

**ERGONOMIC APPROACH IN MAINTAINING
THE BALANCE AMONG TOURISM ECONOMICAL POTENCIAL IN BALI**
(with special reference in Singapadu Tengah Village, Sub-district Sukawati, Gianyar
regency-Bali)

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Masuk: 17 Nopember 2010, revisi masuk : 18 Desember 2010, diterima: 21 Januari 2011

ABSTRACT

At Singapadu Tengah village, sub-district of Sukawati, Gianyar regency is outskirts village with the distance around 10 km from Denpasar city. Since the year 1989, this village has started improving through blossom out of Singapadu Induk village. Site function changes Singapadu Tengah village from agricultural land becomes industrial function and settlement that significantly increases every year. The year of 1990 up to 1995 site function changes around 658 m² per year, the year 1995 until the year of 2000 reaches 1,09 Ha per year, while in the year of 2000 up to 2005 reaches 1,67 Ha per year. This site function change has caused among others 1) high migration current come to Bali in this time has spread to village area in Bali; 2) arrangement of development distribution by the government has not been yet assertive; 3) the low value of the agricultural product selling, and the agricultural land tax is up; 4) as a result of irrigation system that change into the connected irrigation channel; and 5) consumerism. Through total approach in the ergonomic scope, it is expected to improve the condition of agriculture that is more and more depressed effect as the result from influences of site function change. SHIP (Systematical, Holistic, Interdisciplinary and Participatory) approach as part of total approach is one of the way to maintain function of agricultural land as a sector capable to support public economics in Bali.

Keywords: agricultural land function change, Total Ergonomics Approach and Bali's lay out.

INTISARI

Desa Singapadu Tengah, Kecamatan Sukawati, Kabupaten Gianyar adalah sebuah desa pinggiran yang letaknya 10 km dari kota Denpasar. Sejak tahun 1989 desa ini mengalami peningkatan dengan pengembangan desa Singapadu Induk. Perubahan fungsi lahan desa Singapadu Tengah dari lahan pertanian menjadi area industri dan perubahan meningkat dari tahun ke tahun. Dari tahun 1990 hingga 1995 perubahan fungsi lahan sekitar 658 m² per tahun, pada tahun 1995 hingga tahun 2000 mencapai 1.09 Ha per tahun, sedangkan pada tahun 2000 hingga 2005 mencapai 1,67 Ha per tahun. Perubahan fungsi lahan ini menyebabkan 1) datangnya para migran ke desa-desa di Bali, 2) pengaturan distribusi pembangunan oleh pemerintah belum tegas, 3) rendahnya nilai penjualan produk hasil pertanian, dan meningkatnya pajak lahan pertanian; 4) sistem irigasi tersier berubah menjadi sistem irigasi terhubung; dan 5) konsumerisme. Melalui pendekatan ergonomi total, diharapkan dapat memperbaiki kondisi pertanian yang lebih baik dan mengurangi efek sebagai akibat dari pengaruh perubahan fungsi lahan. Pendekatan SHIP (Sistemik, Holistik, Interdisipliner dan Partisipatori) sebagai bagian dari pendekatan ergonomi total merupakan salah satu cara untuk mempertahankan fungsi lahan pertanian sebagai sektor yang mampu menunjang perekonomian masyarakat di Bali.

Kata kunci: perubahan fungsi lahan pertanian, Pendekatan Ergonomi Total dan Tata Ruang Bali

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INTRODUCTION

The government of Bali province since year 1980 begins to develop tourism industry. Around year of 1990 tourism sector begins become superior sector, so that agricultural sector by degrees becomes secondary sector even pulled over. Since the Gulf War has happened, Bali bombing, and SARS, the government of Bali province returns to peep at agricultural sector as a sector that is re-expected.

Agricultural land function change becomes function of settlement in Bali increases 4,8% every year. Based on the data from agriculture and field crop service of Bali year 1995 until 2000 function displace of agricultural land becomes settlement still 1000 hectares per year. While until the year 2007, level of the function displace reaches 3500 hectares per year. If the developments still like this, imaginable will in 20 years again, Bali's agricultural land cannot be expected again. This condition does not only in the urban region but also has spreading to the village region.

Abundant resident pressure causes environment problem arising in Bali. In urban region, vile house arise, traffic jam, industrial disposal and pollution. Green belt is forced to built a settlement by the member because they don't have other alternative. Finally function change of rice field area cannot be avoided by requirement of settlement.

