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The Challenge and Opportunity in the Implementation of Environmental Field Assessment Study to Encourage Behavior Change for Protecting the Environment

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ABSTRACT
Besides the economic growth, development activities often produced unexpected negative impacts on decreasing the quality of life, health problems, and environmental damage, including land degradation, soil erosion, air, and water as well as soil pollution. In general, environmental damage occurred caused directly or indirectly by humans (anthropogenic). The role of higher education was very important, not only encouraged students to protect their environment, but also to spread environmental knowledge for their families, communities, and contribute to enabling a sustainable global environment and society to protect the earth. A university as a higher education institution has a very important role in providing environmental education, research, and outreach program. Data used in this study was taken with the purposive sampling of non-probability sampling technique through environmental field assessment study. This paper discussed an assessment of the environment in the field to understand the challenge and opportunity to better implementation of assessment and behavior change in protecting the environment. The field assessments were taken place in Kabupaten Cianjur and Kabupaten Bogor of West Java in the year 2017 and 2018.

Keywords: *Higher education, Environmental field assessment, Stakeholder analysis, Behavior change*

1. INTRODUCTION

The world's population continues to grow, from an estimated 7.7 billion people worldwide in 2019, the medium-variant projection indicates that the global population could grow to around 8.5 billion in 2030, 9.7 billion in 2050, and 10.9 billion in 2100. More than half of the projected increase in the global population up to 2050 will be concentrated in just nine countries: The Democratic Republic of the Congo, Egypt, Ethiopia, India, Indonesia, Nigeria, Pakistan, the United Republic of Tanzania, and the United States of America [1]. Rapid population growth continues to be a matter of concern for the city as it has manifold effects, one of the most important being environmental degradation [2].

The population growth rate in developing countries affects sustainable development negatively, the population growth rate in developed countries affects sustainable development positively [3]. In the 1980s the World Commission on Environment and Development published a report entitled "Our Common Future" which links the issue of poverty with natural resource and environmental management [4]. Good environmental management contributes positively to the achievement of the Sustainable Development Goal (SDG), which balances economic development supported by quality human resources, with environmental protection.

As the country's economy grows, technology advances, and the population increase, the pressure on natural resources and the environment also increases. Anthropo-pressure results in significant environmental degradation in various parts of the world. The environmental changes are permanent and negatively affect large areas [5].

To carry out good environmental management, knowledge is needed regarding the population and the

environment. Knowledge can be obtained through formal education, from basic education, secondary education to higher education, as well as from informal education such as education obtained from family and society, as well as those obtained from training. Education plays a very important role in fostering caring and empathy in managing a better environment. Families shape attitudes, and the role of family members contributes positively to community life. One informal education that is widely used by farmers in Indonesia is a field school. The approach of the Farmer Field School (FFS) was developed by UNFAO and its partners almost 25 years ago in Southeast Asia.

Population and environmental education are expected to encourage changes in attitudes and behaviors in controlling and spreading rational and responsible populations. Changes in environmentally friendly attitudes and behavior are the keys to success for the implementation of natural resource and environmental management. There were some theories include; primitive models (behavioral change model, environmentally responsible behavior model, reasoned/ responsible action theory), planned behavior theory, environmental citizenship model, the model of human interaction with the environment, the value-belief-norm theory of environmentalism, health belief theory and diffusion of innovation model, and there were none of these theories can independently entirely explain human-environment interaction, but a combination of these theories will undoubtedly provide further insights and possible solutions to the increasing 21st-century environmental problems posed by humans and technology [6]. There is a belief that higher education is considered to be the best place to start environmentally friendly activities, because, at the same time, it can teach principles of understanding and management [7].

This study was taken place as part of the population and environmental fieldwork where the university student of Indraprasta University did their assessment in practicing their study on the population and environment in the class, as part of their exercise to more understand the environmental portrait and environmental education and knowledge. Good environmental management should be supported by better knowledge of population and environment, and education provides a useful contribution to this knowledge.

Data in the field regarding population and the environment is the actual information that occurs at the community level or portrait about the current state of population and environment in the field. Information about the current portrait of population and environmental conditions can be done by "photographing" practice in the field, carrying out field assessments (transects) in the focus areas of the observation.

The purpose of this paper is to understand the challenges and opportunities of the implementation of environmental field assessment and how this can encourage the change of people's behavior facing the current situation of environmental problems on the ground.

