

INSTITUTIONAL AND POLICY OPTIONS FOR
CONSERVATION OF CWR:
APPLICATION OF ANALYTIC HIERARCHY
PROCESS TO
EVALUATE WRR CONSERVATION OPTIONS

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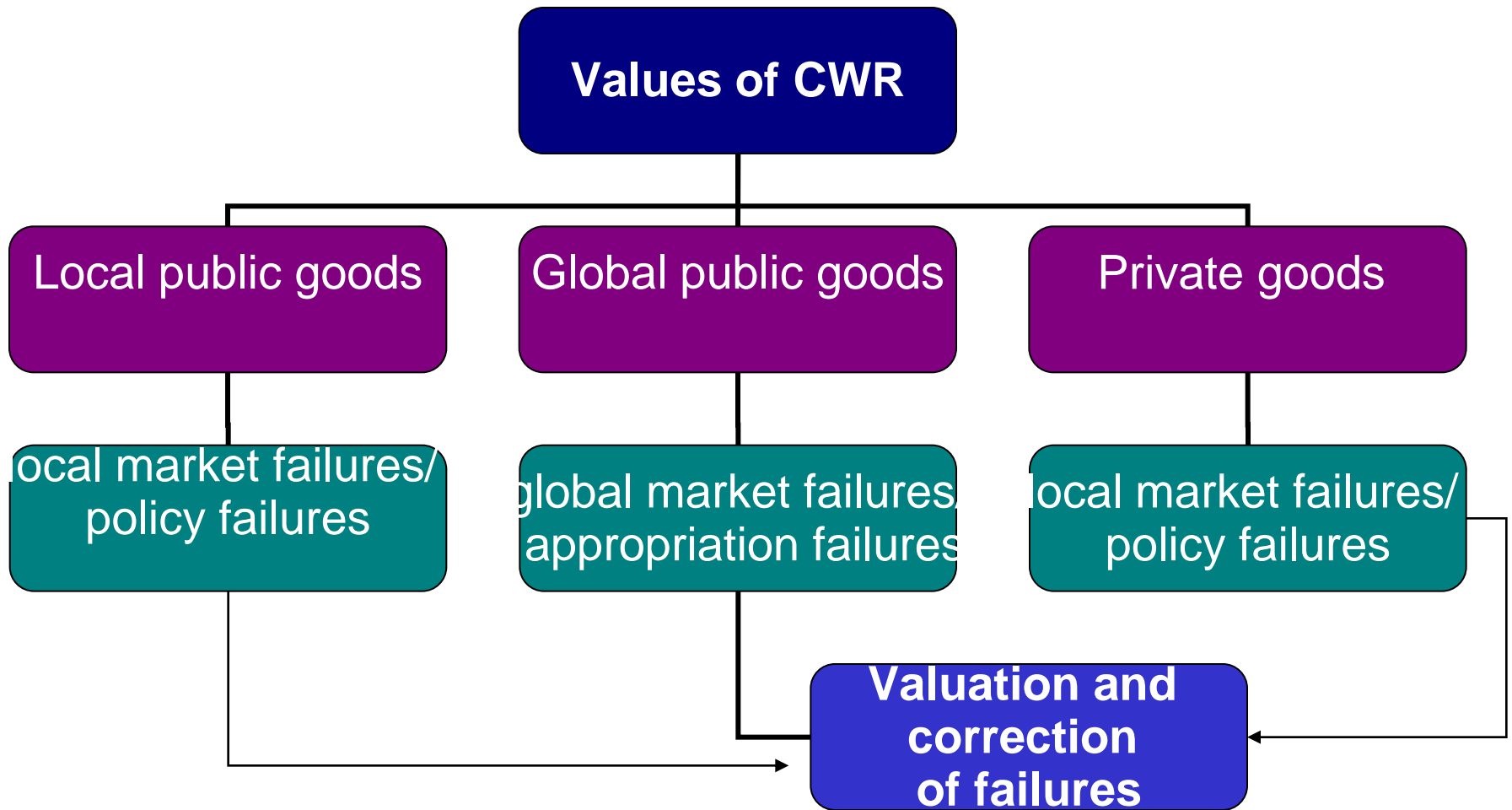
Background

