppers in Gunung Kidul is yet to be known, we believe that it is important to teach the gatherer and all the involved stakeholders to harvest in a sustainable way, so as not to have a negative impact on the ecosystem. In conclusion, insects are creatures that can help to improve the quality of the environment, such as soil fertility.

IV. The Aptness of Eating Grasshoppers versus the Variables of Food Preference of FAO's Food Security Regime

In this research, there are some points that should be considered when determining whether the case of eating grasshoppers in Gunung Kidul has complied with the variables of food preference of the FAO's regime of food security. In the introduction, we explained three main points to answer the aforementioned question. Those are: first, the social aspect of this case (social acceptability and the economic standpoint); second, the ethical value comprises health and environmental aspect. In the following paragraphs, we would like to elaborate the first point relating to this case, followed by the

44 Virginia Melo, Maritza Garcia, Horacio Sandoval, *et al*, "Quality proteins available on the internet at edible indigenous insect food of Latin America and Asia", 23 *Emir. J. Food Agric* 2011, pp. 283 *et sqq.,* at p. 283.

45 Tabassum-Abbasi, Abbasi, Abbasi, *Reducing the environmental impact, supra* note 17 at p. 1761.

46 Hui Shan Grace Tan, Eva van den Berg, and Markus Stieger, "The influence of product preparation, familiarity and individual traits on the consumer acceptance of insects as food", 52 *Food Quality and Preference* (2016), pp. 222.

47 Rumpold and Schülter, *Potential and Challenges of Insects*, *supra* note 39 at p.8.

48 Arnold van Huis, Joost Van Itterbeeck, Harmke Klunder, et al, *Edible Insects, supra* note 14 at p. xiii.

49 Ramos-Elroduy, J, 'Threatened edible insect in Hidalgo, Mexico and some measures to preserve them', 2:51 *Journal of Ethnobiology and Ethnomedicine*2006, pp.1 *et sqq.,* at p.3.

50 Usman Hadi., 2017, 'Ke Gunungkidul, Ayo Coba Belalang Goreng' in detiknews, available on the internet at <https://news.detik.com/berita-jawa-tengah/d-3545141/ke-gunungkidul-ayo-coba-belalang-goreng>, (last accessed on 09 October 2017).

second point. In the end, we would elaborate the compliance of the case of eating grasshoppers with the variables of food preference, and its contribution towards food security.

1. The Social Dimension and Acceptance of Consuming Grasshoppers in Gunung Kidul and Surroundings

In regard to the social aspect, this research highlights two main things, which are the social aspect that is constituted by economic standpoint and the acceptance of eating grasshoppers by people who live in Gunung Kidul. In relation to the economic standpoint, the popularity of grasshoppers has contributed positively to the tourism aspect of Gunung Kidul, which is shown by Gunung Kidul natives who are involved in the business of selling fried grasshoppers as a local delicacy. Furthermore, in Gunung Kidul, the fried grasshoppers are mainly sold in the street food stalls, mostly found alongside the streets of Wonosari, and the specialty shops in almost all areas of Gunung Kidul.

Testimonies from small fried grasshoppers retailers show positive trend in demand, especially in holiday season when tourist visit in Gunung Kidul increase. In the following year, Tribun Jogja, on July 2 2017, reported that one of the fried grasshoppers' sellers, Sukir, noticed the increasing of demand. On a daily basis, he usually sold 2kg of grasshoppers, while during the holiday season he sold 4-5kg of grasshoppers.[51] Karjiyem, who has a fried grasshopper food stall in Wonosari Street, stated that, during holiday season, she could sell 2kg of grasshoppers, equal to 14 jars of fried grasshoppers.[52] At the end of 2017, with the increasing number of tourists who visited Wonosari, Sukir could sell 5-6kg of fried grasshoppers.[53] Besides, in early 2018, which was still a holiday season, Sukir happily told iNews Yogya that he could sell up to 80kg jars.[54] Other testimony from local medium retailer support the positive trends where product's distribution expand into local gift shops once the product acquired a certificate of health *PanganIndustriRumahTangga* (PIRT)[55] from the Ministry of Health Indonesia.[56]

Not only do tourists buy fried grasshoppers from Gunung Kidul, nowadays people can also buy them online. There are at least 20 fried grasshopper sellers from Gunung Kidul who sell their products online in some prominent marketplaces, such as Tokopedia, Bukalapak, and Shopee. All things considered, this study found that the practice of consuming grasshoppers is suitable with the social dimension, that is constituted by the economic standpoint. This is shown by the natives who rely on selling fried grasshoppers as their main source of income. Hence, it is safe to say that the practice of consuming grasshoppers in Gunung Kidul has contributed positively to the livelihood of the natives in that area, as it generates new jobs and opportunities for the natives. The evidence of economic improvement can be seen from their ability to brand fried grasshoppers as their local delicacy, which resulted in the high demand of fried grasshoppers by tourists from other cities, who came directly to Gunung Kidul or people who buy them online.