Change to function of site is not only happened in urban area, but also in village area or urban outskirts (urban fringe). Singapadu Tengah village which is located in sub-district of Sukawati, Gianyar regency, experiences site function change that is fast enough from agricultural function becomes industry function and settlement. Change happened significantly every year is arising. The year of 1990 up to 1995 changes to site function around 658 m² per year, the year of 1995 until 2000 reaches 1,09 Ha per year, while in the year of 2000 to 2005 reaches 1,67 Ha per year.

The Government of Dutch colonial entered effectively into Bali since in 1908 to vanish the king's land and obliged to

work is sticking at the land. The Government of Dutch diverts collection the land tax (suwinih) becomes land tax for the sake of the government of Dutch colonial. The land tax is the target of tax in the form of 2/3 state's crop where the collector was the government head of Swapraja. By Swapraja head, 2/3 crops collected to be sold to the Chinese merchant or Dutch company. The money of sales revenue then delivered to the resident residing at Singaraja. Head of Swapraja and the puri clan referred to occupy the position in Swapraja public service gets salary from government of Dutch Indies in Bali.

The Bali's government in overcoming this problem of course has coped to overcome it. One of them is by specifying lay out plan/ lay out detail plan either in level of province and also at level of regency. In reality it is have not reply the problems. This thing is caused by compilation process of lay out happened not run very well. Compilation done by consultant asked by the government, then ratified by Local Parliament. The role from public is not at all seen. Result of lay out compilation by local government delivered to Local Parliament, was not given to the public to be criticism it, so that happened is incidence of new problem for the public.

In ergonomic science, total approach inside consisting SHIP approach (Systematic, Holistic, Interdisciplinary and Participatory) is one of way of solving social problems comprehensively. According to Manuaba (2006b), lay open that this approach assumed very applicable and comprehensive on going basis in qualitative and quantitative research. In studying the problems of site function change, this approach can be shown in Figure 1.

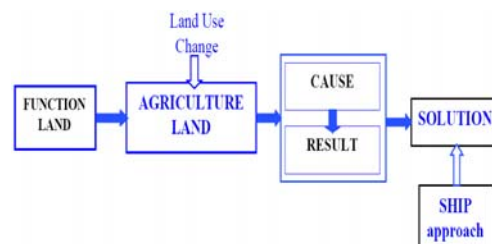


Figure 1. Land Use change studied with SHIP approach

At some social researches, systematic interpreted as approach is having system, where all improvement effort or trouble-shooting will influence factors of social, workplace, time, and defrayal. So all thing interconnected must be considered carefully. This thing can be strived by the way of considering ergonomic principles, in exploiting, process, resolving, and in execution on trouble-shooting.

Holistic in this research was intervention that will be applied to solve the problems must be studied again from some systems having the significant relation and relevant. Where intervention done must be considered technically, economic, ergonomic and socio-culture can be responsible, energy saving and doesn't destroy environment, and intervention applied do not generate new problem after the program is implemented.

Interdisciplinary means in solving problem faced in the field to exploit maximally the analyzed from related discipline. This research will be formed in the working team that consists of: an expert quarrying the problems, plans, performs, evaluates and performs evaluation to the result yielded.

Participatory means involvement every individual or team, expected not only just physic but also mind and feeling. The duty from this team begins from quarrying the problems comes up with its applying and evaluates insufficiencies. So will be got an optimal trouble-shooting result, humanity work system, have quality, everlasting and competitiveness as according to desire of all party. In this case all team members, especially the worker will be entangled actively in solving problem and discuss about the time, type, the best way in applying, number and expense of interventions that will be applied.

According to Linda Lee (1979), change of land use at outskirts of town and village are influenced by some factors. They are: (1) site physic characteristic, (2) regulations about site exploiting (regulatory measures), (3) personal characteristic of site owner, (4) public utilities existence, (5) site

accessibility, and (6) initiative of the developers.

According to Yunus (1997) there are two elements having an effect on development dynamics of area town in village area and outskirts or "urban fringe". First element that is element of human and second is functions of existing development town. Human toward town outskirts more related to efforts to extend its business. Existence of various sites exploiting importance in town outskirts makes process of site exploiting change runs very competitive. In matter of process of site exploiting change, will be generate some fundamental issues, that are: increasing of the land price, increasing of expense and price of change, increasing of speculation symptom of the land, and increasing of fragmentation symptom of the land (Bryan, Russwurm, and McLellan, 1982).