- Wild relatives have economic values
 - Use values - existing direct uses
 - Option values - future uses
 - Indirect use values – functional benefits
 - Non use values - knowledge related values

- Economic values are not recognised by the market
- CWR are subjected to both policy and market failures

- This justifies the mainstreaming of CWR into national planning

Correction of Economic failures of CWR



Economic values and Policy in Sri Lanka

CWR values could be incorporated to decision making through

- ❑ Extended Cost Benefit Analysis of the EIA
- ❑ National Income Accounting (Green Accounting)
- ❑ Economic instruments
- ❑ Natural Resource Damage Assessments (NRDA)

BUT no attempts yet!

Methodology Part I – review of existing all CWR related policies

- Policies were assessed with regard to their
 - General objectives
 - Specific recommendations
 - To Recognize policy gaps
 - To make policy recommendations

Review of existing policies/ strategies

- ❑ Agricultural policy
- ❑ Forest policy
- ❑ Wild Life Policy
- ❑ Environmental Policy
- ❑ National Environmental Action plan
- ❑ National Environment Act
- ❑ Biodiversity Conservation Action Plan
- ❑ National Action Plan For Agrobiodiversity Conservation and Sustainable Utilization in Sri Lanka

Agricultural Policy 2007

Utilization and sharing of plant genetic resources

- ❑ Collect and conserve crop varieties and their wild relatives for future crop breeding and improvement programmes
- ❑ Develop and maintain diverse farming systems for ex-situ conservation of crop genetic resources
- ❑ Use farmer participatory breeding methods for utilization of crop genetic resources
- ❑ Adopt suitable strategies to preserve national identity on utilization and sharing of benefits of genetic resources with other countries through international treaties

COMMENT

Agricultural policy provides an explicit, very comprehensive framework for the conservation of CWR. However, its main focus is on the ex situ conservation and the option values of CWR.

Forest policy

1. National forest policy objectives

- 1.1 To conserve forests for posterity, with particular regard to biodiversity, soils, water, and historical, cultural, religious and aesthetic values.
- 1.3 To enhance the contribution of forestry to the welfare of the rural population, and strengthen the national economy, with special attention paid to equity in economic development.

2. Policy on management of state forest resources

- 2.1 All state forest resources will be brought under sustainable management both in terms of the continued existence of important ecosystems and the flow of forest products and services.
- 2.4 For the management and protection of the natural forests and forest plantations, the state will, where appropriate, form partnerships with local people, rural communities and other stakeholders, and introduce appropriate tenurial arrangements.

3. Policy on management of private forest and tree resources

3.1 Tree growing on homesteads, and other agroforestry, will be promoted as a main strategy to supply wood and other forest products for meeting household and market needs.

6. Policy on intersectoral linkages

6.5 The general public and industries will be educated about the importance of forestry, and of conserving biodiversity and protecting watersheds.

COMMENTS

- ❑ The broad conservation within the natural forests has been ensured fully.
- ❑ However, the policy on management of homegardens has its focus only on the provision of direct products.
- ❑ Ex situ conservation aspects are not specifically mentioned.
- ❑ Explicit recognition of the wild relatives has not been made.
- ❑ Allowances are provided for the awareness and participation of local people.

National Wildlife policy

- ❑ This is a comprehensive policy which incorporates all aspects related to both wild plants and animals.
- ❑ Provisions for conservation of wild relatives are provided in a much broader setting with aspects such as traditional knowledge and community involvement in decision making.

