EXPLORING THE PREFERENCES OF ENVIRONMENTAL MANAGERS FOR MANAGEMENT OF WILD RICE RELATIVES PROTECTION SITES IN THE PUTTALAM DISTRICT OF SRI LANKA

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INTRODUCTION

The wild relatives of crop plants or *"Crop Wild Relatives"* (CWR) includes the progenitors of crops as well as other species that are more or less closely related to them. With regard to rice, there are 20 *"Rice Wild Relatives"* (RWR) found to exist globally and 5 of which are identified in Sri Lanka. These include: (1) *Oryza nivara;* (2) *Oryza granulata;* (3) *Oryza rufipogan;* (4) *Oryza eichingeri,* and (5) *Oryza rhizomatis,* which is endemic to Sri Lanka (Ilankoon and Wijesekara, 2008). Rice being the staple food of the nation, these species constitute an increasingly important resource for the future for improving agricultural production and securing the status of national and household food security. Further, they are indispensible for maintaining sustainable agro-ecosystems in numerous ways through crop improvement, for example *O. nivara* contains brown plant hopper resistant gene; *O. rhizomatis* contains the genetic potential to produce perennial rice, and *O. granulata* and *O. rufipogon* bears drought tolerant and flood resistant ability, respectively. These potentials are, however, yet to be utilized for improving the cultivated varieties of rice.

At the end of an extensive study on CWR species in Sri Lanka, which was conducted over several years covering numerous aspects including their agronomy, spatial distribution, use and conservation etc. and supported by economic valuation studies by Jayasinghe-Mudalige *et al.,* (2009) to explore the option value and the preferences of RWR conservation, a specific geographical area in the Puttalam district where the RWR are available predominately were proposed as a protection area aiming in-situ conservation. However, those RWR species predominant in this district were observed to be increasingly at risk due to economic forces causing extinction of its genetic diversity. The pursuit of environmental and natural resource conservation through protected area management has been a significant domain since the 20th century. The dominant ideology underpinning this conservation is that there is an inverse relationship between human actions and the natural resource conservation. With RWR sites being proposed as protected areas, it raises the critical question of what options prevail for the sustainable management which allows the ecosystem services to be reaped by its stakeholders. The Environmental Management Officers (EMOs) attached to various environment related government institutions play a key role in this respect. This study was, therefore, aimed to assess their perceptions and derive the implicit preference for sustainable management of these protected sites.

METHODOLOGY

For the purpose of this study, Choice Modeling (CM) Experiment, which belongs to the family of Stated Preference Methods that influences respondents to make their choices based on a hypothetical scenario (Adamowicz *et al.,* 1998), was used as the analytical tool to derive the preferences of respondents, i.e. for this case the EMOs.

A multi-stage research process was adopted to collect and analyze data. Initially, to identify the relevant Choice Attributes and Levels, a Focus Group Discussion was carried out with a panel of senior administrators / expert researchers attached to the Biodiversity Secretariat

(BDS) of the Ministry of Environment and the Central Environmental Authority (CEA) of Sri Lanka, which helped to detect 5 attributes and 3 levels for each attribute (i.e. $3^5 = 243$ combinations). These were then tested through a pilot study with a cross section of EMOs from the BDS, CEA and Senior University Academics in the discipline of agriculture (n=15). Due to the inconvenience in managing 243 combinations simultaneously, following the pilot study, they were reduced to a manageable number (i.e. $3^4 = 81$) without losing the generality.

Once the choice sets were finalized (see, Table 1), the actual experiment was carried out using 8 choice cards with a sample of 80 EMOs attached to various governmental institutes, including the BDS and CEA. The Multinomial Logit (MNL) Regression was employed to assess the relationship between the attribute and choice outcome using the "*Statistical Package for Social Sciences* (SPSS) [version 16].

RESULTS AND DISCUSSION

The percentages of different levels of an attribute selected by EMOs in the sample (n=80) for the four attributes is illustrated in Figure 1.
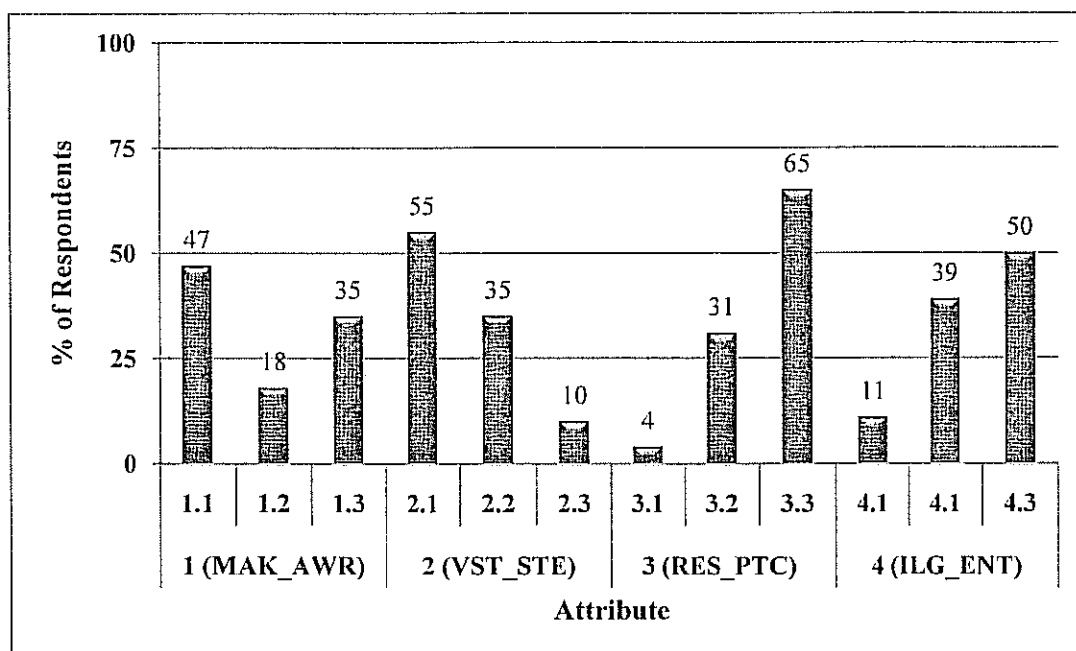
Figure 1. Preferences of Environmental Management Officers on the attributes

