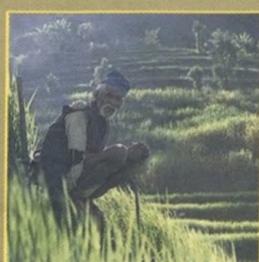
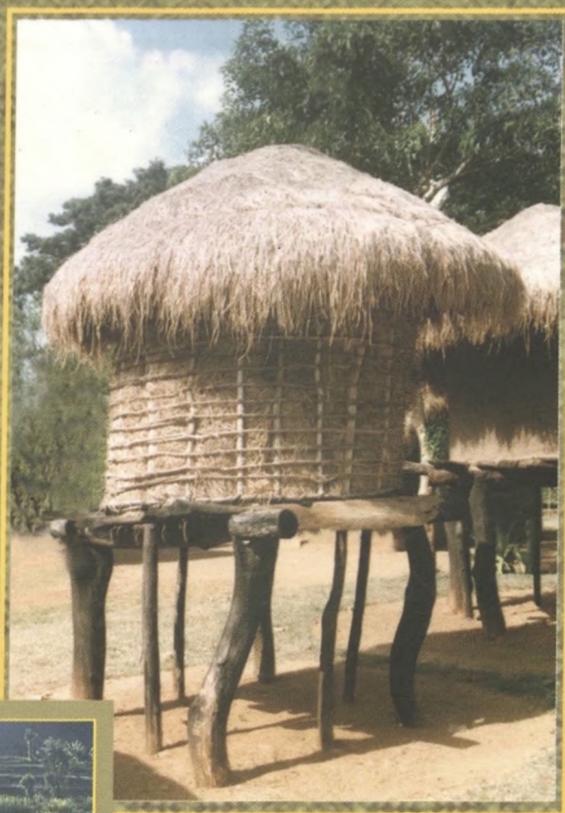


AN UNCERTAIN FUTURE:

Traditional Plant Varieties and their Crop Wild Relatives in Sri Lanka



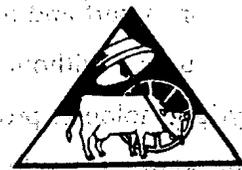
SOUTH ASIA WATCH ON TRADE, ECONOMICS AND ENVIRONMENT

**South Asia Watch on Trade,
Economics & Environment (SAWTEE)
Kathmandu**



**Law & Society
Trust (LST)
Colombo**

AN UNCERTAIN FUTURE:
Traditional Plant Varieties and their
Crop Wild Relatives in Sri Lanka



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AN UNCERTAIN FUTURE: Traditional Plant Varieties and their Crop Wild Relatives in Sri Lanka

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Preface

This research report on *Traditional Plant Varieties and their Crop Wild Relatives in Sri Lanka* is an outcome of Phase II of the Farmers' Rights to Livelihood project in partnership with South Asia Watch on Trade, Economics and Environment (SAWTEE) and supported by the Ford Foundation (New Delhi) and Novib (The Hague). This project is concerned with farmers' rights relating to genetic resources in the context of globalisation and the World Trade Organisation.

Chapter I contributed by Dr. Gamini Hitinayake documents traditional and crop wild varieties in Sri Lanka, their geographical distribution and usages. It also surveys farmers' perceptions as to the advantages and disadvantages of using such varieties. Chapters II and III written by Mr. Jagath Gunawardena identifies threats to the protection of crop genetic resources such as bio-theft and bio-piracy. It goes on to critique the UN Food and Agriculture Organisation's International Treaty on Plant Genetic Resources in Food and Agriculture (ITPGRFA) as well as the World Trade Organisation's Trade-Related Intellectual Property Rights (TRIPS) Agreement.

One finding common to both researchers is that awareness of traditional crop varieties and wild relatives, and of their uses, is in decline even within farming communities. Another observation in common is that state authorities have been slow to take action to arrest threats to biodiversity conservation through appropriate legal reforms and practical measures.

The 1992 United Nations Convention on Biological Diversity (CBD) promised that states would retain sovereign rights over access to their biological resources and that benefits arising from the use of those resources would be fairly shared (Access and Benefit Sharing – ABS). Stakeholders, particularly local communities, were also assured that they would receive information about and be consulted on any proposed initiative and its likely impacts and enabled to meaningfully participate in the process (Prior Informed Consent – PIC), before research and utilisation of genetic resources is authorised.

However subsequent international instruments such as the TRIPS agreement and the ITPGRFA seriously erode principles of Access and Benefit Sharing and Prior Informed Consent contained in the Convention on Biological Diversity.

The LST hopes that this research report and other activities of the project will contribute towards engendering a favourable policy environment that supports farmers' rights to plant genetic resources; and that policymakers will recognise the importance of farmers' participation in decision making processes that affect them.

CHAPTER 1

TRADITIONAL VARIETIES AND WILD RELATIVES OF CROP PLANTS IN SRI LANKA

Dr Gamini Hitinayake

1.0 INTRODUCTION

Crop wild relatives are important both for increasing agricultural production and for maintaining sustainable agroecosystems. The wise conservation and use of crop wild relatives are essential elements for increasing food security, eliminating poverty and maintaining the environment. The genes that come from crop wild relatives make a direct contribution to increase production, food quality and human wellbeing through poverty alleviation.

A number of cultivated food plants have their wild relatives. Wild relatives of crop plants include the progenitors of crops as well as species more or less closely related to them.

Crop wild relative species have already made substantial contributions to improving food production through the useful genes they contribute to new crop varieties. Genes that provide resistance to pests and diseases have been obtained from crop wild relatives and used in a wide range of crops, including rice (e.g. virus resistance from *oryza nivara*), potato (e.g. potato blight), wheat (e.g. powdery mildew and rusts) and tomato (e.g. *fusarium* and nematodes). Genes from crop relatives have been used to improve protein content in wheat and vitamin C content in tomato. Broccoli varieties producing high levels of anti-cancer compounds have been developed using genes obtained from wild Italian *brassica oleracea*. Crop wild relatives have also been a source for genes for abiotic stress tolerance in many crops.

The natural populations of many species of crop wild relatives are increasingly at risk. They are threatened by habitat loss and by increasing destruction of natural environments. Destruction of forests is leading to the loss of many populations of important wild relatives of fruit, nut and industrial crops such as mango and rubber.

Many cereal crop wild relatives, including wild wheat and millet species, occur in arid or semi-arid lands and are severely affected by over-grazing and desertification. Mountain areas, which may possess wild relatives of potato, tomato and fruit crops, are particularly vulnerable to the loss of wild relatives, as these fragile ecosystems are easily eroded as population pressure increases. Crop wild relatives are also traditionally found as natural inhabitants of agroecosystems, in and around farms; the increasing industrialisation of agriculture is reducing their occurrence.

Many species of important crop wild relatives are found in centres of plant diversity and crop diversity in developing countries, which often lack resources to invest in the necessary conservation activities. Additional resources are urgently needed in such areas of high diversity to identify species that should have conservation priority, determine the necessary conservation activities, monitor key species' status, improve the use of these valuable resources in supporting production systems less dependent on external inputs such as pesticides, and ensure that communities in these areas obtain full benefits from the use of these resources.

2.0 ACCESSIONS OF TRADITIONAL CROP PLANTS AND WILD RELATIVES AT PLANT GENETIC RESOURCES CENTRE

Table 1
Summary of crops accessions at the Plant Genetic Resource Centre (PGRC), Gannoruwa, Peradeniya

| Crops species | Number of accessions |
|---|----------------------|
| Rice | |
| <i>Oryza sativa</i> (traditional & cultivars) | 3 194 |
| <i>Wild relatives</i> | 17 |
| Coarse Grains | |
| <i>Eleusine coracana</i> | 195 |
| <i>Panicum miliaceum</i> | 28 |
| <i>Setaria italica</i> | 71 |
| <i>Paspalum scrobiculatum</i> | 5 |
| <i>Zea mays</i> | 223 |

| | |
|------------------------------------|-----|
| <i>Sorghum bicolour</i> | 52 |
| Grain Legumes | |
| <i>Vigna unguiculata</i> | 165 |
| <i>Vigna radiate</i> | 64 |
| <i>Vigna mungo</i> | 28 |
| <i>Vigna umbellate</i> | 18 |
| <i>Macrotyloma uniflorum</i> | 30 |
| <i>Psophocarpus tetragonolobus</i> | 395 |
| <i>Canavalia ensiformis</i> | 15 |
| <i>Phaseolus lunatus</i> | 31 |
| <i>Lablab niger</i> | 19 |
| <i>Pisum sativum</i> | 13 |
| <i>Glycine max</i> | 204 |
| <i>Mucuna pruriens</i> | 4 |
| <i>Pachyrrhizus spp.</i> | 1 |
| Vegetables | |
| <i>Momordica charantia</i> | 72 |
| <i>Momordica dioica</i> | 4 |
| <i>Trichosanthes cucumerina</i> | 28 |
| <i>Luffa acutangula</i> | 58 |
| <i>Luffa aegyptica</i> | 18 |
| <i>Cucurbita spp.</i> | 120 |
| <i>Benincasa hispida</i> | 22 |
| <i>Cucumis spp.</i> | 129 |

The status of collection and maintenance of different germplasm (including wild varieties, traditional and new) is shown in Table 2.

Table 2
Germplasm collection status by crop plants at the Plant Genetic Resource Centre (PGRC), Gannoruwa, Peradeniya

| Crop Group | Number of | | Percentage Collection |
|------------------------|------------|---------------|-----------------------|
| | Species | Accessions | |
| Rice | 2 | 3 809 | 34.0 |
| Other cereals | 9 | 785 | 7.0 |
| Grain legumes | 14 | 1 907 | 17.0 |
| Vegetables | 52 | 2 927 | 26.1 |
| Spices and condiments | 9 | 500 | 4.5 |
| Fruits | 16 | 363 | 3.2 |
| Root and tubers | 7 | 309 | 2.8 |
| Oil seeds | 3 | 180 | 1.6 |
| Medicinal plants | 12 | 21 | 0.2 |
| Wild relatives of crop | 26 | 308 | 2.7 |
| Species | | | |
| Other | - | 96 | 0.9 |
| Total | 180 | 11 205 | 100 |

Source: Ministry of Forestry and Environment (1998), Biodiversity Conservation in Sri Lanka – A Framework for Action

3.0 OBJECTIVES

The present study was conducted to identify

- Traditional Crop Varieties and their Wild Relatives; and
- Uses, Perceptions and Protection of Traditional Varieties of Crop Plants and their Wild Relatives

3.1 METHODOLOGY

A list of genetic material of traditional crop plants and their wild relatives was compiled based on the catalogue of the germplasm accessions maintained by the Plant Genetic Resources Centre (PGRC), Gannoruwa in Peradeniya. PGRC has the largest and most comprehensive collection of accessions of traditional crop plants in Sri Lanka.

Also another list of traditional crop plants and Crop Wild Relatives was compiled using the information given in the Flora of Ceylon (Fosberg, *et al*, 1994). This is given in Appendix 2. The list consists of 55 plant species used as vegetables, wild fruits, spices and in making herbal teas/porridges.

A survey was conducted with farmers in three locations in order to understand their perceptions about the traditional crop varieties and their wild relatives and their conservation. The three locations were Kurunegala (Ibbagamuwa, Galgamuwa, Kumbukwewa), Hanguranketha and Kandy (Kundasale). Conservation of traditional varieties by farmers was also investigated at three other locations namely, Polonnaruwa, Mahiyanganaya and Moneragala in addition to above locations. The questionnaire used for the survey is reproduced as Appendix 1.