Environmental Policy

- ❑ **Biological diversity**
- ❑ Adequate protection provided, by in-situ conservation measures, to all species of fauna and flora that are threatened, including the wild relatives of cultivated species.
- ❑ The propagation and cultivation of local cultivars of food species that represent a valuable and threatened agricultural gene pool, encouraged.
- ❑ The ex-situ conservation of genetic stocks of agricultural species and their wild relatives is provided for.

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- ❑ The value of biodiversity recognized in national accounting.
 - ❑ Research and studies are carried out on aspects of conservation and sustainable use of biodiversity.
 - ❑ Sri Lanka's traditional knowledge on biodiversity is protected, and access to indigenous biodiversity by foreign organizations/persons prevented unless equitable benefits to this country are assured.

□ **Forestry and wildlife conservation**

- Regulate the import and export of genetic resources so as to ensure that the principle of sustainable use and equitable sharing of benefits is adhered to.

□ **Agriculture, plantation, land management and mining**

- Promote the conservation of traditional varieties of plant and animal species used in agriculture and animal husbandry and the conservation of wild stocks of related species and varieties

National Action Plan For Agrobiodiversity Conservation and Utilization in Sri Lanka

- ❑ Critically **review the current knowledge on agrobiodiversity** (status, trend, threat assessment, goods and services provided, economic values, policy gaps).
- ❑ Conduct a comprehensive **agrobiodiversity resource survey to fill gaps** (status, trend, threat assessment, goods and services provided, economic values, policy gaps).
- ❑ **Compile indigenous knowledge** related to crop and animal (including fish) genetic resources.
- ❑ Review all **Intellectual Property Right (IPR) issues** on agrobiodiversity and strengthen IPR knowledge among stakeholders.

- ❑ Enhance mechanisms to **share benefits** of agrobiodiversity through **ecotourism and bioprospecting**.
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- ❑ Strengthen **national literacy on agrobiodiversity**
 - ❑ Strengthen public awareness on agrobiodiversity at informal and formal sectors.
 - ❑ Strengthen **national nutrition literacy** and its link to agrobiodiversity through participatory knowledge management.
 - ❑ Strengthen national **research capacity** and research on agrobiodiversity
 - ❑ Promote conservation and utilization of Crop Wild Relatives (CWR).
 - ❑ Promote agrobiodiversity conservation and utilization through “**model biovillages**”.

National Environment Act

- ❑ There are 9 Ministries in Sri Lanka that are directly involved in addressing the land issues.
- ❑ Main issues related to land resource in Sri Lanka are, deforestation in the catchments areas, poor agricultural practices, illegal encroachment, unplanned development activities, disposal of solid waste etc;
- ❑ The adverse effects on the environment caused by these issues include, loss of bio-diversity, soil erosion, landslides, flooding, loss of scenic beauty and threats on water resource.

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- The National Environmental Act No.47 of 1980, which is an umbrella law, has provisions to declare **Environmental Protection Areas**, under section 24 C, and 24 D, to control such adverse effects, in areas which are not covered under any other law.

BDFAP Addendum

- ❑ 1. Recognize the existence of agricultural biodiversity and its importance in conservation, and ensure integration of these in national policies, plans and action programs.
- ❑ 2. Survey, inventory and making estimates of genetic resources for food and agriculture (PGRFA and FAnGR) at all levels in order to identify and designate priority/specific areas for *in situ*/ on-farm conservation including homegardens within or outside the protected ecosystems.
- ❑ 3. Formulate, adopt and enforce appropriate regulatory and other related legal measures to conserve agricultural biodiversity, ensure rights of holders of traditional knowledge, and facilitate access, sustainable use and equitable sharing of benefits in agricultural production systems.

Identification of policy gaps

- ❑ The policies address the issue of CWR from various points of views;
- ❑ However, a holistic approach to the problem is missing.
- ❑ For example, The National agrobiodiversity strategy has its main focus on agriculture related biodiversity.
- ❑ The other biodiversity yet to be explored is therefore ignored which might be important in terms of optional values.

