

**Integrating Pest Management Value
in *Usada Carik* Balinese Script**
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Abstract

Indonesia is a country with hundreds of ethnics. Each ethnic has a long history of traditional knowledge but recently modern science has taken it over. Traditional pest control is slowly finding a place in modern pest management. Many developed countries start to realize the indigenous pest management principles. It is locally available, culturally acceptable and less expensive. *Usada Carik* is a Balinese traditional pest control knowledge, where people use it for maintaining paddy production. That script was written on the leaves of palm tree (*Borrassus flabellifer*). Its Balinese word refers to the practice of using natural resources for pest control. Can integrated pest management and deep ecology approach being adapted *Usada Carik* value into scientific information?

The transcript of scripture was collected from the Bali Government Information Centre. That pest information then clarified and transformed into deep ecology principles. The interviews were unstructured, open-ended.

The pest management information was written in narrative system, that beginning with the problem of paddy maintenance, name of pest causes, pests control method. *Usada Carik* explained that the balance interrelationship among organism is a natural pattern. That scripture described several of pests that causes paddy production decrease. Those pests were consisted of ten species of grasshopper, viruses, bugs, eight species of rats, and birds. Many plants were used and prepared in various ways. Its activities are similar to deep ecology concepts. Its principles can be transformed into scientific ecological approach. 1. How people use the voice of cricket to protect their paddy from the rats, because its ringing voice is equal with certain vibration qualities. 2. How the peoples protect their rice paddy from the birds with “*orang-orangan*” similar to the people presence in the field. 3. How people using the pheromone of wild cats to protect their rice from the rats, because this hormone is similar to the presence of the cats in the rice fields. All of the above activities are similar to integrated pest management and deep ecology principles.

Key word

1. *Usada Carik* Script. 2. Deep Ecology principles. 3. Integrated Pest Management.

Introduction

Traditional pest knowledge is slowly finding a place in integrated pest management. Some scientist believed that it may help to discover natural pest control. Many developed countries start to realize it, because it is locally available, culturally acceptabled and less expensive than sinthetic pesticide. *Usada Carik* is a Balinese traditional pest control knowledge, where peoples use it for maintaining their paddy production. This activities causes small side effect and all materials are ready in ours environment. It activities is similar to the land ethic and integrated pest management (IPM). A thing is right when it tends to preserve the integrity, stability, and beauty of

the biotic community. It is wrong when it tends otherwise (Leopod, 1984, Arness 1995). IPM is an effective and environmentally sensitive approach to pest management that relies on a combination of common-sense practices. It is scientific investigation and empirical traditional knowledge in pro of life quality.

Balinese can not be separate from the rice, because rice is part of their life. Rice is consider as both physical and spiritual foods.

“Rice is a special sacred food, divinely given to humans. The rice plant has a living spirit or soul comparable to that of humans, and the life cycle of the rice plant is equated with the human life cycle. The rice spirit must be honored and nurtured through rituals in order to assure a bountiful harvest” (Hamilton, 2003).

Can integrated pest management and deep ecology approach being adapted *Usada Carik* value into scientific information?

Objectives

Objectives of research is transformation the value of *Usada Carik*, that Balinese traditional rice pest management. It transform information clarified with deep ecology principles and eight point platform deep ecology. The specific purposes are follows. (1) To analysis structure of *Usada Carik* script content (2) To identify the numbers of paddy pest (3) To identify the number of plants use and how prepared it (4).To restructures it information contents into scintific integrated pest management.

Materials and Methods

The main material is *Usada Carik* which transcript of the scripture was collected from the Bali Government Information Centre. Data and information was collected from two sources. Firstly dirived from the content analysis of *Usada Carik* and secondly obtained from key informants. The information content analysis are include : structures of scripture, number of pests and plants species being used, how to use the materials, and to restructure those informations into scientific knowledge. That information clarified with deep ecology principles (Arness, 1986) and it transformation model adopted *Usada Taru Pramana* research (Suryadarma, 2005).