4.0 FINDINGS OF THE STUDY

4.1 IDENTIFICATION OF TRADITIONAL PLANT VARIETIES AND CROP WILD RELATIVES

Traditional crop accessions maintained at the PGRC, Gannoruwa in Peradeniya are given in Table 3. As said before PGRC is the national institute which has the mandate for collection and maintenance of Plant Genetic Resources of Sri Lanka. It has the largest and most comprehensive collection of traditional and wild relatives of crop plants in Sri Lanka.

| Plant Name | Scientific Name | Accession Name | Origin | Number of types |
|----------------------|-------------------------|--------------------------|---------------|------------------------|
| 01. Rice | <i>Oryza sativa</i> | Traditional & cultivated | Sri Lanka | 2469 |
| 02. Wild Rice | <i>Oryza nivara</i> | - | Anuradhapura | |
| | | Uru Wee | Puttalam | |
| | | V 15 | Sri Lanka | |
| | <i>Oryza rufipogon</i> | Uru Wee | Gampaha | |
| | | V 27 | Sri Lanka | |
| | <i>Oryza eichingeri</i> | V 6 | Sri Lanka | |
| | <i>Oryza sp.</i> | - | Puttalam | |
| 03. Maize | <i>Zea mays L.</i> | Baby corn | Thailand | 2 |

| | | | | |
|--|--|-----------------------------|---------------------|-----------|
| | | Bada iringu | Anuradhapura | 20 |
| | | | Badulla | 15 |
| | | | Hambantota | 17 |
| | | | Kandy | 10 |
| | | | Kegalle | 2 |
| | | | Kurunagala | 7 |
| | | | Matale | 10 |
| | | | Matara | 1 |
| | | | Mexico | 1 |
| | | | Monaragala | 6 |
| | | | Nuwara Eliya | 17 |
| | | | Polonnaruwa | 6 |
| | | | Ratnapura | 6 |
| | | | Thailand | 1 |
| | | Rathu | Matale | 1 |
| | | | Unknown | 2 |
| | | Bala iringu | | |
| | | Hane iringu | Kandy | 1 |
| | | Haramas bada iringu | Anuradhapura | 1 |
| | | | Monaragala | 1 |
| | | Heenati bada iringu | Polonnaruwa | 1 |
| | | Iringu | Badulla | 1 |
| | | | Kandy | 1 |
| | | Kiramana iringu | Badulla | 1 |
| | | Kiri bada iringu | Anuradhapura | 3 |
| | | Maha bada iringu | Ratnapura | 1 |
| | | Maha iringu | Ratnapura | 1 |
| | | Mannaram bada iringu | Kurunagala | 1 |
| | | Mukala iringu | Kandy | 1 |
| | | | Monaragala | 1 |

| | | | | |
|--------------------|---------------------------------|--------------------|--------------|---|
| | | | Ratnapura | 1 |
| | | Mukla iringu | Kandy | 1 |
| | | Pbalu iringu | Badulla | 1 |
| | | Ratu bada iringu | Monaragala | 1 |
| | | Siwru bada iringu | Kurunagala | 1 |
| | | Siwuru bada iringu | Anuradhapura | 1 |
| | | Sudu bada iringu | Kandy | 1 |
| | | Sudu iringu | Kandy | 1 |
| | | Tunmas iringu | Monaragala | |
| | | | | |
| 04. Sorghum | <i>Sorghum bicolor (L.)</i> | Bath iringu | Hambantota | |
| | | Edal iringu | Badulla | 1 |
| | | | Kandy | 1 |
| | | | Kurunagala | 3 |
| | | | Matale | 1 |
| | | | Monaragala | 2 |
| | | | Nuwara Eliya | 1 |
| | | Edal iringu | Hambantota | 1 |
| | | Edal iringu | Matale | 1 |
| | | Idal iringu | Anuradhapura | 1 |
| | | | Badulla | 1 |
| | | | Kegalle | 1 |
| | | | Matale | 1 |
| | | | Monaragala | 3 |
| | | | Nuwara Eliya | 1 |
| | | Karal iringu | Kurunagala | |
| | | | Matale | |
| | | | Monaragala | |
| | | Karal iringu | Hambantota | |
| | | Karal iringu | Kandy | |
| | | Karalliya | Galle | |

| | | | | |
|-----------------------|----------------------|---------------------|-------------|---|
| | | Poth eringu | | |
| | | Rata kurakkan | | |
| | | Rathu thiringu | | |
| | | Red sorghum | | |
| | | Rice sorghum | | |
| | | | | |
| 05. Green gram | <i>Vigna radiata</i> | Ali mung | Monaragala | |
| | | Anju mung | | |
| | | Boowa mung | Hambantota | |
| | | Gaja mung | Monaragala | 1 |
| | | | Ratnapura | 1 |
| | | Kaha mung | Anuradapura | 2 |
| | | | Hambantota | 1 |
| | | | Kandy | 1 |
| | | | Kurunegala | 4 |
| | | | Matale | 2 |
| | | | Monaragala | 3 |
| | | Kalu karal mung eta | Matale | 2 |
| | | Kalu mung | Anuradapura | 1 |
| | | Kola mung | Kurunegala | 1 |
| | | Maha mung | Hambantota | 1 |
| | | Mung | Anuradapura | 4 |
| | | | Hambantota | 1 |
| | | | Kegalle | 1 |
| | | | Monaragala | 1 |
| | | | Kurunegala | 1 |
| | | | Polonnaruwa | 1 |
| | | Mung eta | Hambantota | 2 |
| | | | Ampara | 1 |
| | | | Anuradapura | 3 |
| | | | Monaragala | 2 |
| | | Pinna mung | Hambantota | 8 |

| | | | | |
|-----------------------|--------------------|-----------------|--------------|---|
| | | | Ratnapura | 2 |
| | | Pinna mung kaha | Ratnapura | 1 |
| | | Pinna mung kola | Ratnapura | 1 |
| | | Pisna mung | Hambantota | 2 |
| | | Thel mung | Monaragala | 1 |
| | | Tissa mung | Hambantota | 1 |
| | | Thissa mung | Kurunegala | 1 |
| | | Weda mung | Monaragala | 6 |
| | | Yellow gram | | |
| | | Heen mung | Kegalle | |
| | | | | |
| 06. Black gram | <i>Vigna mungo</i> | Gas undu | Anuradapura | 1 |
| | | | Badulla | 1 |
| | | | Kurunegala | 1 |
| | | | Monaragala | 1 |
| | | Undu | Anuradapura | 2 |
| | | | Badulla | 1 |
| | | | Kurunegala | 1 |
| | | | Monaragala | 3 |
| | | | Kandy | 5 |
| | | | Matale | 7 |
| | | | Nuwara Eliya | 4 |
| | | | Polonnaruwa | 1 |
| | | | Ratnapura | 1 |
| | | Wel undu | Matale | 2 |
| | | | Monaragala | 1 |
| | | | | |
| 07. Soya Bean | <i>Glycine max</i> | Maturata soya | Nuwara Eliya | 1 |
| | | Soya | Nuwara Eliya | 1 |
| | | Soya bonchi | Nuwara Eliya | 3 |
| | | | Badulla | 1 |
| | | | | |

| | | | | |
|------------------------|---------------------------|---------------------|--------------|---|
| 08. Common Bean | <i>Phaseolus vulgaris</i> | Bonchi | Nuwara Eliya | 1 |
| | | Bonchi (Butter) | Badulla | 1 |
| | | Butter bonchi | Badulla | 2 |
| | | | Nuwara Eliya | 3 |
| | | | Ratnapura | 1 |
| | | Dampata bonchi | Badulla | 1 |
| | | Gas bonchi | Badulla | 2 |
| | | | Nuwara Eliya | 1 |
| | | Gus bonchi | Badulla | 1 |
| | | Kaha murunga bonchi | Nuwara Eliya | 1 |
| | | Kaha roii | Badulla | 1 |
| | | Kalu bonchi | Badulla | 1 |
| | | Kalci roll | Badulla | 1 |
| | | Kalu murunga bonchi | Badulla | 2 |
| | | Kalu wel bonchi | Badulla | 1 |
| | | Katugastota bonchi | Badulla | 4 |
| | | Keti murunga | Kandy | 1 |
| | | Keti murunga bonchi | Kandy | 1 |
| | | | Nuwara Eliya | 1 |
| | | Kollu bonchi | Badulla | 4 |
| | | | Nuwara Eliya | 1 |
| | | Kotrole bonchi | Badulla | 1 |
| | | Me karal | Kandy | 1 |
| | | Murunga bonchi | Badulla | 9 |
| | | | Ratnapura | 1 |
| | | | Nuwara Eliya | 3 |
| | | Nari bonchi | Kandy | 5 |
| | | | Nuwara Eliya | 1 |

| | | | | | |
|------------|---------------------------|------------------------------|--------------|-------------|---|
| | | Nil bonchi | Nuwara Eliya | 1 | |
| | | | Badulla | 1 | |
| | | Panduru bonchi | Badulla | 3 | |
| | | Peas butter | Badulla | 1 | |
| | | | Badulla | 1 | |
| | | Peas butter bonchi | Badulla | 2 | |
| | | | Nuwara Eliya | 1 | |
| | | Pole bean | Badulla | 1 | |
| | | Pothu bonchi | Nuwara Eliya | 1 | |
| | | Rila bonchi | Nuwara Eliya | 1 | |
| | | Role bonchi | Badulla | 1 | |
| | | Setti murunga | Kandy | 1 | |
| | | Short murunga bonchi | Nuwara Eliya | 1 | |
| | | Sinhala bonchi | Nuwara Eliya | 1 | |
| | | Sitti murunga | Kandy | 1 | |
| | | | Nuwara Eliya | 3 | |
| | | Sudu bonchi | Badulla | 2 | |
| | | | Nuwara Eliya | 1 | |
| | | Sudu murunga bonchi | Badulla | 1 | |
| | | Sudu paturu bonchi | Badulla | 1 | |
| | | Wairan murunga | Nuwara Eliya | 1 | |
| | | Wel bonchi | Nuwara Eliya | 2 | |
| | | Wel murunga bonchi | Kandy | 2 | |
| | | | | | |
| 09. | Yard-long Bean | <i>Vigna unguiculata</i> | Bamba me | Anuradapura | 1 |
| | | | Batic me | Puttalam | 1 |
| | | | Bim me | Kalutara | 2 |
| | | | Bim polon me | Kalutara | 1 |

| | | | | |
|--|--|--------------|--------------|---|
| | | Bin me | Kalutara | 1 |
| | | Bonchi ma | Badulla | 1 |
| | | Bonchi me | Hambantota | 1 |
| | | | Ratnapura | 1 |
| | | Boo me | Matale | 1 |
| | | Bushita | Anuradapura | 1 |
| | | | Puttalam | 1 |
| | | Bushitawo | Hambantota | 1 |
| | | Butter me | Puttalam | 1 |
| | | Cowpea | Hambantota | 4 |
| | | | Kandy | 1 |
| | | | Moaragala | 1 |
| | | | Nuwara Eliya | 1 |
| | | Digapolon me | Kalutara | 1 |
| | | Dumburu me | Kandy | 1 |
| | | Gan bushita | Gampaha | 1 |
| | | Hane mae | Matale | 1 |
| | | Hawai me | Nuwara Eliya | 1 |
| | | Hawari me | Anuradapura | 2 |
| | | | Gampaha | 1 |
| | | | Kandy | 2 |
| | | | Puttalam | 1 |
| | | Hean lee me | Nuwara Eliya | 1 |
| | | Hean me | Nuwara Eliya | 2 |
| | | Hen me | Matale | 3 |
| | | Hene me | Nuwara Eliya | 1 |
| | | | Matale | 1 |
| | | Hene mekaral | Matale | 1 |
| | | Kalu me | Kandy | 1 |
| | | Kola mae | Nuwara Eliya | 1 |
| | | Kola me | Nuwara Eliya | 3 |
| | | Konda me | Nuwara Eliya | 1 |

| | | | | |
|--|--|-------------|--------------|----|
| | | Kotu me | Anuradapura | 1 |
| | | Kotu me | Kalutara | 3 |
| | | | Kurunegala | 1 |
| | | | Matale | 2 |
| | | | Ratnapura | 1 |
| | | Lee me | Badulla | 1 |
| | | Lee mekaral | Nuwara Eliya | 1 |
| | | Me | Hambantota | 1 |
| | | | Monaragala | 2 |
| | | Me | Kandy | 5 |
| | | | Kurunegala | 2 |
| | | | Matara | 1 |
| | | | Ratnapura | 1 |
| | | Maha lee me | Hambantota | 1 |
| | | Ma karal | Monaragala | 3 |
| | | Mas leme | Galle | 1 |
| | | Mas me | Matale | 2 |
| | | Mas mekaral | Kandy | 1 |
| | | Me | Galle | 1 |
| | | | Kalutara | 3 |
| | | | Kandy | 4 |
| | | | Kurunegala | 6 |
| | | | Nuwara Eliya | 2 |
| | | | Ratnapura | 1 |
| | | Me karal | Nuwara Eliya | 3 |
| | | Me | Kurunegala | 1 |
| | | Mekaral | Anuradapura | 5 |
| | | | Badulla | 6 |
| | | | Galle | 7 |
| | | | Hambantota | 4 |
| | | | Kalutara | 3 |
| | | | Kandy | 14 |