Main policy gaps

1. Information gaps
2. Non recognition of interlinkages between policies and institutions

1. Information gaps

- Information gaps exist at various levels. The present information is mainly related to plant breeding and taxonomic status.
- The information base need to be expanded in a more comprehensive way and should be able to aid decision making at various levels.

Recommendations

The information base should include the following:

1. Biological/ genetic information

- information at genetic level
- species level - distribution patterns
- taxa level - distribution patterns
- information on primary centers and secondary centres

2. Sociological information

1. Socioeconomic features of the people who possess CWR
 2. Preferences of various groups towards CWR
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3. Economic information

1. Economic values of CWR in terms of different stakeholder groups
2. Indirect values of other biodiversity that indirectly help CWR

4. Information related to conservation biology of CWR

5. Information related to institutional/legal mechanisms that conserve CWR

- efficiency of existing institutions
- distinguishing different roles played by each institution, for example,
 - education
 - awareness
 - conservation, ex situ, in situ and on farm
 - environmental monitoring
 - Fundamental research on CWR – genetic aspects, conservation biological aspects, sociological aspects, economic aspects, institutional and legal aspects
 - Applied Research on CWR - development of new crops
- coordination among institutions
- The need to create new institutions
- amendments to existing legislation

Policy gap 2. Non recognition of interlinkages between policies and institutions

- ❑ There are various institutions involved in CWR.
- ❑ It is necessary that a proper links are maintained among these institutions in order to achieve effective conservation and utilization.

Institution	Role
Department of wildlife	In situ conservation
Forest Department	In situ conservation, declaration of new areas for conservation
Central Environmental Authority	Monitoring impacts of development on biodiversity declaration of new areas for conservation
Department of Agriculture	Ex situ conservation
Plant genetic resources centre	Ex situ conservation
Botanical gardens	Ex situ conservation
Rice and other research institutions	Development of new crops
Universities	Fundamental research on CWR
Schools	Education/ awareness

Recommended new Institutional mechanisms

- ❑ Establish National Agrobiodiversity Conservation Advisory Group
- ❑ Strong Coordination mechanism between PGRC , Biodiversity Secretariat, Agriculture Department and Environmental Ministry
- ❑ Establishing PGRC as an independent body?
- ❑ Incorporating CWR assessment to existing EIA ecological assessment
 - Amendment to NEA
- ❑ Better use of EPAs of CEA

Methodology Part II

Selection of the best policy alternative
for CWR conservation using Analytic
Hierarchy Process (AHP) method

The need of a Multi Criteria Method

CWR conservation is a multidisciplinary problem. It involves various

- ❑ Disciplines – taxonomy, conservation biology, economics, sociology
- ❑ Institutions - Government conservation organisations (both in situ and ex situ), research institutes, education and awareness institutes, Agricultural institutes
- ❑ Stakeholders – farmers, researchers, general public, policy makers

Which justify the analysis from a multi criteria perspective

Analytical hierarchy process (AHP)

- ❑ A complex problem is decomposed into a hierarchy
- ❑ goal (objective) at the top of the hierarchy,
- ❑ criteria at next level of the hierarchy
- ❑ decision alternatives at the bottom of the hierarchy.
- ❑ Elements at given hierarchy level are compared in pairs to assess their relative preference with respect to each of the elements at the next higher level.

□ A scale of 1–9 is used to assess the intensity of preference between two elements.

1 indicates equal importance,

3 moderately more,

5 strongly more,

7 very strongly and

9 extremely more importance

Objective

Selection of the Best Option for CWR conservation

Criterion 1

Future Benefits

Criterion 2

Educational Importance

Criterion 3

Recreational Benefits

Criterion 4

Indirect Benefits

Alternative 1
In-Situ Con.

Protected Areas

Alternative 2
In situ con.