Results of Research

1. Structure of *Usada Carik* Script

Usada Carik script had written about the method of pest management, the kind of plants species being used, how to prepare and to use them. Its information

begins with the plant name, the characteristic of the parts of the plant and its composition. It information similar to traditional *Usada Taru Pramana* script (Suryadarma, 2005) (Figure 1).



Figure 1. Baline Traditional Transcript

1a. Iki Usada sawah :ta. pari, sa carmaning blalu incuk, woring yeh embong, ma ping 3, sawengi gawe ring sawah, sadakep sira tur ider kiwa ping 3, temu ring pakundan, ma.

Verses 1a. This is the Usada Sawah (the traditional knowledge to maintain the producton of rice). The outer bark of blalu (Albaasia sp), grinding it, mixed it with the younger tip of paddy. Do it every night, three time, move from the left to right side, and end it in the higher rice feld with chanting mantra.

2. General Information *Usada Carik* Script.

The pest management information was written in narrative system, that beginning with the; problem of paddy's maintainance, paddy's pests name, number of plants being used, how to use material components. It script described many kind of paddy's pest that was decreasing of production. Those pests are consists of; grasshopper, viruses, bugs, rats, and birds. Many plants are use and prepared in most of decoctions are made by simples such as mortar, stone and knife. The information was documented in Balinese language and it encouraged by tradition. Almost all of materials that are used are unrefined plant products such as leaves, bark, roots, and some of tuber. It is combined with material of the animal, like the pheromone of wild cat that to against rat. Ceremony and ritual is part of activities because rice not only physical food but also spiritual aspect. The integrating pest management concepts were determined by balancing between the macrocosm-and the microcosm because both are conected. Every activities are consists of physical aspect is a tangible phenomen it called skala and spiritual aspect it an intagible it called niskala.

3. Number of paddy's pests

The numbers of paddy's pests are consisting ten species of grasshopper, eight varieties of viruses, one bug, eight variety of rats, and four species of birds. Famers called it pest when that situation overgrassing (Table 1)

4. Number of plants being used

The number of plants being used is fifteen species that consist of different of plant's part, such as leaf, tuber, bark, and seeds. Its material use was combined and never single (Table 1)

5. How to use material components

Many plants are used in various ways and those plants were prepared mostly in the form of decoctions which made by mortar, stone, knife (Table 1). Almost all of the materials used in unrefined plant products, some combined with material of the animal, like the pheromone of wild cat.

The total content analysis and description were presented in Table 1.