| | | | | |
|--|--|---------------|--------------|----|
| | | | Kurunegala | 9 |
| | | | Matale | 12 |
| | | | Nuwara Eliya | 5 |
| | | | Polonnaruwa | 1 |
| | | | Puttalam | 5 |
| | | | Ratnapura | 3 |
| | | Mekaral (Red) | Matale | 1 |
| | | Mishita me | Anuradapura | 1 |
| | | Murunga me | Galle | 1 |
| | | | Hambantota | 1 |
| | | | Kalutara | 2 |
| | | Nari paithea | Puttalam | 1 |
| | | Nil me | Kalutara | 1 |
| | | Palu me | Ratnapura | 2 |
| | | Panduru ma | Gampaha | 1 |
| | | Patha me | Puttalam | 1 |
| | | Pathuru me | Ratnapura | 1 |
| | | Patta me | Kalutara | 1 |
| | | Pokuru me | Ratnapura | 1 |
| | | Polon leme | Galle | 1 |
| | | Polon ma | Kegalle | 1 |
| | | Polon mae | Anuradapura | 2 |
| | | | Kalutara | 1 |
| | | | Kurunegala | 1 |
| | | | Monaragala | 2 |
| | | | Polonnaruwa | 1 |
| | | Polon me | Anuradapura | 1 |
| | | | Kalutara | 2 |
| | | | Hambantota | 1 |
| | | | Kandy | 1 |
| | | | Polonnaruwa | 1 |
| | | | Matale | 4 |

| | | | | |
|-------------------|--------------------------|---------------|--------------|---|
| | | | Nuwara Eliya | 1 |
| | | | Puttalam | 1 |
| | | | Ratnapura | 1 |
| | | Pothu me | Kurunegala | 1 |
| | | Rath me | Kalutara | 1 |
| | | Rathu me | Gampaha | 1 |
| | | Rathu me | Anuradapura | 1 |
| | | | Colombo | 2 |
| | | | Kurunegala | 1 |
| | | | Ratnapura | 1 |
| | | | Polonnaruwa | 1 |
| | | Rathu me | Anuradapura | 1 |
| | | | Kalutara | 2 |
| | | | Kurunegala | 1 |
| | | | Puttalam | 2 |
| | | | Matale | 1 |
| | | Ratu diga me | Kurunegala | 1 |
| | | Ratu kota me | Anuradapura | 1 |
| | | Ratu me | Anuradapura | 3 |
| | | Ratumada | Gampaha | 1 |
| | | Seelakara me | Puttaam | 1 |
| | | Sudu me | Anuradapura | 2 |
| | | | Kurunegala | 1 |
| | | | Polonnaruwa | 1 |
| | | Sudu mekaral | Kurunegala | 2 |
| | | Thattu me | Puttalam | 1 |
| | | Wathu me | Nuwara Eliya | 1 |
| | | Wel me | Nuwara Eliya | 1 |
| | | | | |
| 10. Cowpea | <i>Vigna unguiculata</i> | Alinga cowpea | Anuradapura | 1 |
| | | Boo me | Matale | 1 |

| | | | | |
|--|--|----------------|--------------|----|
| | | Bushita cowpea | Anuradapura | 1 |
| | | Cowpea | Anuradapura | 8 |
| | | | Badulla | 6 |
| | | | Hambantota | 8 |
| | | | Kalutara | 1 |
| | | | Kandy | 15 |
| | | | Kegalle | 1 |
| | | | Kurunegala | 1 |
| | | | Matale | 17 |
| | | | Monaragala | 7 |
| | | | Nuwara Eliya | 26 |
| | | | Ratnapura | 1 |
| | | Dekathi cowpea | Monaragala | 1 |
| | | Guru cowpea | Anuradapura | 1 |
| | | Hane me | Kandy | 1 |
| | | Hean me | Kandy | 2 |
| | | | Matale | 3 |
| | | Kadala cowpea | Anuradapura | 7 |
| | | | Hambantota | 1 |
| | | | Kandy | 1 |
| | | | Monaragala | 2 |
| | | Kadala me | Ratnapura | 1 |
| | | Kalu cowpea | Anuradapura | 5 |
| | | | Hambantota | 1 |
| | | | Kurunegala | 1 |
| | | | Matale | 1 |
| | | | Nuwara Eliya | 1 |
| | | | Ratnapura | 3 |
| | | Kiri cowpea | Hambantota | 1 |
| | | Kiri lee me | Mpnaragala | 1 |
| | | Kole me | Kandy | 1 |
| | | Konda cowpea | Anuradapura | 1 |

| | | | | |
|--|--|--------------------------|--------------|---|
| | | Konda kadala | Anuradapura | 1 |
| | | Kos dambala | Badulla | 1 |
| | | Kotu me | Matale | 1 |
| | | Lanka kadala | Kandy | 1 |
| | | Lanka parippu | Anuradapura | 1 |
| | | | Ratnapura | 1 |
| | | Lee me | Monaragala | 4 |
| | | Lee me | Badulla | 3 |
| | | Loku cowpea | Nuwara Eliya | 1 |
| | | Mathurata mung cowpea | Nuwara Eliya | 1 |
| | | Me | Badulla | 1 |
| | | | Kandy | 1 |
| | | Multessa | Puttalam | 1 |
| | | Mung cowpea | Monaragala | 1 |
| | | | Polonnaruwa | 1 |
| | | Pathakada lee me | Monaragala | 1 |
| | | Rata me | Matale | 1 |
| | | Rathu cowpea | Anuradapura | 3 |
| | | | Hambantota | 1 |
| | | | Matale | 2 |
| | | | Monaragala | 1 |
| | | | Nuwara Eliya | 1 |
| | | Red cowpea | Hambantota | 1 |
| | | | Nuwara Eliya | 1 |
| | | Sampath cowpea | Hambantota | 1 |
| | | Sudu cowpea | Anuradapura | 5 |
| | | | Kandy | 1 |
| | | | Kurunagala | 1 |
| | | | Polonnaruwa | 1 |
| | | | Puttalam | 1 |
| | | | Monaragala | 2 |

| | | | | |
|------------------------|------------------------------------|-------------------------|--------------|---|
| | | Sudu mung | Puttalam | 1 |
| | | Thiripehe cowpea | Nuwara Eliya | 1 |
| | | Thora | Kurunagala | 1 |
| | | Uda kambu | Monaragala | 1 |
| | | Udaha cowpea | Gampaha | 1 |
| | | Walawaya cowpea | Monaragala | 1 |
| | | Wasana cowpea | Hambantota | 1 |
| | | | Monaragala | 4 |
| | | | | |
| 11. Groundnut | <i>Arachis hypogaea</i> | Game ratakadju | Kurunagala | 1 |
| | | Hambegamuwa | Monaragala | 1 |
| | | Hambegamuwa (yellow) | Monaragala | 1 |
| | | Hambegamuwa (pink) | Monaragala | 1 |
| | | Kivla local | - | |
| | | Rata kadju | Hambantota | 4 |
| | | | Rathnapura | 1 |
| | | | Monaragala | 2 |
| | | Rata kadju(pink) | Hambantota | 1 |
| | | Rata kadju(red) | Hambantota | 1 |
| | | Rata kadju(yellow) | Hambantota | 1 |
| | | South china | Hambantota | 1 |
| | | Sudu kadju | Monaragala | 1 |
| | | Undu | Anuradapura | 1 |
| | | | | |
| 12. Winged Bean | <i>Psophocarpus tetragonolobus</i> | Daluk dambala | Badulla | 3 |
| | | | Kalutara | 1 |
| | | | Kandy | 1 |
| | | | Kegalle | 1 |

| | | | | |
|-----------------------|---------------------------|-----------------|--------------|---|
| | | | Kurunegala | 2 |
| | | | Matale | 3 |
| | | | Nuwara Eliya | 8 |
| | | Dambala | Anuradapura | 3 |
| | | | Badulla | 1 |
| | | | Colombo | 1 |
| | | | Gampaha | 2 |
| | | | Kalutara | 5 |
| | | | Kandy | 4 |
| | | | Kegalle | 1 |
| | | | Kurunegala | 2 |
| | | | Matale | 4 |
| | | | Nuwara Eliya | 4 |
| | | | Matara | 1 |
| | | | Puttalam | 1 |
| | | Dara dambala | Galle | 2 |
| | | | Matale | 1 |
| | | | Nuwara Eliya | 1 |
| | | Deshiya dambala | Gampaha | 1 |
| | | Diga dambala | Kandy | 1 |
| | | Dubai dambala | Kandy | 1 |
| | | Winged bean | Gampaha | 1 |
| | | | | |
| 13. Sword bean | <i>Canavalia gladiata</i> | Awara | Badulla | 1 |
| | | | Gampaha | 1 |
| | | | Hambantota | 1 |
| | | | Kalutara | 1 |
| | | | Kegalle | 1 |
| | | | Kurunegala | 1 |
| | | | Matale | 1 |
| | | | Nuwara Eliya | 4 |

| | | | | |
|--------------------------|--------------------------|-------------------|--------------|---|
| | | Wal awara | Matale | 1 |
| | | Wel awara | Kegalle | 1 |
| | | | Puttalam | 1 |
| | | | | |
| 14. Hyacinth bean | <i>Lablab purpureus</i> | Dambala | Badulla | 1 |
| | | Halmassan dambala | Kandy | 1 |
| | | | Matale | 1 |
| | | | Puttalam | 1 |
| | | | Nuwara Eliya | 2 |
| | | Halmehi dambala | Matale | 1 |
| | | | Nuwara Eliya | 1 |
| | | Halmessan dambala | Badulla | 3 |
| | | | Kandy | 2 |
| | | | Nuwara Eliya | 2 |
| | | | Anuradapura | 1 |
| | | | Puttalam | 1 |
| | | Kiri dambala | Kurunegala | 1 |
| | | Pini bonchi | Puttalam | 2 |
| | | Pothu dambala | Kandy | 2 |
| | | Soya dambala | Kandy | 1 |
| | | | | |
| 15. Brinjal | <i>Solanum melongena</i> | Batu | Anuradapura | 1 |
| | | | Colombo | 1 |
| | | | Gampaha | 2 |
| | | | Hambantota | 1 |
| | | | Kurunegala | 3 |
| | | | Kegalle | 1 |
| | | | Matale | 3 |
| | | | Monaragala | 1 |
| | | | Nuwara Eliya | 1 |

| | | | | |
|--|--|--------------------------|--------------|---|
| | | | Puttalam | 1 |
| | | Diya leneiri wam batu | Gampaha | 1 |
| | | Elabatu | Colombo | 1 |
| | | | Kurunegala | 1 |
| | | Eri batu | Hambantota | 1 |
| | | Eth batu | Matale | 1 |
| | | Eth dath wambatu | Ratnapura | 1 |
| | | Gam wam butu | Gampaha | 1 |
| | | Halawatha batu | Anuradapura | 1 |
| | | Hene batu | Kandy | 1 |
| | | Hene wam batu | Matale | 1 |
| | | Kaththirikka batu | Hambantota | 2 |
| | | | Kurunegala | 3 |
| | | | Monaragala | 1 |
| | | Katunethi batu | Anuradapura | 1 |
| | | Kola batu | Gampaha | 1 |
| | | Kuliyapitiya wambatu | Kurunegala | 1 |
| | | Lane iri batu | Nuwara Eliya | 2 |
| | | Lean eri batu | Nuwara Eliya | 1 |
| | | Lean iri wambatu | Badulla | 1 |
| | | | Kalutara | 1 |
| | | Len iri batu | Galle | 2 |
| | | | Hambantota | 1 |
| | | | Matale | 1 |
| | | | Puttalam | 1 |
| | | | Ratnapura | 1 |
| | | Len iri podi wambatu | Kalutara | 1 |
| | | Len iri wambatu | Kalutara | 1 |
| | | Lena eri | Nuwara Eliya | 1 |

| | | | | |
|---------------------|--------------------------|---------------|--------------|----|
| | | Lena eri batu | Nuwara Eliya | 1 |
| | | Lena iri | Hambantota | 2 |
| | | Local batu | Puttalam | 1 |
| | | Ni batu | Galle | 1 |
| | | Plastic batu | Anuradapura | 1 |
| | | Sudu batu | Puttalam | 1 |
| | | | Kurunegala | 1 |
| | | Thibbatu | Matale | 1 |
| | | Wambatu | Kandy | 1 |
| | | | Kurunegala | 1 |
| | | | Matale | 1 |
| | | Wambatu | Anuradapura | 10 |
| | | | Badulla | 1 |
| | | | Colombo | 2 |
| | | | Galle | 1 |
| | | | Hambantota | 1 |
| | | | Kalutara | 2 |
| | | | Kandy | 2 |
| | | | Kurunegala | 9 |
| | | | Matale | 2 |
| | | | Monaragala | 2 |
| | | | Nuwara Eliya | 3 |
| | | | Puttalam | 1 |
| | | | Ratnapura | 1 |
| | | Yapane batu | Anuradapura | 1 |
| | | | | |
| 16. Ela-batu | <i>Solanum melongena</i> | Batu | Matale | 1 |
| | | Ela batu | Badulla | 1 |
| | | | Gampaha | 1 |
| | | Elabatu | Anuradapura | 5 |
| | | | Badulla | 1 |