2. METHOD

2.1. Research Areas and Data Collection

To understand the real situation in the ground and how the field assessment might be better undertake then research areas are identified for data collection. Research areas were selected using purposive sampling of a non-probability sampling technique where the researchers went to the community villages on purpose to collect information in the ground, and discuss with people met during the observation.

Research areas selected were *Pasir Buncir* Village of *Bogor* District, *Cimacan* Village of *Cianjur* District, and *Pancawati/Ciherang Pondok* Villages of *Bogor* District, West Java. Data was taken through the implementation of transect where all data was assessed and collected along the path where the group of observers walking through. During the transect all information found and interviews made with the people met in the field were recorded.

2.2. Data Analysis

Data collected during the observation then mapped and analyzed, including a portrait of natural resource and environment, trend analysis of environmental management, institution analysis of environmental management, analysis of capital at the community level, behavior change in environmental management, challenges, and opportunity found.

3. RESULT AND DISCUSSION

3.1. Portrait of Natural Resource and Environment

The field assessment was made at three sites, namely *Pasir Buncir* Village, *Cimacan* Village, and *Pancawati/Ciherang Pondok*. The factual situation found during field assessment can be seen in Table I.

Table 1 Portrait of Issues Found in the field

Field Assessment	Village		
	Pasir Buncir	***Cimacan***	***Pancawati/ Ciherang Pondok***
Land Conservation	• private sector owners • community landowners • community sand mining (now closed) due to landslide • land conservation by government	• conservation forest adjacent to community lands • collaborative management to support conservation forest	• biodiversity park made by the company with various tree species
Waste	• household wasted • Wasted at home yard burnt	• household waste not managed • waste management	• good community awareness • inadequate clean water

Field Assessment	Village		
	Pasir Buncir	***Cimacan***	***Pancawati/ Ciherang Pondok***
	• waste not yet well managed	at housing estate	• company support on the community's clean water
Critical Lands	• lands not well managed by owners	• the pressure to lands due to economic/ development • community less access to lands	• conservation on critical land (e.g. *rorak*, *biopori*, well, dig well, fish pond)
Landowner/ Social Economy	• adat land "*girik*" not a legal certification • tree species planted, e.g. albizia, rubber, banana, and paddy rice	• changes from production to conservation forest • horticulture farmers, husbandry farms • Seasoning traders	• puppet home industry • candied nutmeg • home "food" industries
Ecotourism	• tourism destination (e.g. waterfall, rafting, camping ground, rock climbing, tree estate • difficult access to the destinations	• rock climbing tourism	• teak plantation tourism
Watershed/water management	• river water good • the river used for household, agriculture, rafting, and golf course • rich vegetation along the river	• access to the water is good • Community manage golden fish pound	• water river with little waste • water river used for agriculture • water quality low due to soil erosion, household waste, and waste from industry, mining, and agriculture

Table 1 shown the conservation of land was very much dependent on landowners, the more access to the land was the more intervention can be given to conserving the lands. Unfortunately, conservation of private land, especially agricultural land, is urgent yet challenging because of the diverse priorities of landowners [8]. The conservation lands in the government lands were better than the private and community lands. The biodiversity park made by the company in *Ciherang Pondok* was part of the company's green program that not much happened on other companies. At the same time, economic pressure contributes to more damages to the lands. Conservation lands can be made a contribution to the community with the establishment of win-win collaboration, as made between the national park with the community of *Cimacan* Village.

Waste can be easily found in those three site observations, and mostly from households. The increase in population, the rapid economic growth, and the rise in community living standards accelerate municipal solid waste (MSW) generation in developing cities [9]. Better waste management was located at the housing estate in separating between organic and inorganic waste, and community awareness is higher at the location supported by the private sector through the Corporate Social Responsibility (CSR) program.

The lands became critical and unproductive mostly because of not well managed by the owners as in *Pasir Buncir*, pressured by the community due to economic needs, and less critical due to better use and better managed as in *Ciherang Pondok* as supported by CSR program.

The land owned by the community was mostly legalized by *adat* (customary) land certificate, but for those close to the national park, the community had access to the conservation lands under the collaboration management scheme, as in *Cimacan* Village. Community earning is mostly coming from agriculture practices (in *Pasir Buncir* and *Cimacan* Village), and from community-based teak plantation tourism, puppet home industry, candied nutmeg, and snack food home industry.