In its relationship with form of site function of settlement at outskirts town, improvement of number of outsider to town outskirts according by Yunus (1997) affects at three things are: (1) extension of settlement area, (2) grouping settlement with good quality and settlement with bad quality, and (3) its luster of un-order settlement. Demand for settlement site always increases in town outskirts has resulted reduction impact of agriculture land and by itself results extension of site function form of settlement itself.

Research is conducted in descriptive research. Main method applied is survey method that is research taking sample from a population and applies questionnaire as a tool of fundamental data compiler (Singarimbun, 1995). The research also does direct observation to phenomenon happened in field.

This research chooses location in a village near by urban region, by taking case study at Singapadu Tengah village, Gianyar regency. With reference to time scope, these research only studies displace / function change of site by three points of time that is the year of 1995, 2000 and 2005.

Singapadu Tengah village selected as a case study is based on initial survey,

this village experience relatively a fast change that can be seen from the growth of the resident and the site function change compared to other villages located at town outskirts. Phenomenon of change to the village becomes town outskirts easier to be observed in this area.

Primary data sources from the respondents, that is people who response or reply the questions of the researcher, and from the result of observation, that is the result of observation to the last year site function spread object and other phenomenon that cannot be obtained from documentation study. Hereinafter, in secondary consisted of numeral data and the map sources from government institutions like village office, Sub-district, Bappeda, BPS, BPN, and PMD.

In this research, population is all households having residence at area that

before the year of 1995 still is agricultural land. On that account at the time of this research has not yet existed documentation about amount of household occupying new residence, hence amount of samples are determined based on quota sampling. This quota sampling is determined by considering limitation of energy, cost, time, and analysis plan. For the considerations decided this research takes sample of 100 households. This total is assumed to have an adequate for analysis purpose. Hereafter, other respondent like owner of site, developer, entrepreneur, and key figure is determined in purposive to considerations: seen and or knows the process of site function change at location of research, easy to be contacted, and the information searched have been assumed is adequate for purpose of analysis.



Figure 2. Progress of Singapadu Tengah village on 1995, some village's main road still function as agriculture land.(red marks)
Source: Data of Singapadu Tengah village office (1995)



Figure 3. Progress of Singapadu Tengah village on 2000, seen in the map only few of agriculture land that reside at village's main road (red marks)
Source: data of Singapadu Tengah village office (2000)

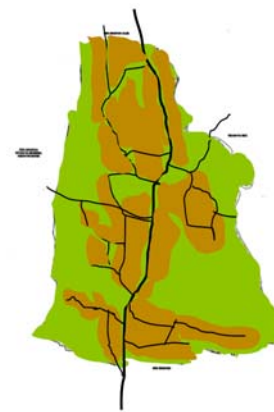


Figure 4. progress of Singapadu Tengah village on 2005, seen in the map few of village's main road have been fulfilled by small industry and settlement. Site function for agriculture still around 45% that residing at village outskirts.
Source: data of Singapadu Tengah village office (2005)

DISCUSSION

Singapadu Tengah village is a village reside at radius 10 km from Denpasar town. Now, Singapadu Tengah village experiences fast development especially on exploiting arranges of site. Change to site function is enough worrying. From data of village office of Singapadu Tengah (2007), happened function

change of agricultural land become industry and settlement functions that is increasing every year. The year of 1990 up to 1995 has changed the site function around 658 m² per year, the year of 1995 until the year of 2000 reaches 1,09 Ha per year, while in the year of 2000 up to 2005 reaches 1,67 Ha per year (figure 2-4). This change of site function has

caused among others 1) high migration current to come to Bali at this time have been disseminate to village area in Bali; 2) arrangement of development distribution by the government has not yet assertive; 3) the low of sell value of agriculture product, and agriculture land tax more and more rising (not proportional with sell value of agriculture product); 4) as a result irrigation system becomes intruding and agriculture leaved by its owner to change over in service sector, small industry and tourism, hence agriculture sector to be un-care and tended to sold or rent and this sector applied only on the side; and 5) effect of consumptive culture growing in village, hence most the resident seldom defending agriculture land as work on land.