Table 1 Content Analysis of *Usada Carik* Script

No	Pests Control function	Plant and or animal use against pests	Composition and technic
1	Against Viruses and bugs	1. The tip of younger paddy 2. Bark of <i>Albasia sp</i>	Grinding, mix with water. Spray every night and changing verses.
2	Against the algae	1. The kitchen ash	Spray in rice field
3	Against many pest	1. <i>Ketugtug</i> 2. <i>Malukut</i> leaf, three " <i>genggam</i> " 3. Erythina leaf, three leaves 4. Water, put it the coconut shell 5. <i>Temen</i> leaf	1. Five leaves, put it each corner of the rice field, one leaf in the center Grinding, mixed with water, and spray in rice paddy
4	Against Viruses or <i>lanas wereng</i>	1. The bark of erythina plant 2. Onion 4. Garlic	Decoctions made by mortar, stone. Put in the inlet of water canal
5	Against imago of insects	Salt, one kg	Spray in the rice field
6	Against Grasshopper (<i>Balang sangit</i>)	1. Onion 2. Garlic 3. " <i>Jerangan</i> " 4. Fruit of <i>Areca nut</i> . 5. " <i>pohon gegirang</i> " 6. " <i>Simbukan</i> " leaf	Grinding, mixed, spray in rice field, tern left, three time.
7	Against over-grassing by grasshopper (" <i>balang sangit</i> ")	1. The solvent of burnt rice, like ash 2. The leaf of erythina, bundle with three colours thread –red, white, black-, etc 3. Fogging with fire on the coconut shell	Spray in rice field, tern left, three time. I hope success.
8	Against the rats, and mouse.	1. Ceremony for <i>Ki Gili Tunggil</i> - security of rice field Red rice, covered with erythina leaf in each corner of field, etc 2. Ceremony for <i>Rare Angon</i> , the symbol children who love playing with wild cat in the rice field). Raw material for pray consists of rice, eggs salt, bettle leaf, chalk, erythina leaf, etc 3. <i>Sesaji</i> /offering for the rats: rice, combines with duck blood, etc 4. Neutralizer of the rats activities Water put in the <i>miane</i> leaf, etc 5. Against the rats, etc	Spray in rice field, turn left, and right, three time. Hope for success. Make the voices of mouse and cat, three time.
9	Many kind of birds	1. Put white rice in the <i>samida</i> leaf, combine with chalk, etc 2. <i>Orang-orangan</i> (scar-crow), spray with onion and garlic three times 2. Put <i>sunari</i> , that made from bamboo pole, etc	The bird will be fear, when the scar-crow is moving, blown by the wind The bird will be fear, when the holes on the bamboo poles making sound or high frequency vibration when blown by the wind

The values *Usada Carik* are similar to deep ecology principles, because everything in nature is connected. It numbers reason why everything is connected. 1. How farmers use the voice of cricket to protect their paddy from the rats, because its ringing voice is equal with certain vibration qualities. 2. How farmers protect their rice paddy from the birds with “*orang-orangan*”, because it is similar to the presence of the people in the rice field. 3. How farmers use the pheromone of wild cats to protect their rice from the rats, because this hormone is similar to the presence of the cats in the rice field. The farmers honour all of the animals, they don't kill all mice in rice field, because mouse represents “human desire” and elephant (*Ganesha*) represents human wisdom. Wisdom controls the desire, like a rat follows an elephant and they are always together.

5. Restructure *Usada Carik* Information

The objective to restructure *Usada Carik* is to promote its traditional pest control information into scientific knowledge (Table 2).

Table 2 Restructured *Usada Carik* Information Model

<i>Usada Carik</i> script	Translate in English	Local pest	Composition	Nama bahan
1a. Iki <i>Usada sawah</i> :ta. pari, sa carmaning blalu incuk, woring yeh embong, ma ping 3, sawengi gawe ring sawah, sadakep sira tur ider kiwa ping 3, temu ring pakundan, ma,.	This is the <i>Usada Sawah</i> (the traditional knowledge to maintain the production of rice). The protection from the pest is as follows: The outer bark of blalu (<i>Albaasia</i> sp), grinding it, mixed with the tip of paddy. Do it every night, three times, move from the left side to right, and in the higher field, chanting mantra.	The kind of pest a. Kamal b. Perit c. Bikul d. Kubangkubang e. Balang batu f. Balang kori g. Balang sangit i. Putihah	1. Combination of a part plant resources 2. Spiritual activities	1. Bark of <i>Albaasia</i> sp 2. Tip of younger paddy regeneration (<i>embong</i>)
Etc	Etc			

It restructure would be accommodated different perception, where their perception depended on what they think about themselves in relation to things around (Toledo, 1992). Its principles are similar to the permaculture philosophy. Permaculture is a philosophy of working with nature rather than against nature and it designs a system which arranges what was always there in a different way (Mollison, 1992). We can learn the law of return of nature and platform of deep ecology (Arness, 1986).

Discussions

1 Integrating pest management value in *Usada Carik*

Usada Carik Balinese integrating pest control does not simply consist of taking natural material and using them against pest. Instead, it seeks balance and propriety, in cultural Balinese sense, between rice and goodness and human and

cosmos like the Balinese architecture (Eiseman, 1990). It is not only natural, because the Balinese should regard their rice field as the extensions the concept of environmental and organizational balance. Balancing among biophysical aspect (*skala*) and spiritual aspect or unseen (*niskala*).