The tourism sector was a promising economic feature of activities in the observation sites. The community tourism management is found in *Pasir Buncir*, such as waterfall, camping ground, and rafting, and in the teak plantation in *Pancawati*. The more government management was in conservation tourism with some community collaboration in a tour guide.

Water pollution was a major problem in the world and may cause deaths and diseases in some countries. Water quality in site observations was good, but the community has inadequate access to clean water. It was comprehensive since access to water has been considered as an urgent matter and sanitation has been put in second place [10]. Due to the lack of access of the community to clean water in these villages, so support to the community gave through the collaboration between private sector and government conservation forest manager in such water management program would be important.

3.2. Trend Analysis of Environmental Management

The stakeholder has very crucial roles in environmental management. The impacts either positive or negative of the environmental management not only to that particular site but also destructions to broader areas as well as social and economic consequences. Stakeholder engagement and environmental lessons learned can be taken from the past and present experiences to better future environmental management.

Data on stakeholder engagement on natural resource and environmental management can be seen in Table 2.

Table 2 Stakeholder Engagement on Natural Resource and Environment

Field observation	Village		
	Pasir Buncir	***Cimacan***	***Pancawati / Ciherang Pondok***
Land Conservation	• previously managed by the state-owned company, now by private-owned, and community • sand mining owned by the community • nowadays, the government manage conservation lands	• lands closed to the community managed by the state-owned company, now by stated conservation agency where community engagement only under conservation-based	• a biodiversity park belongs to the company bought from the community's agricultural lands in 2010
Waste	• better waste management even though municipal waste found around the settlement	• household habit on waste management not changed, but better on the housing estate	• NGO and company work with the community • waste found in the river
Critical Lands	• Lands belong to business owners not well managed	• critical lands due to economic pressure • managed by a state-owned company, now for conservation	• Community less active, now better after receiving support from NGOs and company.
Landowner/social economy	• "*giri*k" land certification • tree species planted (e.g. albizia, rubber), banana, and paddy rice	• from production to conservation with less economic access • farming on horticulture, cattle farms, seasoning trading	• home industry puppet since the year 2000 in the village • home "home" industry changed from previously so many unemployment
Ecotourism	• *curug*, rafting, camping ground, rock climbing, tree estate • difficult access to the sites, fewer facilities	• tourism village with mountain climbing tourism and botanical garden	• Teak plantation tourism
Watershed/water management	• river water used for agriculture, rafting, golf grass • rich vegetation along the river	• used for community life. • community fish pond supported by national park offices.	• river water quality better but water catchment in the upstream not good

Conservation of lands was very much dependent on the stakeholder engagement from time to time. In the case of *Pasir Buncir*, historically the lands were mostly managed by the government, and now also by the number of private owners, including companies and individuals.

The stakeholder engagement could be further grouped into three key elements-creating space, aligning motivations, and building trust [11]. The government, company, NGO, and community may have different concerns to bring each of the stakeholders and to share ideas that would be very important. Every stakeholder may also have different care of issues depending on the values of engagement, and how open one with another would be another challenge.

The conservation issues at site observation have different space of how the openness of discussion from one into another, motivation, as well as trust. Conservation was taken fewer concerns by the companies, including those sand mining has ever done by company and individuals where the abandoned mine sites now very much degraded need to rehabilitate. As the government has the authority to regulate in managing lands so the role of government in stakeholder engagement was very crucial. The conservation lands under government authority such as national park should engage the community because the sites are close to the settlements, especially after the land management system in *Cimacan* Village changed from a state-owned company to the government agency of conservation management in the year 2003 where the community has to change their engagement of economy-based production to conservation forest. Another was a very good example of company engagement in *Ciherang Pondok* where a company opened space for collaboration, building his motivation to be part of a green company and promote company social responsibility program to build the trust, and a biodiversity park established in the company lands.

The community living in *Pasir Buncir* village manages their household waste in person, not much different than the previous one which similar to the one in *Cimacan*. Engagement in the private sector in the housing estate encourages the housing community to follow the roles that manage the household waste better. The private sector through the corporate social responsibility program in *Pasir Buncir* proven given community awareness to manage waste better.