| | | | | |
|----------------------|----------------------------|-------------------|--------------|---|
| | | | Colombo | 2 |
| | | | Gampaha | 1 |
| | | | Hambantota | 7 |
| | | | Kalutara | 1 |
| | | | Kegalle | 1 |
| | | | Kurunegala | 6 |
| | | | Matale | 7 |
| | | | Monaragala | 2 |
| | | | Nuwara Eliya | 4 |
| | | | Polonnaruwa | 1 |
| | | | Puttalam | 2 |
| | | Elabatu (Big) | Gampaha | 1 |
| | | Elabatu (Small) | Gampaha | 1 |
| | | Hene ela batu | Monaragala | 1 |
| | | Japan batu | Anuradapura | 1 |
| | | | Polonnaruwa | 1 |
| | | Kaththirikka batu | Hambantota | 1 |
| | | Kaththirikka batu | Kegalle | 1 |
| | | Katu ela batu | Nuwara Eliya | 1 |
| | | Sudu ela batu | Kalutara | 1 |
| | | Thalana batu | Hambantota | 2 |
| | | Thalum batu | Kalutara | 2 |
| | | Talana batu | Monaragala | 1 |
| | | | | |
| 17. Ahas-batu | <i>Solanum macrocarpon</i> | Ahas batu | Kalutara | 2 |
| | | | Kandy | 2 |
| | | Kolakana batu | Kalutara | 1 |
| | | | | |
| 18. Gona-batu | <i>Solanum torvum</i> | Rata thibbatu | Nuwara Eliya | 1 |
| | | Thibbatu | Kegalle | 1 |

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|---------------------|----------------------------|----------------------|-------------|---|
| 19. Thibbatu | <i>Solanum violaceum</i> | Thibbatu | Kalutara | 1 |
| | | Thiththa thibbatu | Kandy | 1 |
| | | | Matale | 1 |
| | | Thitta thibathu | Matale | 1 |
| | | Tibbatu | Kalutara | 1 |
| | | Tiththa thibbatu | Monaragala | 1 |
| | | Titta tibbatu | Badulla | 1 |
| | | | | |
| 20. Del batu | <i>Solanum capsicoides</i> | Del batu | Ampara | 1 |
| | | | Badulla | 2 |
| | | | Kandy | 3 |
| | | Del batu/ Nari batu | Ratnapura | 1 |
| | | Nari batu | Kandy | 1 |
| | | | | |
| 21. Capsicum | <i>Capsicum annum</i> | Amu miris | Matale | 1 |
| | | Ath Honda malu miris | Puttalam | 1 |
| | | Athdath malumiris | Kurunegala | 1 |
| | | Batalu Ang miris | Galle | 2 |
| | | Hen miris | Kurunegala | 3 |
| | | Kalu malu miris | Badulla | 1 |
| | | | Ratnapura | 1 |
| | | Malu miris | Anuradapura | 1 |
| | | | Badulla | 1 |
| | | | Gampaha | 1 |
| | | | Hambantota | 1 |
| | | | Kandy | 1 |
| | | | Kurunegala | 9 |
| | | | Puttalam | 9 |

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|---------------------|--------------------------------|------------------------|--------------|---|
| | | | Ratnapura | 1 |
| | | Miris | Anuradapura | 1 |
| | | | Galle | 2 |
| | | | Hambantota | 9 |
| | | | Kandy | 1 |
| | | | Kurunegala | 1 |
| | | | Matara | 1 |
| | | | Nuwara Eliya | 3 |
| | | Navakadu miris | Puttalam | 1 |
| | | Sudu miris | Matale | 1 |
| | | Sudu nawakadu miris | Puttalam | 1 |
| | | Uda miris | Anuradapura | 2 |
| | | Wanni miris 1 | Monaragala | 1 |
| | | Wanni miris 2 | Monaragala | 1 |
| | | Waraniya miris | Ratnapura | 1 |
| | | | | |
| 22. Capsicum | <i>Capsicum frutescens</i> | Bola kochchi | Gampaha | 2 |
| | | | Kalutara | 1 |
| | | Chillies | Kalutara | 2 |
| | | Dampata kochchi | Kurunegala | 1 |
| | | Heen kochchi | Galle | 1 |
| | | | Gampaha | 1 |
| | | | Kegalle | 3 |
| | | | Nuwara Eliya | 1 |
| | | Ho miris | Ratnapura | 1 |
| | | Ka pari kochchi | Kalutara | 1 |
| | | Kawum miris | Kandy | 2 |
| | | | Nuwara Eliya | 1 |
| | | Kochchi | Colombo | 1 |
| | | | Galle | 4 |

| | | | | |
|-------------------|------------------------------------|------------------|--------------|---|
| | | | Gampaha | 3 |
| | | | Hambantota | 1 |
| | | | Kalutara | 7 |
| | | | Kegalle | 6 |
| | | | Kurunegala | 6 |
| | | | Monaragala | 1 |
| | | | Nuwara Eliya | 2 |
| | | | Polonnaruwa | 1 |
| | | | Ratnapura | 2 |
| | | Kochchi miris | Kegalle | 1 |
| | | | Nuwara Eliya | 1 |
| | | Kola kochchi | Gampaha | 1 |
| | | Nai miris | Kandy | 1 |
| | | Nay kochchi | Kurunegala | 1 |
| | | Nie kochchi | Puttalam | 1 |
| | | Nil kochchi | Kalutara | 1 |
| | | Rata kochchi | Nuwara Eliya | 1 |
| | | Sudu kochchi | Anuradapura | 1 |
| | | | Kalutara | 1 |
| | | | Kandy | 1 |
| | | | Kurunegala | 5 |
| | | | Matale | 1 |
| | | | Monaragala | 2 |
| | | | Ratnapura | 1 |
| | | Thakkali kochchi | Kalutara | 1 |
| | | Visha kochchi | Galle | 1 |
| | | Wanni kochchi | Puttalam | 1 |
| | | | | |
| 23. Tomato | <i>Lycopersicon esculentum</i> | Bala takkali | Hambantota | 1 |
| | | Batu thakkali | Ratnapura | 1 |
| | | Batu takkali | Anuradapura | 1 |

| | | | | |
|-------------|-------------------------|-------------------|--------------|---|
| | | | Monaragala | 1 |
| | | Bilinda thakkali | Anuradapura | 1 |
| | | Bola takkali | Kandy | 1 |
| | | Geta thakkali | Nuwara Eliya | 1 |
| | | Goraka takkali | Kandy | 1 |
| | | | Ratnapura | 1 |
| | | Goraka thakkali | Kandy | 3 |
| | | | Kegalle | 1 |
| | | | Puttalam | 1 |
| | | Kaha takkali | Hambantota | 1 |
| | | Local | Ratnapura | 2 |
| | | Mass thakkali | Hambantota | 1 |
| | | | Matale | 1 |
| | | Rata batu | Monaragala | 1 |
| | | Rata batu takkali | Monaragala | 1 |
| | | Takkali | Kurunegala | 1 |
| | | Thakkali | Hambantota | 5 |
| | | | Kandy | 3 |
| | | | Matale | 1 |
| | | | Monaragala | 1 |
| | | | Nuwara Eliya | 1 |
| | | | Kurunegala | 1 |
| | | Tomato | Kandy | 1 |
| | | Wel thakkali | Badulla | 1 |
| | | | | |
| 24. Pumpkin | <i>Cucurbita maxima</i> | Bala wattakka | Hambantota | 1 |
| | | Bola wattakka | Ratnapura | 1 |
| | | Desha puhul | Hambantota | 1 |
| | | Gal kuru wattakka | Kurunegala | 1 |
| | | Handun wattakka | Hambantota | 1 |
| | | Labu | Gampaha | 1 |

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|-------------------------|---------------------------------|-------------------|--------------|---|
| | | Maha-oya wattakka | Monaragala | 1 |
| | | Petti wattakka | Kurunegala | 1 |
| | | Rata wattakka | Matale | 2 |
| | | Wattakka | Anuradapura | 2 |
| | | | Kurunegala | 2 |
| | | | Hambantota | 3 |
| | | | Matale | 2 |
| | | | Monaragala | 1 |
| | | | Nuwara Eliya | 3 |
| | | | Polonnaruwa | 1 |
| | | | Puttalam | 4 |
| | | Wattakka | Matale | 2 |
| | | | Anuradapura | 3 |
| | | | Badulla | 7 |
| | | | Nuwara Eliya | 2 |
| | | | Ratnapura | 1 |
| | | | | |
| 25. Snake gourd | <i>Trichosanthes cucumerina</i> | Sudu pathola | Kandy | 1 |
| | | | Nuwara Eliya | 1 |
| | | Tirunelveli white | Jaffna | 2 |
| | | Uru pathola | Puttalam | 1 |
| | | | | |
| 26. Luffa | <i>Luffa sp.</i> | Bim wetakolu | Kalutara | 1 |
| | | Bola wetakolu | Kalutara | 1 |
| | | Diya wetakolu | Kegalle | 1 |
| | | Hen wetakolu | Kurunegala | 2 |
| | | Keti wetakolu | Gampaha | 1 |
| | | | | |
| 27. Angled luffa | <i>Luffa acutangula</i> | Diya wetakolu | Nuwara Eliya | 1 |
| | | Hean wetakolu | Kurunegala | 1 |

| | | | | |
|------------------------|--------------------------|----------------|--------------|----|
| | | Hen wetakolu | Kurunegala | 1 |
| | | Kotta wetakolu | Kurunegala | 1 |
| | | Math wetakolu | Galle | 1 |
| | | Mehi wetakolu | Monaragala | 1 |
| | | Ran weta kolu | Ratnapura | 1 |
| | | Ran wetakolu | Polonnaruwa | 1 |
| | | Wanni wetakolu | Kalutara | 1 |
| | | Wetakolu | Anuradapura | 9 |
| | | | Kalutara | 1 |
| | | | Hambantota | 2 |
| | | | Monaragala | 1 |
| | | | Galle | 14 |
| | | | Gampaha | 2 |
| | | | Kandy | 3 |
| | | | Kurunegala | 5 |
| | | | Matale | 8 |
| | | | Nuwara Eliya | 5 |
| | | | Puttalam | 4 |
| | | | | |
| 28. Ash Pumpkin | <i>Benincasa hispida</i> | Alu puhul | Anuradapura | 2 |
| | | | Hambantota | 1 |
| | | | Kalutara | 1 |
| | | | Kandy | 1 |
| | | | Kurunegala | 1 |
| | | | Nuwara Eliya | 1 |
| | | | Puttalam | 1 |
| | | Ash pumpkin | Badulla | 1 |
| | | | Nuwara Eliya | 1 |
| | | | Kalutara | 1 |
| | | | Matale | 1 |
| | | | Gampaha | 1 |

| | | | | |
|-------------------------|----------------------------|---------------|--------------|---|
| | | | Kegalle | 1 |
| | | Puhul | Kurunegala | 2 |
| | | | Matale | 3 |
| | | | Puttalam | 1 |
| | | | | |
| 29. Bitter gourd | <i>Momordica charantia</i> | Batu karawila | Kurunegala | 3 |
| | | | Matale | 3 |
| | | Bitter gourd | Kalutara | 1 |
| | | Dara karawila | Hambantota | 1 |
| | | Gam karawila | Kurunegala | 1 |
| | | Gan karawila | Kegalle | 1 |
| | | Gata karawila | Hambantota | 1 |
| | | Geta karawila | Kandy | 1 |
| | | | Kurunegala | 1 |
| | | | Matale | 1 |
| | | | Monaragala | 1 |
| | | Kalu karawila | Galle | 1 |
| | | | Hambantota | 1 |
| | | | Ratanapura | 1 |
| | | Karawila | Anuradapura | 7 |
| | | | Colombo | 2 |
| | | | Galle | 6 |
| | | | Hambantota | 6 |
| | | | Kalutara | 4 |
| | | | Kandy | 3 |
| | | | Kegalle | 1 |
| | | | Matale | 6 |
| | | | Nuwara Eliya | 7 |
| | | | Puttalam | 3 |
| | | | Ratnapura | 5 |
| | | Katu karawila | Kandy | 1 |