In the first verses (1a) *Usada Carik*, which introduction integrating pest control system as the extensions of the concept of environmental and organizational balance. To maintain the paddy production, the famers to integrate using of natural pesticide from some plants, grinding it, do it every night, three time, move from the left side, ending the to last higher rice feld, and chatting *mantra*

This is the Usada Sawah (the traditional konwled and method why the people maintain their producton of rice and protected them from the pest. The protected formulation from the pest is followed. The outer bark of blalu (Albasia sp), grinding it, mixed it with the younger tip of paddy. Do it every night, three time, move from the left side the right side, ending the to last higher rice feld, and chatting mantra.

The famers are use many symbol against the pest, because symbol is very important for them. Like symbol moving from the left side and ending to last higher rice feld. Every tradition in the world employs symbolism but symbolism is employed to its acme in Balinese culture. One must learn to appreciate this. Science of symbolism in the integrating pest management. In the absence of such an understanding the world periphery of Balinese famers will appear funny, unintelligent and absurd. In the process of knowing this science of symbolism one discovers the deeper meaning of the real Hindu tradition which apparently appears to be superficial.

All this world is pervaded by Me in My unmanifested form (aspect); all being exis in me, but I do not dwell in them. My womb is the great Brahma,in that I place the germ; from which, O Bharata, is the birth of all being (Big. XIX 3). When he (a man) sees the whole variety of beings as resting in the one, and spreading forth from That (one) alone, then he becomes Brahma (Bg. VIII,30).

My womb is the great Brahma (God) indicated that sustanain is character of nature. Nature is symbol and manifested of God, that was ordered by Law (*Rta*) of God. Lives are cyclic and it part of them is spiracle nature law. The curve described by the earth as it turns is spiral, and the pattern of its moving about the sun. The solar system itself being part of spiral galaxy also describes a spiral in its movement. The myriad things are constantly moving in the spiral movement and we live within that spiral movement (Nakamura in Mollison, 1988).

Most people in every traditional culture learn from the nature. Nature is the real teacher. The Nature is real teacher for whom people develop our intelligence. Intelligence is a natural quality of life. Trees are intelligent in their own way; they have enough intelligence for their own life. The universe is intelligent, there is intelligence hidden everywhere, and if you have eyes to see, you can see it everywhere (Osho, 2003).

2 Natural and Cultural Symbol Available

Using man-animate (*orang-orangan*) in the rice field and spray it with red garlic and white garlic for three times to against the bird. Using *sunari*, that made by bamboos pole, completely with small hole in part of bamboos, white cotton at the bamboo tip that to against the bird and rats.

Orang-orangan is the symbol of human who have the rice field, red garlic and white garlic, some call as the symbol evil spirit. *Orang-orangan* was connected by bamboos thread to moving it, when bird coming. It farmers activities protected our paddy not to kill the birds, but only making bird suffer. Onion, garlic, and calc not only as a symbol of the evil spirit, maybe it chemical can against bird. This activities is similar to the platform deep ecology (points 1, 2 and 3)

1. *The well-being and flourishing of human and non-human life on Earth have value in themselves (synonyms: intrinsic value, inherent worth). These values are independent of the usefulness of the non-human world for human purposes.*
2. *Richness and diversity of life forms contribute to the realization of these values and are also values in themselves.*
3. *Humans have no right to reduce this richness and diversity except to satisfy vital needs.*

The bird which part of life in the earth they have value in themselves, and humans have no right to reduce this richness and diversity, because richness and diversity of life forms contribute to the realization of these values. It philosophy is according to philosophy of equilibrium (Mollison 1988). Even the bacteria; life is collaboration, accommodation, exchange, and barter (Lewis 1974 in Mollison 1988).