The previous management under the engagement of stakeholders in managing the critical land was changed from previous state lands to the business land and community in those site observations have not yet many changes in managing critical lands, due to fewer collaborators and limited engagement of company and government.

Private sector solution for development has some key dimensions, namely private finance needs to deliver share benefits, good investment depends on effective partnerships, build trust, and scale-up solutions [12]. The existing of corporate business activities,

smallholder business should mobilize private sector finance with better impact to better community welfare at the site observation, which some part already made with a low impact which needs to make it better. The ecotourism community concerns were still not under the expected scheme of stakeholder engagement as mentioned above, even though the community was more active in *Pancawati* and *Pasir Buncir* than those in *Cimacan* where a government agency has more roles.

3.3. Institution Analysis of Environment Management

According to Brescia (2018), there are at least three common uses of the term institution in the context of conducting the comparative institutional analysis. (1) an institution can be used to describe stand-alone organizations or a particular entity like the U.S. Senate, a law school, a nonprofit organization, or a business. (2) institutions may refer to institutional systems, such as the government, the market, and the courts, rather than a particular governmental body, business, or court. (3) institutions as "the rules of the game" [13]. For this analysis, an institution here referred to describe the stand-alone organization and the institutional system. In this study, there were some institutions have important roles in managing natural resources and the environment. The institutions here can be a government institution, a private institution, NGO, community, and university. Based on the discussion in *Pasir Buncir*, *Cimacan*, and *Pancawati/Ciherang Pondok*, the following were a picture of institutions may have specific roles in natural resource and environmental management in the respective village, namely:

3.3.1. Government Institution

Pasir Buncir: The government institution has significant roles in environmental management in this village. The ministry of forestry (now the ministry of environment and forestry), ministry of public work, and village government play significant roles in soil conservation. Among the role, the national government supported the community in providing tree seedling (e.g. watershed agency/BPDAS supported the community on tree planting, government agency also helped on animal health and support the community on animal husbandry farming, national park agency (TNGGP) gave attention on forest conservation. The district government agency of agriculture and forest supported on environment issues, and village government gave limited support on the extension of waste management and support on gender issues.

Cimacan; TNGGP managed forest conservation including in Curug Cibeureum and Curug Goong located close to the village, also organized mountain climbing tours. Collaborative management of conservation forest program at the buffer zone of TNGGP had supported by TNGGP and head of the village. TNGGP donated and supported golden fish cultivation for the community group. The Head of the village provided a village decree to formalize Farmer Group Gerbi Lestari as a community learning organization. The national government donated tree seedlings to the community (mostly not expected tree species accordingly), conservation extension to the community-made once in a month for conservation awareness but the impact was still minimum.

Pancawati; Village government applied household solid waste management, but the impact not yet much. The village government accordingly has a role in making decision converting the land function into a non-rice field. Implementation role of government on local community economy was still below the expectation, and this was needed. Even though teak plantation tourism was very promising but the village government seems not yet provided enough support on this.

3.3.2. Private Sector Institution

Pasir Buncir; Private sectors managed a lot of lands, and had full access to manage their lands, including for tourism development but infrastructure and facility not yet started after more than 20 years. Some lands were found degraded and become unproductive. A state-owned company with the community engagement (forest resource management with the community/PHBM) scheme manages Curug Cikaweni and Curug Cilengko. Private sectors occupied about 50% of lands and the government managed conservation lands of 30% of the Pasir Buncir areas. Other private business practices around the village were farming practices, sand mining (now not operated anymore with the remaining environmental impact). Another company utilized river water to watering golf fields.

Cimacan; private sectors owned lands but not yet utilized and managed, and some lands also leased to the community. Most of the private business owned lands plan for ecotourism but not yet started.

Pancawati; There was a local company that provided knowledge and technical training for the local community, and helped the community to provide rainwater storage facilities for household needs in 2014, now this rainwater storage a little dirty because not well maintained. The company also supported in empowering the community on environmental programs including provided financial support to access clean water, and land conservation. Puppet making home industries and food home industry were also found in the village. The community also got financial support from a village level government bank, and informal providers of financial services such as money lenders, pawnshops.