Specially designed areas

Alternative 3
In-Situ Con

Private lands

Alternative 4
Ex-Situ Con

RRIs

Alternative 5
Ex-Situ Con

Genetic Resource gardens

Alternative 6
Ex-Situ Con

PGRC

Data collection methods

- Pre tested Questionnaire
- Five stakeholder groups
 - experts (15)
 - policy makers (10)
 - Breeders (5)
 - farmers (30)
 - general public (30)
- Respondents were asked to rank criteria and each alternative with respect to each criterion
- The rankings were converted to eigenvectors and a composite ranking for each criterion and each alternative was developed.
- General attitudes on other places of conservation, tools on increasing awareness, and new institutional mechanisms proposed were also obtained.

Calculation

- Pairwise ranking
- Converting the fractions to the decimal places
- Computing the first eigenvector and First Normalizing
- Finding the difference between first eigenvector and second eigenvector
- Deriving the final eigenvector
- Deriving the rank

Results - Most important benefit from conserving WRR

	Farmers	Experts	Policy Makers	Breeders	General public
Recreational benefit	3	2	2	3	3
Educational Benefit	2	3	3	2	1
Future Benefit	1	1	1	1	2
Indirect benefit	4	4	2	4	4

Best conservation option

		Farmers	Experts	Policy Makers	Breeders	General public
In-Situ	Special areas	5	2	5	4	5
	PA's	6	1	1	1	3
	Pvt Lands	4	3	4	5	6
Ex-Situ	PGRC	2	6	2	1	2
	Genetic Resource Gardens	3	4	6	3	4
	RRI	1	5	3	2	1

Observations

- The relative ranking of different types of benefits indicate that future benefits are preferred by the majority of stakeholders.
- The most preferred conservation option varies among different stakeholders,
- The expert groups' preferences were for in-situ conservation while non-experts preferred ex-situ options.

Opinions on Other methods of Conserving WRR

Rank	Experts	Policy Makers	Farmers	Breeders	General public
1	Ecotourism oriented hotels	Ecotourism oriented hotels	Schools	Public places	Schools
2	Schools	Schools	Public places	S, H, R	Public places
3	Religious places	Religious places	Ecotourism oriented hotels		Religious places
4	Public places	Public places	Religious places		Ecotourism oriented hotels

Tools for increasing awareness

- ❑ **Workshops** for target groups; and involvement of those directly affected by CWR conservation at a local level
- ❑ Training unemployed/underemployed youth as **guides** on CWR species in collaboration with Sri Lanka Tourist board
- ❑ Inclusion in the school **curricula** in secondary education and in Universities (advanced level Bio resources Technology syllabus in soft technology)
- ❑ Preparation of printed (newsletters, brochures, reports) and electronic (videos, Internet) **promotional material**; newspaper and radio and television coverage
- ❑ Development of a **map** with GPS coordinates and pictures of conserved areas, varieties etc. for public awareness and motivate them for in-situ conservation

Tools for increasing awareness

Rank	Experts	Policy Makers	Farmers	Breeders	General public
1	Workshops	Curricula	Workshops	Promotional material	Promotional material
2	Training guides /curricula	Workshops	Promotional material	Curricula	Workshops
3	Promotional material	Training guides	Curricula	Maps	Curricula
4	Maps	Promotional material	Training guides	Workshops	Training guides
5		Maps	Maps	Training guides	Maps

Recommendations

- Integrated approaches involving both in-situ and ex-situ approaches would be the best option for WRR conservation.

Other Criteria to make judgments on policy options

□ Economic

- Comparing opportunity costs with CWR economic values
- Economic value of CWR - derived from related crop value
- Possibility of incorporation of global values

□ Harlan and de Wet (1971) gene pool concept

□ Threat assessments (using abundance as criteria/ IUCN lists)

□ Cultural assessments

The way forward

- ❑ Linking national policies with global policies
- ❑ Integration of ex situ and in situ conservation
- ❑ New institutional mechanisms

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