| | | | | |
|-------------------------|--------------------------------|------------------------|--------------|---|
| | | Keti murunga bonchi | Kandy | 1 |
| | | Mugati karawila | Matale | 1 |
| | | Polos karawila | Colombo | 1 |
| | | Sitti murunga | Kandy | 1 |
| | | Sudu karawila | Hambantota | 2 |
| | | | Kurunegala | 1 |
| | | | Nuwara Eliya | 2 |
| | | | Polonnaruwa | 1 |
| | | Thel karawila | Nuwara Eliya | 1 |
| | | Thiththa karawila | Kalutara | 1 |
| | | | | |
| 30. Bottle gourd | <i>Lagenaria siceraria</i> | Diya labu | Badulla | 1 |
| | | | Galle | 1 |
| | | | Kalutara | 1 |
| | | | Kandy | 1 |
| | | | Nuwara Eliya | 1 |
| | | Kota labu | Kurunegala | 1 |
| | | Labu | Anuradapua | 1 |
| | | | Galle | 1 |
| | | | Hambantota | 1 |
| | | | Kandy | 3 |
| | | | Kegalle | 1 |
| | | | Kurunegala | 3 |
| | | | Matale | 1 |
| | | | Nuwara Eliya | 1 |
| | | | Polonnaruwa | 1 |
| | | | Puttalam | 4 |
| | | | | |
| 31. Smooth luffa | <i>Luffa aegyptica</i> | China wetakolu | Galle | 1 |

| | | | | |
|--------------------------|----------------------------|------------------|--------------|---|
| | | Diya wetakolu | Hambantota | 1 |
| | | | Kalutara | 1 |
| | | Niyan wetakolu | Gampaha | 1 |
| | | | Kandy | 2 |
| | | | Kegalle | 3 |
| | | | Kurunegala | 2 |
| | | | Matale | 1 |
| | | | Nuwara Eliya | 3 |
| | | | Ratnapura | 1 |
| | | Wali wetakolu | Moneragala | 1 |
| | | | | |
| 32. Coccinia sp | <i>Coccinia cordifolia</i> | Kowakka | Anuradapura | 1 |
| | | | Colombo | 1 |
| | | | Kurunegala | 1 |
| | | Mei Mini Kowakka | Anuradapura | 1 |
| | | | | |
| 33. Momordika sp. | <i>Momordika dioica</i> | Thumba karawila | Galle | 1 |
| | | | Hambantota | 1 |
| | | | Kurunegala | 1 |
| | | | Moneragala | 1 |
| | | | | |
| 34. Kekiri | <i>Cucumis melo</i> | Amu kekiri | Hambantota | 1 |
| | | Atu kekiri | Hambantota | 1 |
| | | Batu kekiri | Anuradapura | 1 |
| | | | Kurunegala | 2 |
| | | Gal kekiri | Ratnapura | 1 |
| | | Geta kekiri | Matale | 1 |
| | | Gon kekiri | Anuradapura | 2 |
| | | | Kurunegala | 1 |
| | | | Matale | 1 |

| | | | | |
|-------------------|-------------------------|------------------|--------------|----|
| | | Gona kekiri | Kurunegala | 1 |
| | | | Anuradapura | 1 |
| | | | Matale | 1 |
| | | Hen kekiri | Kurunegala | 1 |
| | | Honda kekiri | Kandy | 1 |
| | | Kekiri | Anuradapura | 10 |
| | | | Badulla | 1 |
| | | | Colombo | 1 |
| | | | Gampaha | 3 |
| | | | Hambantota | 1 |
| | | | Kalutara | 1 |
| | | | Kandy | 4 |
| | | | Kegalle | 1 |
| | | | Kurunegala | 7 |
| | | | Matale | 5 |
| | | Kiri Kurakkan | Hambantota | 1 |
| | | Loku Kekiri | Anuradapura | 1 |
| | | Mala Wetu Kekiri | Puttalam | 1 |
| | | Pittu Kekiri | Puttalam | 3 |
| | | | Kurunegala | 1 |
| | | Podi Kekiri | Anuradapura | 1 |
| | | | Puttalam | 1 |
| | | Punchi Kekiri | Monaragala | 1 |
| | | Seeni Kakiri | Hambantota | 1 |
| | | Seeni Kekiri | Anuradapura | 1 |
| | | | Hambantota | 5 |
| | | | Nuwara Eliya | 1 |
| | | | Plonnaruwa | 1 |
| | | Thiththa Kekiri | Kurunegala | 1 |
| | | Wanni Kekiri | Kurunegala | 1 |
| 35. Kowkka | <i>Coccinia grandis</i> | Kowakka | Anuradapura | 1 |

| | | | | |
|----------|-----------------------------------|-------------------|--------------|----|
| | | | Hambantota | 1 |
| | | | Ratnapura | 1 |
| | | | | |
| 36. Okra | <i>Abelmoschus esculentus</i> | Ath Dala Bandakka | Kalutara | 1 |
| | | | Kurunegala | 1 |
| | | | Ratnapura | 1 |
| | | Bala Bandakka | Polonnaruwa | 1 |
| | | Bandakka | Anuradapura | 19 |
| | | | Colombo | 1 |
| | | | Galle | 14 |
| | | | Gampaha | 4 |
| | | | Hambantota | 10 |
| | | | Kalutara | 8 |
| | | | Kandy | 18 |
| | | | Kegalle | 2 |
| | | | Kurunegala | 15 |
| | | | Matale | 24 |
| | | | Moneragala | 5 |
| | | | Nuwara Eliya | 20 |
| | | | Polonnaruwa | 2 |
| | | | Puttalam | 2 |
| | | | Ratnapura | 3 |
| | | Bim Bandakka | Kalutara | 1 |
| | | Demas Bandakka | Monaragala | 1 |
| | | Diya Bandakka | Polonnaruwa | 1 |
| | | Eddala Bandakka | Hambantota | 1 |
| | | Ethdala Bandakka | Kurunegala | 1 |
| | | Hane Bandakka | Kandy | 1 |
| | | Harmas Bandakka | Monaragala | 1 |
| | | Hen Bandakka | Kurunegala | 1 |

| | | | | |
|-----------------------|----------------------------|--------------------|--------------|---|
| | | Hene Bandakka | Matale | 1 |
| | | Itipandam bandakka | Kurunegala | 1 |
| | | | Puttalam | 1 |
| | | Katu bandakka | Kurunegala | 1 |
| | | Kota bandakka | Hambantota | 1 |
| | | Kotta bandakka | Anuradapura | 2 |
| | | Local | Ratnapura | 1 |
| | | Local bandakka | Gampaha | 1 |
| | | Nona bandakka | Anuradapura | 1 |
| | | Rata bandakka | Matale | 1 |
| | | Rathu bandakka | Matale | 1 |
| | | | Kurunegala | 1 |
| | | | Polonnaruwa | 2 |
| | | Ratu bandakka | Anuradapura | 1 |
| | | | Hambantota | 1 |
| | | Thel bandakka | Matale | 1 |
| | | | | |
| 37. Amaranthus | <i>Amaranthus hybridus</i> | Heenkuru Thampala | Kalutara | |
| | | Lansi Thampala | Kalutara | 1 |
| | | | Kurunegala | 1 |
| | | Lokukuru Thampala | Kalutara | 1 |
| | | Rath Thampala | Kurunegala | 1 |
| | | Rathu Thampala | Kalutara | 1 |
| | | | Kandy | 1 |
| | | Ratu Thampala | Polonnaruwa | 1 |
| | | Thampala | Anuradapura | 1 |
| | | | Kurunegala | 1 |
| | | | Nuwara Eliya | 1 |
| | | | | |
| Amaranthus | <i>Amaranthus dubius</i> | Koora Thampala | Kalutara | 1 |

| | | | | |
|---------------------------|--------------------------------|-------------------------|--------------|---|
| | | Podi Koora Thampala | Kalutara | 1 |
| | | Thampala | Kalutara | 1 |
| | | | | |
| Amaranthus | <i>Amaranthus hybridus</i> | Landesi Thampala | Anuradapura | 1 |
| | | Lansi Thampala | Kurunegala | 1 |
| | | Rath Thampala | Nuwara Eliya | 1 |
| | | Thampala | Baduula | 1 |
| | | | Nuwara Eliya | 1 |
| | | | | |
| Amaranthus | <i>Amaranthus lividus</i> | Katu Kura | Kandy | 1 |
| | | | | |
| Amaranthus | <i>Amaranthus tricolor</i> | Hamaspala | Anuradapura | 1 |
| | | Lansi thampala | Kalutara | 1 |
| | | Rat thampala | Polonnaruwa | 1 |
| | | Rathu koora thampala | Kalutara | 1 |
| | | Rathu thampala | Ratnapura | 1 |
| | | Thampala | Galle | 1 |
| | | | Hambantota | 1 |
| | | | Kalutara | 3 |
| | | | Matale | 2 |
| | | | | |
| 38. Ceylon spinach | <i>Basella alba</i> | Nivithi | Badulla | 1 |
| | | | Galle | 1 |
| | | | Gampaha | 1 |
| | | | Kalutara | 1 |
| | | | Kandy | 2 |
| | | | Puttalam | 2 |
| | | Niwithi | Badulla | 1 |

| | | | | |
|-----------------------|----------------------------|---------------------|--------------|---|
| | | | Kalutara | 1 |
| | | | Nuwara Eliya | 1 |
| | | Panduru niwithi | Kalutara | 1 |
| | | | | |
| 39. Gas niviti | <i>Talinum triangulare</i> | Gas nivithi | Polonnaruwa | 1 |
| | | Gas niwithi | Galle | 1 |
| | | Nivithi | Gampaha | 1 |
| | | | Kalutara | 1 |
| | | | Kegalle | 1 |
| | | | | |
| 40. Kiri henda | <i>Cellosia argentea</i> | Katu kura | Monaragala | 1 |
| | | Kiri handa | kalutara | 1 |
| | | | Matale | 1 |
| | | Kiri handa thampala | Kalutara | 1 |
| | | Kiri henda | Kalutara | 2 |
| | | | Matale | 2 |
| | | | Monaragala | 1 |
| | | | Polonnaruwa | 1 |
| | | Kiri henda thampala | Kalutara | 1 |
| | | | | |
| 41. Yam | <i>Dioscorea alata</i> | Katu ala | Anuradapura | 1 |
| | | | Kandy | 1 |
| | | | | |
| Yam | <i>Dioscorea bulbifera</i> | Panu ala | Kandy | 1 |
| | | | | |
| 42. Butsarana | <i>Canna indica</i> | But sarana | Kegalle | 1 |
| | | | | |
| 43. Mustard | <i>Brassica juncea</i> | Aba | Anuradapura | 8 |

| | | | | |
|-------------------|------------------------|-------------------------|--------------|----|
| | | | Badulla | 10 |
| | | | Kandy | 9 |
| | | | Kurunegala | 2 |
| | | | Matale | 11 |
| | | | Nuwara Eliya | 8 |
| | | | Polonnaruwa | 4 |
| | | | | |
| 44. Sesame | <i>Sesamum indicum</i> | Godakawela | Ratnapura | 1 |
| | | Hambagamuwa black | Monaragala | 1 |
| | | Hambagamuwa white | Monaragala | 1 |
| | | Hambagamuwa Kalutala | Hambantota | 1 |
| | | Hambagamuwa mixed | Hambantota | 1 |
| | | Haramas tala | Anuradapura | 1 |
| | | Haramas thala | Anuradapura | 1 |
| | | Kahata Thala | Hambantota | 1 |
| | | Kalu tala | Polonnaruwa | 1 |
| | | Kalu thala | Badulla | 1 |
| | | | Hambantota | 2 |
| | | | Monaragala | 1 |
| | | | Polonnaruwa | 1 |
| | | | Ratnapura | 1 |
| | | Mas thala | Hambantota | 1 |
| | | | Kurunegala | 2 |
| | | Pokuru thala | Anuradapura | 1 |
| | | | Monaragala | 1 |
| | | Sesami (local) | Anuradapura | 1 |
| | | Sudu tala | Hambantota | 1 |
| | | Sudu thala | Badulla | 1 |