3.3.3. Community

Pasir Buncir; Households, sources of solid waste with no waste container. Another was from goat farming on river bank polluted the river, only small part used as

fertilizer. Several solid wastes from households are thrown into the river and farmers use the river for irrigation, farming, and fish pond. Small businesses community sand-mining caused land degradation, erosion, and landslides. Community agriculture practices were close to the conservation forest areas, with the potential for disturbing the forests. Community nature conservation group (PACING) in Pasir Buncir had activities in tourism. Lands for community house mostly under “girik" certificate, not yet legally government certificate. The lands were also used by the community for agriculture practices, including paddy fields. Additional community income was also come from ecotourism, since 2016.

Cimacan; Similar to Pasir Buncir, household as a source of solid waste, did not yet have a waste container, even though a closer housing estate near the village managed the household solid waste properly, including in waste separation between organic and non-organic ones. Besides managed his/her, some communities leased lands from companies. Forestry-based community farming group GERBI, and vegetable farming group CAPUNG had some conservation-based business initiatives in managing lands at the community level. Community forum of interpreters and community guides supported the TNGGP on the TNGGP conservation tourism program, especially for the tourists who did not have standardized requirements for mountain climbing as applicable in TNGGP. Forestry Community Group GERBI manages goldfish growth, and fishing supported by TNGGP.

Pancawati/Ciherang Pondok; Community was involved in making rorak, biopori, in planting nutmeg, vegetables, and preparing the land fields more productive. The community was directly involved in creating soil conservation (rorak, biopori, infiltration wells, dug wells, innovation in fish ponds, rain harvesting tools), planting nutmeg trees, planting vegetables. Households also produce household waste, still did not do waste sorting and processing, disrupted the preservation of land and water. Home industries produced waste and did not sort out yet and processed. Farmer groups sometimes cleaned up the rubbish that disrupted the environment and preservation of land and water. farming communities utilized river water for their farming. The majority of the Ciherang Pondok worked as farm laborers, some worked as home industry workers, and few of them were traders, craftsmen, teachers, and civil servants. community-owned teak garden (Leuweung Rangrang) in Pancawati, covering an area of 2 ha to welcome domestic and out of town tourists. The community of merchants who sold foods/drinks at teak garden areas where people from surrounding settlements. Some communities had small home industries processed nutmeg into a snack.

3.3.4. NGO

Pasir Buncir; Some NGOs had activities and supported communities in conserving lands, including BIO-M with a community economy-based conservation program.

Pancawati; NGOs helped in monitoring feasibility of soil and water conservation programs, and worked with communities to plant perennial crops, including innovation of the use of existing fish ponds more useful in providing clean water, and supported local communities facilitate soil water infiltration and biopori wells. The Gmelina Foundation facilitated the community in empowering activities in Pancawati Village and facilitating partnerships with the company to help the community.

3.3.5. University

Pancawati; The Bogor Agricultural Institute (IPB) conducted environmental researches in Pancawati, focusing on land and water where these researches then also reported to the Bogor district government and the Central Government for policy and government authority follow up.

The following Figure 1 shows the interaction of institutions in soil conservation at the community level in Pasir Buncir.

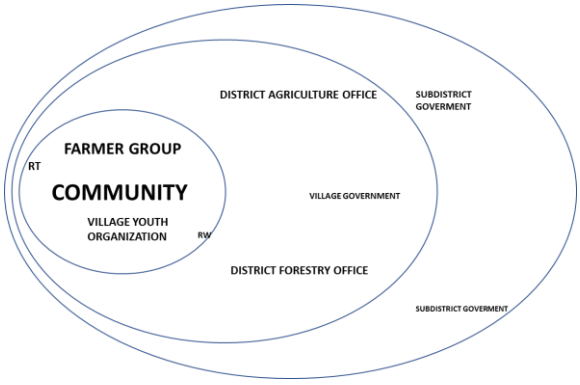

Figure 1 The institution engagement at the village level in *Pasir Buncir*

Figure 1 explains the followings:

- The community was the main actor in the ground.
- The farmer group was the second important actor to plant trees for soil/land conservation.
- Village youth organizations (Karang Taruna) together with RT (neighborhood harmonious) were close to the community but less involved. RW (citizen harmonious) was far and less involved than RT.
- Forestry office and Agriculture office in the district according to the community give support but far from the village.
- Role of sub-district government and private sector were still very minimum.

(Note: The thicker the letters the more important it is for the community, the more the distance is in fig. 1 (from the words "COMMUNITY") the more distance the location of the institution is from the community).