Using *sunari*, that made by bamboos pole, completely with small hole in part, and white cotton at the bamboo tip to against the bird and rats. The sound of *sunari* from the bamboos hole when wind blow is symbol of sound *Sangsaka* that evil spirit—the power of plants. Vibration *sunari* of sound is not only symbol *Sangsakara* but maybe that vibration equal with quantum vibration.

The attitude and activities of farmers is agreed with concept of goodness because *Laksmi* closed with food. *Without Laksmi there is no food, no life sustenance* (Marglin, 1985). “*Rice originate from the body of Indra, the soma of juice flowed and because rice in this way his energies, went from him* (Kumar 1988 in Hamilton 2003). The fertility of rice crop is metaphorically equated with the fertility of human females. *Laksmi* is symbol food and essentially is a rejection of anthropocentrism. It is an assertion that human and nonhuman life should flourish. “Life”, in this context, is understood broadly, for example, river landscapes, and ecosystem.

Accepting the idea that's human are not the only valuable part of nature is the watershed perception from which deep ecology flows. Ecological ethnicities have become distinct today because they maintain the rhythm of circularity and regenerative cycles of natures, economic by cultivating appropriate cosmo visions, observing related ritual, and practicing prudence in the ways they care about nature, harvest from nature, nurture nature, and in turn are nurtured (Parajuli, 2001)

3 The Alternative Transformation of *Usada Carik* Value

Transformation value of *Usada Carik* into integrated pest management does it in a selective way. It illustrated pest management information would produce integrated pest management. The effective implementation of traditional is based on research results (Suryadarma 2005, adapted Adimihardja *et al*, 1995) (Figure 2).

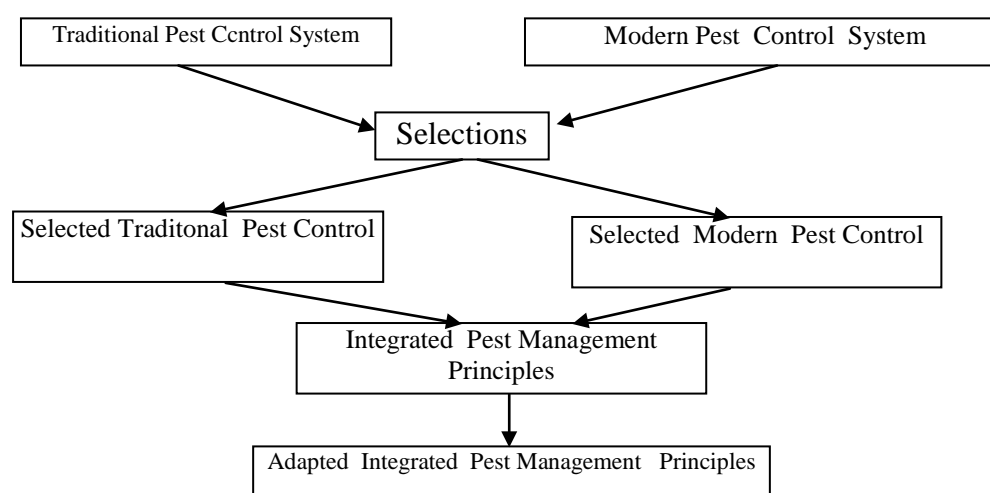


Figure 2. The Selection Processes of Traditional – Modern Knowledge

Figure 2 gives a picture of intersection between the key experts in the traditional pest control representing local community in others various experts in other to

arrange alternative solution pest control problems. For instance how to use broadcasting community that rising vibrating of cricket voices to against a rats in the rice field. How to develop research that using wild cat pheromone to control population of rat?

Conclusion

1. Structure of *Usada Carik* script had written about the method of pest management that information was written in narrative system. It structure information similar to traditional indigenous knowledge Balinese scripture.
2. To identify the numbers of paddy pest
3. To identify the number of plants use and how prepared it
4. To restructures it information contents into scientific integrated pest management

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