On the one hand, there is one more social aspect to be examined, that is the social acceptance of consuming grasshoppers by people who live in the Gunung Kidul and surrounding region. As mentioned earlier, at first, the natives in Gunung Kidul only consumed grasshoppers as their additional meal. Later, people started to sell them and the business of fried grasshoppers started to grow.

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51 Tribun Jogja, "Pernah Lihat Belalang Digoreng? Coba 'Walang Goreng Dadakan'", 02 July 2017, available on the internet at: <http://jogja.tribunnews.com/2017/07/02/pernah-lihat-belalang-digoreng-coba-walang-digoreng-dadakan>, (last accessed on 01 February 2018).

52 Ade Lestarini, "Gurihnya Walang Goreng di Wonosari, Berani Coba?", 24 September 2017, available on the internet at:<http://m.metrotvnews.com/rona/wisata-kuliner/nbw1gdJK-gurihnya-walang-goreng-di-wonosari-berani-coba>, (last accessed on 01 February 2018).

53 Tris Jumali, "Akhir Tahun, Belalang Goreng Gunungkidul Laris Manis", 18 December 2017, available on the internet at: <http://jogja.tribunnews.com/2017/12/18/akhir-tahun-belalang-goreng-gunungkidul-laris-manis?page=all>, (last accessed on 01 February 2018).

54 Kismaya Wibowo, "Belalang Goreng Gunungkidul Diburu Wisatawan", 03 January 2018, available on the internet at: <http://www.inews.id/daerah/yogya/belalang-goreng-gunungkidul-diburu-wisatawan>, (last accessed on 01 February 2018).

55 The certificate of *PanganIndustriRumahTangga* (Homemade Food Industry) is given to a small food company that runs its business at home with the equipment to process the product manually or semi-automatically. For further information about PIRT certificate, please read the Regulation Regarding the Certificate of Homemade Food Industry *(PeraturanKepalaBadanPengawasObatdanMakananTentangPedomanPemberianSertifikatProduksiPanganIndustriRumahTangga)*.

56 Tribun Jogja, "Omzet Walang Goreng Pak Gareng 20 Kilogram Per Hari", 10 February 2011, available on the internet at: <http://jogja.tribunnews.com/2011/02/10/omzet-walang-goreng-pak-gareng-20-kilogram-per-hari>, (last accessed on 19 January 2018).

All things considered, we argue that the practice of consuming grasshoppers is socially accepted by people who live in Gunung Kidul and its surrounding area. Coupled with the fact that natives in Gunung Kidul have been consuming grasshoppers for many years, the growing number of natives who work as grasshoppers sellers also paint their interest to use grasshoppers to support their livelihood. As for the acceptance by the people who live in the surrounding regions, we believe that there has not been much objection against the practice of consuming grasshoppers. Obviously, for some people outside Gunung Kidul who have never consumed grasshoppers, they felt a bit hesitant at first. However, the high demand for fried grasshoppers in Gunung Kidul proves that people in the surrounding regions are also compelled to choose grasshoppers as their food preference.

2. The Ethical Value of Consuming Grasshoppers Comprises Environmental and Health Aspect

In the previous parts, we have covered the ethical debate on consuming insects in general. Lockwood in Waltner-Toews and Houle (2017) argued that there are two main reasons as to why insects should be given our moral consideration, including first, empirical evidence showing that insects can feel pain and suffer and, second, the fact that 'insects as conscious beings have future (even if immediate) plans with regard to their own lives, and the death of insects frustrate these plans' (Lockwood, *n.d.* in Walter-Toews and Houle (2017)). As indicated above, it is clear that insects are conscious beings and can feel pain as well. Thus, in this research we would try to elaborate the ethical value while considering the environmental and health aspects.