3.4. Analysis of Capital in the Community Level

DFID identifies five different capital endowments to compose the livelihood assets, including natural capital, human capital, physical capital, financial capital, and social capital [14]. The capitals owned by the community in the observation areas are as follows:

3.4.1. Human Capital

Human capital is very necessary for supporting community welfare. The human capital is a set of resources that combines knowledge, training, and skill that relates the education quality and economic development [15]. The majority of villagers in Pasir Buncir, Cimacan, and Pancawati/Ciherang Pondok had low access to education, mostly graduated from elementary school, some graduated from junior high school. Most of the main reason because of the school distance problem. The people were most concerned about informal religion study they got from the mosque and/or musholla (prayer room) in the village. Villagers were easy to do cooperation of social work *(gotong royong)* for their community life and friendly to communicate with visitors. The community of Pasir Buncir had experience in conveying their different willingness and perspectives about the program may establish by the institution who willing to implement program/activities in the village. The human capital based on knowledge and training at the community level was quite low since difficult access to formal education and less training given by the government. Good social work and have a willingness for collaboration give very good capital to improve their future welfare.

3.4.2. Natural Capital;

Natural capital is the natural resource stocks (soil, water, air, genetic resource, etc.) and environmental services (hydrological cycle, pollution sinks, etc.) from which resource flows and services useful for livelihoods are derived (Scoones, 1998). There was very potential for clean water resources in the villages. The agricultural lands provided good quality agricultural products, including paddy rice and other agricultural products. The forest was also very close to the *Cimacan* Village where the community gets the benefit of environmental services, including a man-made teak forest in Pancawati. The river that flows through the villages was good and contributed to community life, and valuable environmental services for the down-stream people in Bogor and Jakarta. The potential fertile soil in the villages was very good for agriculture farming practices. Forest, besides was not only for secure plant and animal biodiversity but also to provide good air for community living around the forest area, water catchment for sustaining water, including the existing man-made teak forest was very valuable for environment and community earning. The clean water was very helpful for community life. The natural capital in the villages had provided valuable environmental services for the community around the villages and the down-stream people in Bogor and Jakarta.

3.4.3. Physical Capital;

Government infrastructure funds and community self-help funds for the school, mosque/ musholla, road, bridge, transportation, local health, and sanitation were very useful to support community life. The school was quite far from home for the student who wants to continue their study to the higher class, e.g. school for junior and senior high school, especially for Pasir Buncir and Cimacan community. The road was available but some were already damaged, site observation in Pasir Buncir was not easily accessed by car, so the motorcycle taxi *(ojek)* very helpful to access the village. The community health center *(Puskemas)* was available, even though it was quite far from the village.

3.4.4. Financial Capital;

Economic or financial capital is the capital base (cash, credit/debit, savings, and other economic assets, including basic infrastructure and production infrastructure, and technologies) that are essential for the pursuit of any livelihood strategy [14]. From the observation, there were government banks available at the village level (i.e. Bank Rakyat Indonesia), but community saving and lending cooperative was not available, only the commercial loan (with high-interest rate) mostly easy to find in the village for community loans besides the government bank.

3.4.5. Social Capital;

The social capital is including social resources (networks, social claims, social relations, affiliations, associations) upon which people draw when pursuing different livelihood strategies requiring coordinated actions [14]. From the observation, it was found that community security in the villages supported by babinsa and babinkamtibmas (village-assigned police officers). The government-driven extension program was made in Cimacan and Ciherang, but not frequent in Pasir Buncir. The villager had very good social support (including gotong royong), friendly, and have frequent Islamic community lecturing (pengajian). The social resources available in the villages were security and extension programs driven by government support the better network and securing the social relations. The good social support (including gotong royong), friendly and religious community were valuable social capital can support the villagers their networks, social relations, and community associations.

3.5. Behavior Change in the Environment Management

Attitude is very important because it will shape a person's perception of social and physical influences and their influence on behaviors. Example: attitude influences friendship or hostility towards others, gives and receives help, employs people from ethnic minorities. Concerning evaluation, it relates to the relationship between one category and the evaluation category, such as good vs bad [16].