| | | | | |
|-----------------------|--------------------------|---------------|-------------|---|
| | | | Hambantota | 5 |
| | | | Kandy | 2 |
| | | | Matale | 1 |
| | | | Ratnapura | 1 |
| | | Suduthala | Anuradapura | 1 |
| | | Thala | Anuradapura | 3 |
| | | | Badulla | 3 |
| | | | Hambantota | 5 |
| | | | Kandy | 1 |
| | | | Matale | 4 |
| | | | Kurunegala | 5 |
| | | | Ratnapura | 3 |
| | | | Monaragala | 2 |
| | | | Puttalam | 1 |
| | | Tissa | Hambantota | 1 |
| | | Tummas tala | Anuradapura | 1 |
| | | Wal thala | Kandy | 1 |
| | | Yala thala | Kurunegala | 2 |
| | | | Ratnapura | 1 |
| | | | | |
| 45. Watermelon | <i>Citrullus lanatus</i> | Karapusi | Hambantota | 1 |
| | | Komadu | Hambantota | 2 |
| | | | Kalutara | 1 |
| | | Pani komadu | Hambantota | 2 |
| | | | Puttalam | 1 |
| | | Pattakka | Kandy | 1 |
| | | Peni komadu | Matale | 1 |
| | | | Puttalam | 1 |
| | | Peni puhul | Matale | 1 |
| | | | Monaragala | 1 |
| | | Poto pattakka | Hambantota | 1 |

| | | | | |
|---------------------|--------------------------|------------------|------------|---|
| 46. Banana | <i>Musa sp.</i> | Ambon | Kegalle | 1 |
| | | Emban | Matale | 2 |
| | | Embul | Badulla | 1 |
| | | | Galle | 1 |
| | | Gal kesel | Kegalle | 2 |
| | | Kalu kehel | Ratnapura | 1 |
| | | Kolikuttu | Monaragala | 2 |
| | | Marathamana | Kandy | 1 |
| | | Muwanethi kehel | Ratnapura | 1 |
| | | Nethrampalam | Kalutara | 1 |
| | | | Ratnapura | 1 |
| | | Puwalu | Kalutara | 1 |
| | | Rata hondarawalu | Ratnapura | 1 |
| | | Rata kolikuttu | Kegalle | 1 |
| | | Rathkehel | Ratnapura | 1 |
| | | Sapuanamalu | Ratnapura | 1 |
| | | Seeni kehel | Galle | 1 |
| | | Seeni kesel | Kandy | 1 |
| | | Sudu kochchi | Ratnapura | 1 |
| | | Sudu puwalu | Kandy | 2 |
| | | Suwandel | Galle | 1 |
| | | | Kalutara | 1 |
| | | Wal suwandel | Kegalle | 1 |
| | | Wathabanga | Ratnapura | 1 |
| | | | | |
| 47. Plantain | <i>Musa sp.</i> | Hamban puwalu | Kalutara | 1 |
| | | Kithala | Galle | 1 |
| | | Eti kehel | Ratnapura | 2 |
| | | Eti kesel | Ratnapura | 1 |
| | | | | |
| 48. Naran | <i>Citrus reticulata</i> | Geta naran | Kandy | 1 |

| | | | | |
|--------------------------|------------------------------------|--------------|--------------|---|
| | | Jama naran | Kandy | 1 |
| | | Konda naran | Kandy | 1 |
| | | Pini naran | Kandy | 1 |
| | | | | |
| 49. Sweet orange | <i>Citrus sinensis</i> | Penidodam | Kandy | 1 |
| | | | | |
| 50. Jak | <i>Artocarpus heterophyllus</i> | Kurukos | Kegalle | 1 |
| | | | | |
| 51. Cotton | <i>Gossypium sp.</i> | Kapu | Kandy | 1 |
| | | | Matale | 1 |
| | | Kapupulun | Matale | 1 |
| | | | | |
| 52. Asamodagam | <i>Trachyspermum roxburghianum</i> | Asamodagam | Matale | 1 |
| | | | Nuwara Eliya | 1 |
| | | | Polnnaruwa | 1 |
| | | | | |
| 53. Katu wel batu | <i>Solanum virginianum</i> | Katuwel batu | Puttalam | 1 |
| | | | | |
| 54. Amukkara | <i>Withania somnifera</i> | Amukkara | Badulla | 1 |
| | | | | |
| 55. Indi | <i>Phoenix zeylanica</i> | Indi | Anuradapura | 1 |

4.2 USES, PERCEPTIONS AND PROTECTION BY PEOPLE

4.2.1 HOW PEOPLE PERCEIVE TRADITIONAL PLANT VARIETIES

Peoples' perceptions about the advantages and disadvantages of traditional varieties are given in Table 4. According to them traditional varieties produce low yields but require fewer inputs for their production when compared to new varieties. They also perceive traditional varieties as having special nutritional characteristics.

However the biggest constraint for using traditional varieties is that they do not fetch high prices to compensate the low yield they produce. This seems to be the underlying factor that has motivated farmers to use new improved varieties and hybrid seeds when planting the crops.

| Table 4 | | | |
|--|----------------|-------|---------------|
| Advantages and disadvantages of traditional crop varieties as perceived by the farmers in the Kurunegala, Kandy and Hanguranketha | | | |
| Characters of wild types | Percentage (%) | | |
| | Kurunegala | Kandy | Hanguranketha |
| (a) Advantages | | | |
| Low cost of production | 60% | | |
| Low labour cost in planting | 20% | | |
| More tasty than new varieties | 20% | | |
| More nutritious than new varieties | 40% | 22% | 100% |
| High resistance to diseases | 20% | 33% | |
| Crop management is relatively easy | 20% | | |
| Can compete with weeds | 20% | | |
| Require no inorganic chemicals and fertilisers | | 22% | |
| Produce high yield under low input conditions | | 67% | 20% |
| Produce more healthy food | | 33% | |

| | | | |
|--|-----|-----|------|
| Traditional varieties have high medicinal value | | 33% | 100% |
| Produce high flavoured food | | | 20% |
| They can be sold at a higher price | | | 20% |
| (b) Disadvantages | | | |
| Longer duration taken for maturity | 20% | | |
| Low yield potential | 40% | | 20% |
| Some varieties are suseptible to diseases if grown without chemicals | 20% | | |

4.2.2 USE OF TRADITIONAL VARIETIES DURING CULTIVATION OF CROPS

During the survey, it was found that none of the farmers surveyed (at locations in Kandy, Kurunegala, Hanguranketha, Moneragala, Polonnaruwa, Hambantota and Mahiyanganaya) were found using traditional varieties for cultivation of rice or upland crops.

It was observed that traditional varieties have been replaced by the hybrids (local and imported). It seems that these varieties have completely disappeared from the landscape and also from the small stocks of seed maintained by the local farmers.

Among the traditional rice varieties *Kalu Heenati* and *Pachchaperumal* is rarely found. These were the two main varieties that were used to develop the old improved rice varieties/hybrids.

4.2.3 TRADITIONAL CROP VARIETIES KNOWN BY FARMERS

Table 5 and 6 shows the traditional rice and other crop varieties cited by the farmers during the discussions held at three locations. However, the knowledge held by the farmers about these traditional crop varieties is rather poor. They have not used these varieties in the recent past. Only some older farmers had some experience of using the traditional varieties.

| Wild type | Percentage (%) | | |
|---------------------|----------------|-------|---------------|
| | Kurunegala | Kandy | Hanguranketha |
| Ma we | 40% | - | - |
| Muthu samba | 60% | - | - |
| Suthuru samba | 40% | - | - |
| Hatapanduru we | 40% | - | - |
| Heenati | 20% | 22% | 40% |
| Hatada we | 20% | - | - |
| Heenati we | 20% | - | - |
| Kalu heenati | 20% | 33% | - |
| Hatial | 20% | 11% | - |
| Goda we/Kalu hatial | 20% | - | - |
| Suwadel | 20% | - | - |
| Hangimuththan we | - | 22% | - |
| Hodara walu | - | 11% | - |
| Sudu we | - | 22% | 60% |
| Bala we | - | 11% | 40% |
| Raththunda | - | - | 20% |
| Kalu we | - | - | 40% |
| Kottiaran | - | - | 20% |
| Bala Raththunda | - | - | 20% |

| | | | |
|----------------|---|---|-----|
| Kalu Kottiaran | - | - | 20% |
|----------------|---|---|-----|

| Crop | Wild type | Percentage (%) | | |
|--------------|-------------------|----------------|-------|---------------|
| | | Kurunegala | Kandy | Hanguranketha |
| Ginger | Sinhala | 20% | | |
| Banana | Ati kesel | 20% | | |
| Beans | Waduru me | 20% | | |
| | Nil bonchi | | | 20% |
| | Askoda me | | | 20% |
| Cassava | Wal maiyokka | 20% | | |
| Bitter gourd | Batu karawila | 20% | | 20% |
| | Thumba karawila | | 11% | 40% |
| | Katu karawila | | | 40% |
| | Thel karawila | | | 40% |
| Yam / tubers | Kidaran ala | | 44% | |
| | Wal ala | | 44% | |
| | Buthsarana | | 11% | |
| | Desi ala | | 11% | |
| Tomato | Goraka takkali | | 22% | |
| Brinjal | Thiththa thibbatu | | 11% | |

| | | | | |
|----------------|-----------------|--|-----|-----|
| Mukunuwanna | Wel mukunuwanna | | 11% | |
| | | | | |
| Gotukola | Weda gotukola | | 11% | |
| | | | | |
| Finger millet | Thanahal | | | 40% |
| | Kollu | | | 20% |
| | | | | |
| Thampala | Thampala | | | 20% |
| | | | | |
| Indian mustard | Indian mustard | | | 20% |
| | | | | |
| Chilli | Batu miris | | | 20% |
| | | | | |
| Okra | Thel bandakka | | | 20% |
| | Buwa bandakka | | | 20% |

4.2.4 EFFORTS TO CONSERVE TRADITIONAL CROP VARIETIES

It was also found that no mechanism exists with farmers to store and protect the traditional varieties. Also there are no organised efforts from the state agencies (other than PGRC) or private sector to conserve the traditional crop varieties. Only some NGOs who promote organic and sustainable agricultural practices have taken initiatives to protect the traditional varieties of crop plants.

5.0 CONCLUSION

As mentioned earlier it is important to conserve the traditional varieties and wild relatives of crop plants. After considering the current status following actions/measures can be recommended in order to conserve the traditional varieties and wild relatives of crop plants:

- Exploration of habitats of such plants in order to identify the genetic material for taking measures for *in-situ* and *ex-situ* conservation
- Creating awareness about the (nutritional and agronomic) importance of traditional crop varieties
- Promoting organic farming and other sustainable agriculture practices
- Conservation of natural habitats

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APPENDIX 1

Questionnaire – Survey on perception of people on crop wild relatives of traditional plant varieties

Section 1: Background information

1.1 Farmers' name :-----

1.2 Address :-----

1.3 Agrarian service centre -----

1.4 Climatic zone :-----

1.5 Level of Education of the Farmer -----

Up to O/L Higher

Up to A/L Other

Section 2: Farming information

2.1 Farming experience in years -----

2.2 Extent of land held (acres)-----

2.3 Crops cultivated during last year-----

Section 3: Crop Wild Relatives

3.1 What are the crop varieties you cultivate? -----

3.2 What are the traditional crop varieties you cultivate?-----

3.3 Do you know about the crop wild relatives? Yes/No

If yes

3.3.1 What are the crop wild relatives you know?

| Crop | Wild relatives | Yes | No |
|------|----------------|-----|----|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