Resident of Singapadu Tengah village experiences growth that is relatively quick compared to other villages in the sub-district of Sukawati. Based on citizen census on 1990 and 2000, the village resident is each equal to 3.765 and 4.525 peoples or experiences the growth average of 1,32% per year. In the same period, growth of Bali's resident is 1,22%. Growth of this resident indicates that this area experiences change that is relative more intensive compared to other area. One of village's characteristic in urban fringe area is progress of number of residents is above average of progress of village's resident in general.

From quantity side in period of 1995, 2000 and 2005, resident of Singapadu Tengah village experiences improvement in number and a real densities very real (59,72%). Improvement in amount that is big enough in the period of time of 15 years indicates this area becomes purpose of outsider in big number. Existence of new comer in Singapadu Tengah village shows this village has fascination either as residences or also as place of economic activity.

Other civil phenomenon that is important to be studied is displacing of resident's livelihood structure. As a village between town outskirts and tourism, besides experiencing fast growth of resident, Singapadu Tengah village also experiences change of a real basic

resident livelihood structure. In Period of 1955-2005, number of residents working in agriculture sector is decline very sharply, either absolutely and relative. Degradation of agricultural sector replaced by improvement of service sector role, commerce, home industry and tourism sector. Thereby, basis of public economic in the village has changed from primary sector become secondary and tertiary.

Incisive degradation percentage on agriculture sector caused by new labor force in this area very rare has an interest on agriculture sector. This thing proved from the result of research to 69 farmers showing, that 79,05% farmer have age above 50 years with average age of 57,6 years. The information from Pakaseh Subak Wahem and Subak Pengubengan at Singapadu Tengah village, I Wayan Sukanta (45 Years) obtained information that in this village very difficult to look for the farmer who is work on. Most resident of Singapadu Tengah village has art skill / hand made with bigger revenue than a farmer. Keen degradation on percentage of farmer's livelihood also caused happening of change over profession from a farmer to small industrial handicraft and existence of new comer in big number who livelihood on outside agriculture sector.

Job opportunity and revenue per capita generally become indicator to see economic progress on that region. Development on tourism in Bali have been directly able to be enjoyed by society of Singapadu Tengah. Thais why the public in this area involves directly with tourism activity. Singapadu Tengah is a place that produce handicraft of stone statue, wall engraving, desk have carves and various business of art good from local production.

Available of business choice on tourism sector results business on agriculture more and more leaved by local resident. Businesses on this tourism sector have proven increases the revenue of local resident in real. According to the research which has been done by Suartha (1994), average of revenue per capita on local resident increase 37,1 % in period of time on

1980-1990, that is Rp. 735.000 become Rp. 1.125.000.

Change on region physic condition that is most real at research area is decreasing area of rice field and dry field to build new settlement, either by local resident and new comer from outside village. on 1995 wide of rice field area is 317,21 ha (79,09% from region wide) while by in the end of the year 2005 rice field area still remaining with width of 292,09 ha (42,03% from region wide). This number is including rice field which had not yet been built but had not work on again as agriculture land. So during fifteen years already happened decrease of rice field area with width of 25,12 ha or average of 1,67 ha per year.

From the analysis of site function map and result of research, there are three factors to be identified having an effect on site function change in research area, they are: (1) There is a village market growing fast enough in sub-village of Negari, Singapadu Tengah village followed by build some

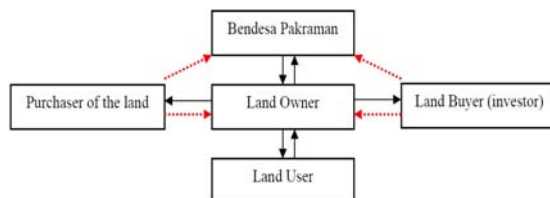


Figure 5. Hierarchy relation with the Land user

Systematic

In hierarchy, existence of relation system between customary with owner of site. Customary as institute knowing condition of site exploiting in its village and at the same time as control exploits the function of its area. The coordination relation between customary with this user which has not yet run optimally.

Holistic

Problems handling of land use at the village should be done entirely, begin

supermarkets, art gallery shop, and restaurant. So at around that activity grows new settlement occupied by direct for business activity, residence and rent-house; (2) As tourism access towards tourism object of Ubud, built art shop and tourism business alongside the village's main road. This thing brings follower impact to support the business in the end having estuary on improvement of requirement of site demand; (3) Built tourism object in the form of zoo like Bali Zoo Park, Bali Bird Park and Bali Reptile Park, also very influences site function change at Singapadu Tengah village.