There are some key findings from field assessment, including [17]:

- The information taken from the field is insufficient to support behavior change, it needs the stimulation of learning and participation through regular dialogue with the affected community.
- Relationships with partners, families, and the community or society in which one lives can substantially determine how we behave.
- Behavior change interventions need to take into account the specific psychological and social influences that guide decision making and behavior in a particular setting. That means that the process of designing and implementing effective interventions needs to become a more iterative process of discovery, learning, and adaptation. What matters is not only which policy to implement, but also how it is implemented.

The field assessments taken place in the observation sites of *Pasir Buncir, Cimacan*, and *Pancawati/Ciherang Pondok* had captured a lot of information, but there was not sufficient to support the behavior change. More actions need to be done by implementing regular assessments at the community level, including identifying appropriate stakeholders engaged in the regular process.

Farmer Field School (FFS) was described as a platform and school without walls for improving the decision-making capacity of farming communities and stimulating local innovation for sustainable agriculture [18]. FFS programs produced community-wide effects, not only changing the behavior and practices of participants but also influencing the decisions of non-participants [19]. Pro-environmental behavior refers to behavior that harms the environment as little as possible or even benefits the environment [20].

To the stakeholders in the site observations of *Pasir Buncir, Cimacan*, and *Pancawati/Ciherang Pondok*, they can be introduced to the more pro-environmental behavior, and FFS can be used as one of the approaches as well as for better knowledge, attitude, and practice of better environmental management at the field level.

3.6. Challenges and Opportunities found

The first environmental initiatives appeared about 200 years ago due to the need to rescue endangered species. Over time, reasons that have imposed nature protection have diversified. Environmental education and education for the environment today play an important role in sustainability. Environmental education provided by higher education institutions has an important impact on training and preparing the future generation for a green society [21]. Environmental education may be used at the community level by applying appropriate approaches to support the establishment of a green community at the village level.

Work-integrated learning (WIL) is considered a key strategy for promoting graduate employability. Graduate employability is a complex concept, one which has broadened in recent years to encapsulate a diverse range of skills, attributes, and other measures such as networks, professional-identity, and active citizenship [22]. The fieldwork of the university student of Indraprasta University in the observation sites did their assessment in practicing and implementing their theoretical knowledge in the field, and at the same time promote better knowledge, attitude and practice on the field level.

During the field assessment process, KAP surveys can be applied to find out more information related to the knowledge, attitude, and practice (KAP) of environmental concern in the field. In KAP surveys, the Knowledge part is normally used only to assess the extent of community knowledge about particular concepts and programs, especially on the environmental concept and programs. Furthermore, Attitudes are interlinked with the person's knowledge, beliefs, emotions, and values, and they are either positive or negative, and practice is the investigation of environment-related practices. KAP survey data is often used to plan activities aimed at changing behavior, based on the false assumption that there is a direct relationship between knowledge and behavior [23]. The implementation of a KAP survey can be applied in those research sites or/and other sites.

The FFS approach can be used to train the community to be able to implement transect in capturing environmental portrait and develop a better plan of their village environmental management. FFS is a learning process that has been tried in some countries, especially to stimulate local innovation, and to promote behavior change at the community level. As FFS is an informal school applied in the field, few local communities should be trained as local facilitators.

4. CONCLUSIONS

Environmental problems were easily found in the villages of *Pasir Buncir, Cimacan* Village, and *Pancawati* Village/*Ciherang Pondok* Village, there had not been many improvements in environmental management from time to time. Environmental problems that often recur were a challenge and an opportunity for better innovation and facilitation to give effect to the performance of stakeholders (government, private sector, and the community) to better manage the

environment. Some business stakeholders had helped the socio-economic community through CSR programs, but the impact was very limited.

The field school for the environment is about the education for the community, can be taught formally to the student. The student can then socialize the implementation to the community through informal education of training of trainer (TOT). The field school approach can be taught informally to stakeholders as part of adult education, which facilitates the learning community in the field, and at the same time gives space for the community to hold discussions, including discussing the results of the transects of environmental problems found. The field school can encourage behavior changes at the community level. Knowledge-Attitude and Practice (KAP) regarding environmental management is a free opinion of the community without influenced by others.

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REFERENCES

[1] UN, "World Population Policies 2015 Highlights," ed: UN, 2019.

[2] N. Guria and M. K. Sinha, "Population Growth and its Effects on Environment: A Case Study of Bilaspur City (CG)," 2015.