3.3.2 Can you differentiate crop wild relatives from weed plants?

Yes

No

3.3.3 What is the importance/use of those crop wild relatives?

Section 4: Any other information / comments about Crop Wild Relatives

APPENDIX 2

Wild Fruits, Traditional Varieties and Wild Relatives of some Crop Plants

| | |
|--------------------------------------|--|
| 01. Crop | Rice |
| Botanical Name | <i>Oriza sativa</i> (L.) |
| Family | Poaceae |
| Common Name | Uruwi, wi |
| Growing Region | Low elevations, in standing water or in areas only seasonally wet |
| Growing Form | Annual or perennial 60-80 cm tall |
| Uses | Staple food in Sri Lankans |
| Varieties | |
| Traditional varieties/Wild Relatives | <p>Ma we group</p> <p>Kohu</p> <p>Kuru</p> <p>Kalu kan</p> <p>Sudu</p> <p>Maha</p> <p>Goda</p> <p>Rathkunda</p> <p>Samba group</p> <p>Podi</p> <p>Kuruluthudu</p> <p>Muthumanikkan</p> <p>Molagu</p> <p>Puluk</p> <p>Sura</p> <p>Bala we group</p> <p>Sudu</p> <p>Bala kera</p> |

| | |
|----------------|--|
| | <p>Danahala group</p> <p>Heenati Heenati wi Podi heenati Sudu heenati Seenaddi</p> <p>Illankalian group</p> <p>Illankalian</p> <p>Murunkan group</p> <p>Sinna murungan Murungan</p> |
| 02. Crop | Finger millet |
| Botanical Name | <i>Eleusine coracana</i> (L.) |
| Family | Poaceae |
| Common Name | Kurakkan |
| Growing Region | Mainly dry zone, also in wet zone wet elevations up to 2000m Anuradhapura, Badulla |
| Growing Form | Annual/perennial herb, erect, 30-100cm high |
| Uses | As a serial, other edible purposes are little or no, no value as fodder |
| Varieties | |
| Wild Relatives | <i>E. indica</i> |
| Wild Relatives | <i>Vigna trilobata</i> (Bin-me) <i>Vigna vexillata</i> |
| 03. Crop | Black gram |
| Botanical Name | <i>Vigna mungo</i> (L.) |
| Family | Fabaceae |

| | |
|----------------|--|
| Common Name | Bu-me, Mun, Ulundu |
| Growing Region | Dry zone(mainly Badulla, Trincomalee districts) |
| Growing Form | Sub erect cultivar with many branches |
| Uses | Use as flour |
| Varieties | |
| Wild Relatives | |
| 04. Crop | Egg plant |
| Botanical Name | <i>Solanum melongena</i> |
| Family | Solanaceae |
| | |
| Common Name | Ela-batu |
| Growing Region | Dry zone (Mannar, Vaunia, Trincomalee, Hanbantota) |
| Growing Form | Herb 40-60cm high much branched |
| Uses | Fruits eaten with curry, medicinal useful for liver complaint |
| Varieties | |
| Wild Relatives | Var. insanum <i>S.pseudocapsocum</i> <i>S.pubescens</i> <i>S.torvum</i> (Gona-batu) <i>S.trilobatum</i> (Wel-tibbatu) <i>S.ciliatum</i> Lam(Nai batu) <i>S.lasiocarpum</i> Dunal (Mala batu) <i>S.violaceum</i> Ortega (Titta batu) <i>S.viginianum</i> L (Karabatu) |
| 05. Crop | Snake gourd |
| Botanical Name | <i>Tricosanthus anguina</i> (L.) |
| Family | Cucurbitaceae |
| Common Name | Pathola |
| Growing Region | Dry zone and Intermediate zone |
| Growing Form | Climbing wine |
| Uses | Tender pods as vegetable |
| Varieties | |

| | |
|----------------|---|
| Wild Relatives | <i>Tricosanthus cucumerina</i> L. (Dum-mella) <i>T.nervifolia</i> L.(Titta-hondala) |
| 06. Crop | Bitter gourd |
| Botanical Name | <i>Momordica charantia</i> (L.) |
| Family | Cucurbitaceae |
| Common Name | Batukaravila, Karavila |
| Growing Region | Lowland rainy and riverine forests, areas up to 1200m |
| Growing Form | |
| Uses | Fruits- curries and pickles, vegetables |
| Varieties | |
| Wild Relatives | <i>Momordica charantia</i> (Batu karavila) <i>Momordica dioica</i> Roxb.ex(Tumba karavila) |
| 07. Crop | Cucumber |
| Botanical Name | <i>Cucumis sativus</i> (L.) |
| Family | Cucurbitaceae |
| Common Name | Pipinha, rata kekiri |
| Growing Region | Dry zone and intermediate zone |
| Growing Form | Annual, climbing hispid |
| Uses | Fruit- salad, curry |
| Varieties | |
| Wild Relatives | <i>Cucumis melo</i> L. (Kekiri) <i>Cucumis trigonus</i> Roxb |
| 08. Crop | Kekiri |
| Botanical Name | <i>Cucumis melo</i> |
| Family | Cucurbitaceae |
| Common Name | Kekiri |
| Growing Region | Mannar, Hambantota, Kandy |
| Growing Form | Stem climbing |
| Uses | Fruit- curry |
| Varieties | |
| Wild Relatives | |
| 09. Crop | Bottle gourd |

| | |
|----------------|--|
| Botanical Name | <i>Lagenaria siceraria</i> |
| Family | Cucurbitaceae |
| Common Name | Diyalabu |
| Growing Region | Mainly dry zone |
| Growing Form | Wine, climbing stem |
| Uses | |
| Varieties | |
| Wild Relatives | <i>Lagenaria vulgaris</i> (Diya labu) |
| 10. Crop | Ridge gourd |
| Botanical Name | <i>Luffa acutangula</i> |
| Family | Cucurbitaceae |
| Common Name | Vetakolu, Dara vetakolu |
| Growing Region | Mainly dry zone (Low country) |
| Growing Form | Wine, climbing stem |
| Uses | Tender pods- vegetable |
| Varieties | |
| Wild Relatives | <i>Luffa cylindrica</i> <i>Luffa aegyptica</i> Miller (Niyana wetakolu) |
| 11. Crop | Okra / Ladies fingers |
| Botanical Name | <i>Hibiscus esculentus</i> (L.) |
| Family | Malvaceae |
| Common Name | Bandakka |
| Growing Region | Mainly, Anuradhapura, Monaragala, Kandy districts |
| Growing Form | Annual herb; erect up to 0.5-2m |
| Uses | Tender pods- vegetable |
| Varieties | |
| Wild Relatives | <i>Hibiscus abelmoschus</i> L. (Kapukinissa) <i>A. angulosus</i> <i>A. ficulneus</i> |
| 12. Crop | Tampala |
| Botanical Name | <i>Amaranthus dubius</i> |
| Family | Amaranthaceae |

| | |
|----------------|--|
| Common Name | thampala |
| Growing Region | Roadsides and waste places Kandy, Nuwara –Eliya, Ratnapura, Colombo, Badulla |
| Growing Form | Annual herb, erect mostly up to 90cm |
| Uses | Green vegetable, as a source of bird weed |
| Varieties | |
| Wild Relatives | A.spinosus (Kotuthampala) A.hybridus A.caudatus A.tricolor A.lividus A.viridis (Kura thampala) A.graecizans A.gangeticus(Sudu thampala) |
| 13. Crop | Ceylon spinach |
| Botanical Name | <i>Brasella alba</i> |
| Family | Brasellaceae |
| Common Name | Nivithi |
| Growing Region | In forests and shady places in dry regions |
| Growing Form | Fleshy, twining perennial herb |
| Uses | As a vegetable |
| Varieties | |
| Wild Relatives | |
| 14. Crop | Gotukola |
| Botanical Name | <i>Centella asiatica</i> |
| Family | Apiaceae |
| Common Name | Gotukola, Heen gotukola |
| Growing Region | From sea level to highest elevations all over the island Anuradhapura, Kandy, kegalle, Nuwara-eliya, |
| Growing Form | Herbaceous perennial, stem-creeping, glabrous at maturity |
| Uses | Fresh form- as salad, Dry leaves- medicinal purposes |
| Varieties | |

| | |
|----------------|--|
| Wild Relatives | <i>Hydrocotyle asiatica</i> (Heen gotukola) |
| 15. Crop | Mukunuwenna |
| Botanical Name | <i>Alternanthera sessilis</i> |
| Family | Amaranthaceae |
| Common Name | Mukunuwenna |
| Growing Region | Very common in many habitats, in wet paddy ditches to dry roadside banks All over the island |
| Growing Form | Annual/perennial herb |
| Uses | As vegetable, medicinal purposes |
| Varieties | |
| Wild Relatives | <i>A.pungens</i> <i>A.paronychioides</i> <i>A.betzickiana</i> <i>A.triandra</i> Lam |
| 16. Crop | Pol-pala |
| Botanical Name | <i>Aerva javanica</i> |
| Family | Amaranthaceae |
| Common Name | Pol-pala, Pol-kudu-pala |
| Growing Region | Sandy places near the sea level on the west side of the island, rare Jaffna, Puttalam, districts, Kalpitiya |
| Growing Form | Perennial herb, erect .3-1.5m |
| Uses | Medicinal use |
| Varieties | |
| Wild Relatives | <i>A. lanata</i> |
| 17. Crop | Drumstick |
| Botanical Name | <i>Moringa oleifera</i> Lam |
| Family | Moringaceae |
| Common Name | Murunga |
| Growing Region | Widely in dry zone chena |
| Growing Form | Tree 3-12m tall |
| Uses | Tender pods, leaves and flowers as vegetables |

| | |
|----------------|--|
| Varieties | |
| Wild Relatives | <i>Moringa pterygosperma</i> Gaerth |
| 18. Crop | Kathurumurunga |
| Botanical Name | <i>Sesbaniya grandiflora</i> (L.) |
| Family | Fabacea |
| Common Name | Kathurumurunga |
| Growing Region | Mainly dry zone and intermediate zone |
| Growing Form | Tree to about 10m tall |
| Uses | Leaves and flowers as vegetable, For medicinal purposes |
| Varieties | |
| Wild Relatives | <i>Sesbaniya asculanta</i> <i>Sesbaniya macrantha</i> <i>Sesbaniya sericea</i> |
| 19. Crop | Kiri ala |
| Botanical Name | <i>Sonaratia alba</i> (L.) |
| Family | Sonneratiaceae |
| Common Name | Kiri ala |
| Growing Region | Mangrove swamps- common from Chilaw to Puttalam |
| Growing Form | A bush or small tree |
| Uses | Vegetable (Food crop) |
| Varieties | |
| Wild Relatives | |
| 20. Crop | Innala |
| Botanical Name | <i>Plectranthus rotundifolius</i> |
| Family | Lamiaceae |
| Common Name | Innala |
| Growing Region | Wet mid lands and lowlands |
| Growing Form | Herb (Lateral) |
| Uses | Food crop |
| Varieties | |
| Wild Relatives | |
| 21. Crop | Sweet potato |

| | |
|-----------------|--|
| Botanical Name | <i>Ipomea batatas</i> |
| Family | Convolvulaceae |
| Common Name | Batala |
| Growing Region | Most common in tropics Matale, Kandy, Nuwara-Eliya, Badulla, Kegalle, Ratnapura, Galle districts |
| Growing Form | Vine |
| Uses | Vegetable |
| Varieties | Kaha batala, sudu batala, bola batala, ratu batala |
| Wild Relatives | I.alba I.asarifolia I.cairica I.carnea I.coptica I.deccana I.eriocarpa I.hederifolia I.harsfalliae I.indica |
| 22. Crop | Cassava |
| Botanical Name | <i>Manihot esculanta</i> |
| Family | Euphorbiaceae |
| Common Name | Maiokka |
| Growing Region | |
| Growing Form | Herb, shrub or tree |
| Uses | Vegetable |
| Varieties | |
| Wild Relatives | M.glaziovii (Gas manyokka) |
| 23. Crop | Turmeric |
| Botanical Name | <i>Curcuma longa</i> |
| Family | Zingiberaceae |
| Common Name | Ath-kaha, bim kaha, kaha, rata kaha |
| Growing Region | Mainly Colombo district |

| | |
|----------------|--|
| Growing Form | Rhizome Orange, Leaf tuft to 1m |
| Uses | Spice |
| Varieties | |
| Wild Relatives | |
| 24. Crop | Ginger |
| Botanical Name | <i>Zingiber cylindricum</i> |
| Family | Zingiberaceae |
| Common Name | Inguru |
| Growing Region | Endermic, Common in shady situations up to 1500m |
| Growing Form | Leaf shoots up to 2m |
| Uses | Medicinal properties of the rhizome |
| Varieties | |
| Wild Relatives | |
| 25. Crop | Cardamom |
| Botanical Name | <i>Elettaria cardamomum</i> (L.) |
| Family | Zingiberaceae |
| Common Name | Cardamungu, ensal, rata ensal |
| Growing Region | Southern India and Sri Lanka Kandy, Badulla, Matale, ratnapura, Galle districts |
| Growing Form | Leafy shoot up to 4m high |
| Uses | Seeds- provide the cardamom of commerce(spice) |
| Varieties | |
| Wild Relatives | Amomum cardamomum Amomum repens Alponia cardamomum |
| 26. Crop | Clove |
| Botanical Name | <i>Syzygium aromaticum</i> |
| Family | Myrtaceae |
| Common Name | Karabuneti |
| Growing Region | In the intermediate zone north of Kandy |
| Growing Form | A medium sized tree with smooth pale brown bark |