In regard to the environmental aspect, we have discovered that in the past two years, there have been some complaints from the sellers of fried grasshoppers regarding the difficulty to catch grasshoppers in the area of Gunung Kidul. This argument is being propped up by the following statements from the sellers themselves, as follows: Ngademi, a fried grasshopper's seller from Wonosari stated that most of the raw grasshoppers that he cooked were bought from Klaten, a city located 42km away from Gunung Kidul.[57] Likewise, Wisnu, the owner of one of the most popular fried grasshoppers' brands *'Pak Gareng'* explained that the stock of raw grasshoppers in Gunung Kidul is no longer enough to fulfil the high demand from consumers, which caused him to buy raw grasshoppers from its surrounding regions, such as Purworejo, Kebumen and Cilacap.[58]

As shown above, the statements from those sellers indicate a shortage of raw grasshoppers in Gunung Kidul. Although the cause of the decrease in brown grasshoppers in Gunung Kidul is yet to be known, this study suggest that as the business of fried grasshopper grows, the stakeholders who are involved in it should take some things into account: first, for the gatherers of raw grasshoppers, they need to develop a technique to catch grasshoppers in a sustainable way that will not harm the ecosystem. In order to do that, the environmental department in Gunung Kidul should pay more attention to the practice of gathering grasshoppers. For this reason, they can communicate and teach the gatherers to catch grasshoppers in their natural habitat sustainably and ensure them the importance of the sustainable practice of catching/gathering grasshoppers to prolong the business of grasshoppers itself. The aspect of sustainability is important, as there are many natives who make a living in the industry of fried grasshoppers.

In terms of the health aspect, a laboratory[59] test has been conducted concerning the amount protein and fat inside of the fried grasshoppers that are sold in Gunung Kidul. The result showed that there are 1,21g of protein in 100g of fried grasshoppers. Additionally, there are 52,1g of fats in 100g of fried grasshoppers.[60] Based on the result, it is found that the protein amount in the grasshopper is not significant. That being said, Gemala Anjani, SP, M.Si, PhD,

57 Esti Utami, "Belalang Goreng Khas Gunung Kidul Tembus Mancanegara", available on the internet at: <https://www.suara.com/lifestyle/2016/07/26/073700/belalang-goreng-khas-gunung-kidul-tembus-mancanegara>, (last accessed on 19 January 2018).

58 Go To Gunungkidul, "Pak Gareng" Pelopor Oleh Oleh Belalang Goreng Dalam Toples", 06/01/2017, available on the internet at: <http://gotogunungkidul.com/2017/01/pak-gareng-pelopor-oleh-oleh-belalang-goreng-dalam-toples/>, (last accessed on 12 January 2018).

59 The laboratory test was conducted at The Integrated Laboratory of Universitas Diponegoro, on Jalan Prof. Soedharto, Tembalang, Kota Semarang, Jawa Tengah.

60 This study used a type of brand of fried grasshopper as a sample. The result of the content of Gunung Kidul's fried grasshoppers may vary, depending on the processing and cooking technique, as well as the ingredients.

stated that we shall pay close attention to the natural resources around us, that might contain nutrients which can be good for our health, for instance, insects.[61]

In addition, similar to the environmental aspect, in this case The Agency of Drug and Food Control in Yogyakarta (The Agency), have to start to supervise the industry of insects as food, be it home industry or company. It is addressed to provide insects as food that is nutritious for people who are interested in consuming insects. The supervision from The Agency might potentially boost consumer acceptance towards edible insects because the guarantee of health and food safety in grasshoppers-based products.

V. Conclusion

In the matter of food preference, this study argues that edible insects, one of them being grasshoppers, are quite suitable with the concept of food preference tabled by the food security regime. This statement is being propped up by the following evidence: first, regarding the social aspect, the natives of Gunung Kidul have consumed the grasshoppers for many years, and in the past six years, the business of fried grasshoppers in Gunung Kidul has started to grow, which resulted in people having new jobs as producers, distributors, and sellers of raw and fried grasshoppers. To put it another way, the people in Gunung Kidul have accepted the practice of consuming grasshoppers, and edible insects, in this case grasshoppers, have also been ethically acceptable to the natives in Gunung Kidul, as it is something that has been passed over generations, and has evolved in the community for a long period of time.

Second, in relation to the health and environmental aspect, this study found that there should be more attention given by the local government to the industry of fried grasshoppers, including the practice of consuming grasshoppers. The health and environmental aspect is important because it is related to the sustainability of the grasshopper, which also affects the sustainability of the industry of fried grasshoppers. However, according to this study, there has not been any significant harm to the environment or to human health as the result of consuming grasshoppers. Thus, on the whole, we still deem the social, health, and environmental aspects of the practice of eating grasshoppers in Gunung Kidul suitable to the concept of food preference tabled by the food security regime.

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61 As previously stated, in regard of the type of grasshopper in this research, GemalaAnjani, a professor from Nutrient Science Major in Diponegoro University suggested that there should be more laboratory tests to find out specifically about the content of nutrients in the brown grasshopper (*Valanga nigricornis*), and other substances inside it, such as toxins or allergens (if any).