[3] T. Güney, "POPULATION GROWTH AND SUSTAINABLE DEVELOPMENT IN DEVELOPED-DEVELOPING COUNTRIES: AN IV (2SLS) APPROACH GELİŞMİŞ-GELİŞMEKTE OLAN ÜLKELERDE NÜFUS ARTIŞI VE SÜRDÜRÜLEBİLİR KALKINMA: BİR IV (2SLS) YAKLAŞIMI," *Population*, vol. 22, no. 4, pp. 1255-1277, 2017.

[4] J. Pretty *et al.*, "Introduction to environment and society," *The SAGE handbook of environment and society*, pp. 1-32, 2007.

[5] J. Chmielewski, P. Kusztal, and I. Żeber-Dzikowska, "Anthropogenic impact on the environment (case study)," *Environmental Protection and Natural Resources; The Journal of Institute of Environmental Protection-National Research Institute.*, vol. 29, no. 1, pp. 30-37, 2018.

[6] E. A. Akintunde, "Theories and concepts for human behavior in environmental preservation," 2017.

[7] D. Freidenfelds, S. N. Kalnins, and J. Gusca, "What does environmentally sustainable higher education institution mean?," *Energy Procedia*, vol. 147, pp. 42-47, 2018.

[8] J. M. Yeiser, J. J. Morgan, D. L. Baxley, R. B. Chandler, and J. A. Martin, "Private land conservation has landscape-scale benefits for wildlife in agroecosystems," *Journal of Applied Ecology*, vol. 55, no. 4, pp. 1930-1939, 2018.

[9] Z. Minghua *et al.*, "Municipal solid waste management in Pudong new area, China," *Waste Management*, vol. 29, no. 3, pp. 1227-1233, 2009.

[10] T. Turrén-Cruz, J. A. García-Rodríguez, and M. Á. López Zavala, "Evaluation of Sanitation Strategies and Initiatives Implemented in Mexico from Community Capitals Point of View," *Water*, vol. 11, no. 2, p. 295, 2019.

[11] H. A. Schoonover *et al.*, "Creating space, aligning motivations, and building trust," *Ecology and Society*, vol. 24, no. 1, 2019.

[12] OECD, "Building blocks for private sector engagement in development co-operation," in *Private Sector Engagement for Sustainable Development*, ed: OECD, 2016, pp. 21-32.

[13] R. H. Brescia, "Understanding Institutions: A Multi-Dimensional Approach," *UNHL Rev.*, vol. 17, p. 1, 2018.

[14] I. Scoones, "Sustainable rural livelihoods: a framework for analysis," 1998.

[15] R. Islam, A. B. A. Ghani, B. Kusuma, and B. B. Theseira, "Education and Human Capital Effect on Malaysian Economic," *International Journal of Economics and Financial Issues*, vol. 6, no. 4, 2016.

[16] D. Albarracín, W. Wang, H. Li, and K. Noguchi, "Structure of attitudes: Judgments, memory, and implications for change," 2008.

[17] W. Avis, "Methods and approaches to understanding behavior change," ed: GSDRC Helpdesk Research, 2016.

[18] E. N. Ajani, "Farmer Field School (FFS) and Junior Farmer Field and Life School (JFFLS) as challenges to agricultural extension development and practice in Nigeria," *Journal of Agricultural Extension*, vol. 14, no. 1, 2010.

[19] UN, "A Shift in Global Perspective Institutionalizing Farmer Field School," in *The State of Food and Agriculture*, ed. Rome: UN, 2015.

[20] L. Steg and C. Vlek, "Encouraging pro-environmental behavior: An integrative review and research agenda," *Journal of environmental psychology*, vol. 29, no. 3, pp. 309-317, 2009.

[21] G. D. Boca and S. Saraçlı, "Environmental education and student's perception, for sustainability," *Sustainability*, vol. 11, no. 6, p. 1553, 2019.

[22] A. D. Rowe and K. E. Zegwaard, "Developing graduate employability skills and attributes: Curriculum enhancement through work-integrated learning," 2017.

[23] A. Launiala, "How much can a KAP survey tell us about people's knowledge, attitudes, and practices? Some observations from medical anthropology research on malaria in pregnancy in Malawi," *Anthropology Matters*, vol. 11, no. 1, 2009.