Making awareness is a critical factor in managing RWR as many are unaware of the existence and the importance of which on the site which, in turn cause destruction. However, mixed results were obtained with respect to who should involve in an execution of awareness programs to the potential visitors to these sites. While almost half (47%) of EMOs participated to the choice experiment were in favor of getting the support of the appropriate people from the communities adjacent to the protection sites, more than one third (35%) of respondents were on the view that it should solely be carried out by the government officers.

About 55 percent of respondents stated that "no one should be allowed" to access the identified protection sites freely, while another 35 percent have agreed to allow entrance for "only academic and research purposes". In contrast, a minority stated that entrance should be allowed to anyone, but on severe penalties for overexploitation. More than two third of respondents (65%) indicated that responsibility of protecting the site should be in the hands of government. Only a minute portion (4%) preferred to transfer the full responsibility to the community stating that they have closer relationship with the site. The rest of the 31% preferred to have a program that joins both parties, i.e. the government and community since

with awareness and formation of community-based organizations the burden of protecting these sites can be transferred to adjacent communities to some extent. Half of the respondents believed that, as the existing rules are not stringent enough to control the over exploitation and destruction, new rules must be introduced to safeguard the protection sites from illegal entrants. In contrary to which, about 40 percent EMOs indicated that existing rules are sufficient for the purpose.

Table 1 reports the results from the Multinomial Logit Regression. It highlights that all Levels considered in the analysis were significant at ρ=0.05 level. This implies that the EMOs, in general, "preferred" the attributes if it received a positive sign for its coefficient and otherwise, if the sign was negative.

Table 1. Coefficients and Standard Errors of MNL estimates

	Attribute		Level	Coefficient (SE)
			Intercept	3.517*
				(0.542)
01	Responsibility of making	1.1	Community-based organization [CBO]	2.086*
	awareness	1.2	Third party organization [TPO]	-1.139*
	[MAK_AWR]			(0.319)
		1.2	Government officers [GVO]	-0.947*
				(0.392)
02	Visits to CWR	2.1	Not be allowed [NOT]	4.960*
	protection sites	2.2	Limited to academic & research [LTD]	-1.936*
	[VST_STE]			(0.387)
		2.3	Allow anybody [ALL]	-3.020*
				(0.453)
03	Responsibility	3.1	Community 100% [COM]	-0.816*
	of protecting the	3.2	Share between community & government	-2.056*
	sites		(50% : 50%) [SHR]	(0.306)
	[RES_PTC]	3.3	Government 100% [GOV]	2.872*
				(0.457)
04	Illegal entrants	4.1	Not punish [NPN]	-7.446*
	to the protection	4.2	Punish under existing regulation [EXR]	3.553*
	sites			(0.490)
	[ILG_ENT]	4.3	Punish under new regulation [NWR]	3.893*
				(0.518)

Note:=0.05 significant level, SE=Standard Error*
Model Fitting Information; p value=0.000; Pseudo R-square; (McFadden=0.287), (Nagelkerke=0.436)

A positive coefficient for level 1.1 reflects that EMOs believed as the community-based organization have been having a closer relationship with the sites reaping the ecosystem services, their participation is imperative for sustainable management. However, en masse, the management perception is more focused on protectionism of the CWR sites. They preferred 2.1, 3.3 and 4.3 levels to the other levels which gave negative signs. They further considered that the low levels of education of adjacent community will have an adverse impact on the protection sites if entrance was free and unbound. Hence, the managers were hesitant in allowing anyone to visit the sites. The higher positive coefficient for the Attribute: "illegal entrants should be punished by formulating new rules/fines" highlights the weaknesses in enforcing prevailing policies which calls for a revision of policy tools in this respect.

CONCLUSIONS/RECOMMENDATIONS

It was evident that the preferences of the officials were predictably more biased towards a protectionism-based management system. Though they accented the involvement of community and third parties for activities such as awareness creation, they believed that the sole authority of management should strictly be with the government. Hence, it was recommended to have more stringent economic tools such as revised penalties and incentives in place against illegal entrants to restrict over exploitation. Interestingly, fully aware of the economic tradeoff, they were of the view that to achieve sustainable management, the community should be benefited from the ecosystem service which could be done by linking protection mechanisms with livelihood enhancement strategies for the community. Thus, suggestions were made towards implementing income earning strategies such as sustainable tourism and the revenue from which to be utilized to supplement the existing conservation schemes.

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ACKNOWLEDGMENT