As proposal in solving problems of site function change at Singapadu Tengah village through Total approach cumulatively among other through 4 elements (Manuaba, 2006b) that are : Systemic, Holistic, Interdisciplinary and Participatory. Breakdown of the fourth elements applied as input in this research as follows shown Figure 5 and Figure 6.

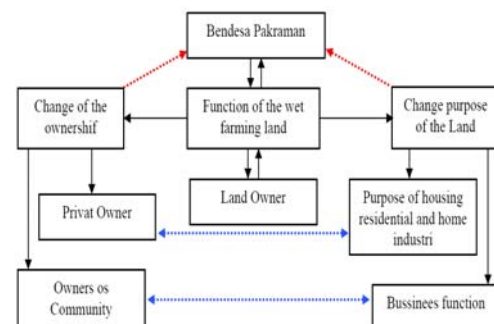


Figure 6. Every Changing of the right and function of the land, should be provide land use regulation for Desa Pakraman base on discussion with the villagers.

from clear regulation system of village about village land function, Clearness of head customary in arranging land use at village from the law which have been agreed on, performs a deliberation and consensus if required. This approach done in flexible, simple, easy to be comprehended by the society and has the character of continuation;

Interdisciplinary

This problem handling cannot only do by management of customary with user, but entangling various sciences like:

agriculture expert, Planology expert, culture social expert, economist, jurist and tourism expert. So problems handling from bottom up to Top down done in synergy. Main purpose is expected increasing prosperity social of the public by the way of to optimal the village structure, work organization and quality of social contact;

Participatory

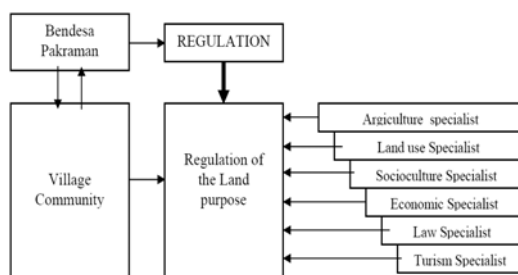


Figure 7. The regulation forming process about land use system and interdiscipliner to be involved to improve the process in community.

In activity which is more specific, better entangle village's elite figure, head of customary village who comprehends usage of land function especially in the case of site function change done by investor or local resident. Beside that are required role and the pekaseh as institute chief in managing irrigation system of agriculture (subak) at village.

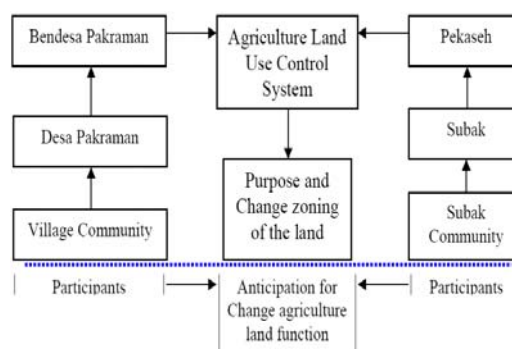


Figure 8. Community participants are very important to anticipate the changing of agriculture land function in Singapadu Tengah Village.

Note:
Bendesa Pakraman is the person who can bind the community with the rule of religion. Pekaseh is the person who organise agriculture and water use organisation in Bali.

Conclusion

Site function change in Singapadu Tengah village during fifteen years had already happened, decreased of rice field area with width of 25,12 ha or average of 1,67 ha per year. Causes of it change is influenced by some factors, like: 1) effect from existence of village's market has growing fast enough in sub-village of Negari, Singapadu Tengah village followed by built some supermarkets, art gallery shop, and restaurant. So at around the activity grows new settlement occupied by direct for business activity, residence and rent-house; 2) effect from tourism access towards tourism object of Ubud, built art shop and tourism business alongside the village's main road. Those things bring follower impact to support the business for the increased of requirement of site demand; and 3) enlargement of tourism object in the form of zoo like Bali Zoo Park, Bali Bird Park and Bali Reptile Park, also very influences site function change at Singapadu Tengah village.

To anticipate this problem required comprehensive regulation system, because problem of land very potential become a conflict. One of them is approach to anticipate the problem of site function change that is total approach which is inside studied with SHIP approach cumulatively through 4 elements that are: Systemic, Holistic, Interdisciplinary and Participatory.

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