| | |
|----------------|---|
| Uses | Major spice |
| Varieties | |
| Wild Relatives | |
| 27. Crop | Black pepper |
| Botanical Name | <i>Peperomia nigrum</i> (L.) |
| Family | Piperaceae |
| Common Name | Gam miris wel, miris |
| Growing Region | Locally naturalized in secondary and disturbed forests of wet zone from sea level up to about 800m |
| Growing Form | A tall glabrous climber with the stems thickened at the nodes, producing ground runners |
| Uses | Dry fruits to make pepper powder |
| Varieties | |
| Wild Relatives | |
| 28. Crop | Cinnamon |
| Botanical Name | <i>Cinnamomum verum</i> |
| Family | Lauraceae |
| Common Name | Kurundu |
| Growing Region | Endemic, moist low country to about 700m |
| Growing Form | Moderate sized tree up to 18m tall |
| Uses | Aromatic bark is the cinnamon of commerce Oil- distilled from both the bark and the leaves Roots – afford a camphor |
| Varieties | |
| Wild Relatives | |
| 29. Crop | Goraka |
| Botanical Name | <i>Garcinia quaesita</i> |
| Family | Clusiaceae |
| Common Name | Goraka, rata goraka |
| Growing Region | Endemic, low lands to 1000m altitude, wet and intermediate zone Kandy, Badulla, kegalle, Galle districts |
| Growing Form | Tree up to 20m tall |

| | |
|----------------|---|
| Uses | Dried fruits- used for making fish curries(spice), brine for fish preparation, Medicinal purposes |
| Varieties | |
| Wild Relatives | G.zeylanica G.morella (kana-goraka) G.hermonii |
| 30. Crop | Indian mustard |
| Botanical Name | <i>Brassica juncea</i> (L.) |
| Family | Brassicaceae |
| Common Name | Aba |
| Growing Region | Cultivated areas up to 2000m Puttalam, Trincomalee, Matale, Kandy, Nuwara-Eliya, Badulla, Hambantota |
| Growing Form | Annual herb erect to 1 m or more |
| Uses | Ingredient for cooking curries (spice), Medicinal properties |
| Varieties | |
| Wild Relatives | <i>B. oleracea</i> |
| 31. Crop | Betel |
| Botanical Name | <i>Pier betel</i> (L.) |
| Family | Piperaceae |
| Common Name | Bulat, bulat-wel |
| Growing Region | Colombo district, N'Eliya and Kandy districts (Not known as a wild plant) |
| Growing Form | A climber up to 20 m tall |
| Uses | Leaves – a universal masticatory stimulant and carminative Whole plant has a peculiar and characteristic odour and taste Oil – strong antiseptic properties |
| Varieties | |
| Wild Relatives | |
| 32. Crop | Areca nut |
| Botanical Name | <i>Areca concinna</i> |
| Family | Arecaceae |
| Common Name | Lenteri puwak |

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|----------------|--|
| Growing Region | Endemic, endangered, Southwest lowlands from Kalutara to Galle |
| Growing Form | Tree, slender stem, clustering, 2-5 m high |
| Uses | As a substitute for Areca for masticating with betel |
| Varieties | |
| Wild Relatives | |
| Uses | Leaves – a universal masticatory stimulant and carminative Whole plant has a peculiar and characteristic odour and taste Oil- strong antiseptic properties |
| Varieties | |
| Wild Relatives | |
| 33. Crop | Curry leaf |
| Botanical Name | <i>Murraya koenigii</i> |
| Family | Rutaceae |
| Common Name | Karapincha |
| Growing Region | Low country specially in the dry zone but widespread in cultivations |
| Growing Form | Shrub or small tree to 5m tall |
| Uses | Leaves – essential ingredient in cooking curries, medicinal properties |
| Varieties | |
| Wild Relatives | <i>M.glenoei</i> <i>M.foetidissima</i> <i>M. minutum</i> <i>Var ceylanicum</i> (Wal karapincha) |
| 34. Crop | Dehi |
| Botanical Name | <i>Citrus aurantifolia</i> |
| Family | Rutaceae |
| Common Name | Dehi, Hin-dehi |
| Growing Region | Kandy, Monaragala districts |
| Growing Form | Small tree |
| Uses | Fruit edible, medicinal properties |
| Varieties | |

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|----------------|---|
| Wild Relatives | C.hystrix C.medica C.macoptera |
| 35. Crop | Banana |
| Botanical Name | <i>Musa acuiunata</i> (L.) |
| Family | Musaceae |
| Common Name | Gal- kehel, unel |
| Growing Region | On rocky ground near streams in open forests that allow light to penetrate – 1000 m |
| Growing Form | Plants erect, sparsely stooling usually 3-5m high |
| Uses | Young male bud – eaten as vegetable Ripen fruits – edible |
| Varieties | |
| Wild Relatives | |
| 36. Crop | Asparagus |
| Botanical Name | <i>Asparagus officinalis</i> (L.) |
| Family | Asparagaceae |
| Common Name | Hathawariya |
| Growing Region | Dry low and mid country and montane zone |
| Growing Form | Rambling and scan dent, much branched shrub with long stems |
| Uses | Young shoots and tubers – eaten, medicine |
| Varieties | |
| Wild Relatives | <i>Asparagus racemosus</i> |
| 37. Crop | Jackfruit |
| Botanical Name | <i>Artocarpus heterophyllus</i> |
| Family | Moraceae |
| Common Name | Kos |
| Growing Region | Common in Sri lanka |
| Growing Form | Evergreen tree |
| Uses | Fruit, vegetable, timber |
| Varieties | |
| Wild Relatives | |

| | |
|----------------|--|
| 38. Crop | Breadfruit |
| Botanical Name | <i>Artocarpus incisus</i> |
| Family | Moraceae |
| Common Name | Rata-del |
| Growing Region | Planted in parks and gardens Kandy district |
| Growing Form | Evergreen tree |
| Uses | Vegetable |
| Varieties | |
| Wild Relatives | <i>A. nobilis</i> (bedi-del) |
| 39. Crop | Mango |
| Botanical Name | <i>Mangifera indica</i> (L.) |
| Family | Anacardiaceae |
| Common Name | Amba |
| Growing Region | Village gardens in the lower wet and montane zone up to about 600m altitude |
| Growing Form | Medium or large size tree 8-30 m high |
| Uses | Timber, fruits – edible |
| Varieties | |
| Wild Relatives | |
| 40. Crop | Weralu |
| Botanical Name | <i>Elaeocarpus subvillosus</i> |
| Family | Elaeagnaceae |
| Common Name | Gal weralu |
| Growing Region | Moist lowland forests extending in the montane zone to c. 1200m |
| Growing Form | A tree 7-12 m high |
| Uses | Fruits – edible |
| Varieties | |
| Wild Relatives | |
| 41. Crop | Etamba |
| Botanical Name | <i>Mangifera zeylanica</i> |

| | |
|----------------|---|
| Family | Anacardiaceae |
| Common Name | Etamba |
| Growing Region | Lowlands in moist and dry regions up to 3000 tt |
| Growing Form | Large tree |
| Uses | Timber (tea boxes) Fruit – edible though unpalatable |
| Varieties | |
| Wild Relatives | |
| 42. Crop | Gal siyambala |
| Botanical Name | <i>Dialium ovoideum</i> |
| Family | Fabaceae |
| Common Name | Gal siyambala |
| Growing Region | Native to Ceylon but has been introduced into South-East Asia (Anuradhapura, Polonnaruwa, Kurunagala, Matale, Ampara, Moneragala) |
| Growing Form | Large unarmed tree |
| Uses | Fruit – edible use in preparation of chutneys Tree – timber for furniture making |
| Varieties | |
| Wild Relatives | <i>Dialium guineense</i> |
| 43. Crop | Ugurassa |
| Botanical Name | <i>Flacourtia indica</i> |
| Family | Flacourtiaceae |
| Common Name | Ugurassa |
| Growing Region | Scrub, jungle, steep grassy roadsides and submontane forests; 260-810 (-1200 cult) m |
| Growing Form | Shrub or tree, spiny 2-10 (-15) m tall |
| Uses | Fruit – edible (acidic in taste) Ornamental young foliage (undesirable weed) Tough and durable timber for posts |
| Varieties | |
| Wild Relatives | |
| 44. Crop | Himbutu |

| | |
|----------------|---|
| Botanical Name | <i>Salacia reticulata</i> |
| Family | Hippocrateaceae |
| Common Name | Himbutu |
| Growing Region | Moist zone in wet secondary forests, up to 1500 m, rather common |
| Growing Form | Woody climber or scandent shrub |
| Uses | Fruit – edible |
| Varieties | |
| Wild Relatives | - |
| 45. Crop | Amberalla |
| Botanical Name | <i>Spondias dulcis</i> |
| Family | Anacardiaceae |
| Common Name | Amberalla |
| Growing Region | Kandy, Kegalle, Ratnapura |
| Growing Form | Tree |
| Uses | Fruit – edible |
| Varieties | |
| Wild Relatives | <i>Spondias mangifera</i> <i>S.pinnata</i> <i>S.mombin</i> |
| 46. Crop | Laulu |
| Botanical Name | <i>Chrysopyllum roxburghii</i> |
| Family | Sapotaceae |
| Common Name | Laulu |
| Growing Region | Primary and secondary wet evergreen forest often by river banks; 30-750 m |
| Growing Form | Slender tree 6-20 m tall |
| Uses | Fruit - edible (sweetish, rather unpalatable sticky latex) |
| Varieties | |
| Wild Relatives | - |
| 47. Crop | Heen damba |
| Botanical Name | <i>Syzygium umbrosum</i> |

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|----------------|--|
| Family | Myrtaceae |
| Common Name | Hin damba |
| Growing Region | Endemic, common between 1000 and 2000m in the wet zone hills from Rakwana to Knuckles and including Namunukula |
| Growing Form | Medium sized tree |
| Uses | Fruit – edible |
| Varieties | |
| Wild Relatives | - |
| 48. Crop | Madan |
| Botanical Name | <i>Syzygium cumini</i> |
| Family | Myrtaceae |
| Common Name | Madan |
| Growing Region | Dry zone in all forms of forests but specially along the margins of streams and tanks |
| Growing Form | Large shrub to large canopy tree – 25 m tall |
| Uses | Timber- constructions, bridges |
| Varieties | |
| Wild Relatives | - |
| 49. Crop | Mora |
| Botanical Name | <i>Dimocarpus longan</i> |
| Family | Sapindaceae |
| Common Name | Mora |
| Growing Region | In forests of dry and wet regions to 700m |
| Growing Form | Medium sized to large trees, 20-30m |
| Uses | Fruit – edible |
| Varieties | |
| Wild Relatives | - |
| 50. Crop | Nelli |
| Botanical Name | <i>Phyllanthus emblica</i> |
| Family | Euphorbiaceae |
| Common Name | Nelli |
| Growing Region | Monsoon forests, not native in Ceylon |

| | |
|----------------|--|
| Growing Form | Tree to 15m high |
| Uses | Fruit – edible, medicinal uses |
| Varieties | |
| Wild Relatives | - |
| 51. Crop | Pineapple |
| Botanical Name | <i>Ananas comosus</i> |
| Family | Bromeliaceae |
| Common Name | Annasi |
| Growing Region | Kegalle district |
| Growing Form | Medium sized terrestrial herb |
| Uses | Fruit – edible |
| Varieties | |
| Wild Relatives | Bromelia ananas B.comosa |
| 52. Crop | Diwul |
| Botanical Name | <i>Limonia acidissima</i> |
| Family | Rutaceae |
| Common Name | Diwul |
| Growing Region | Limited to dry zone Monaragala, Polonnaruwa, Mannar, Hambantota, Batticaloa districts |
| Growing Form | Small tree |
| Uses | Fruit – edible |
| Varieties | |
| Wild Relatives | Sehinus limonia Anisifolium limonia Feronia limonia |
| 53. Crop | Papaya |
| Botanical Name | <i>Carica papaya</i> |
| Family | Caricaceae |
| Common Name | Gas-labu, Papol |
| Growing Region | Cultivated in all parts of the country |
| Growing Form | Small tree, 5-7 m height |

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|----------------|---------------------------------|
| Uses | Vegetable (raw) Fruit (ripe) |
| Varieties | |
| Wild Relatives | C.pubescens |

** Source : Fosberg, F. R., Dassanayake M. D. and Clayton W. D. (1994) A Revised Handbook to the Flora of Ceylon Vol. 8*

CHAPTER II

TRADITIONAL CROP VARIETIES AND CROP WILD RELATIVES

Mr. Jagath Gunawadena

Traditional crop varieties that have been cultivated in Sri Lanka are facing two types of threats at present. One is the threat of extinction and the other is that they are being subjected to bio-theft and bio-piracy because of the genetic wealth they contain. Traditional crop varieties remain largely neglected by both farmers and the authorities.

It was these crop varieties, once the backbone of our agriculture, that have contributed to the development of new high-yielding varieties. These varieties had unique characteristics (traits) that made them useful and important. These traits range from adaptations that made some to be grown in various conditions such as floods and droughts, and resistant to pests and diseases. There were others with special characteristics such as aroma, tastes and medicinal uses.

For example, the traditional rice varieties known as *pokkali* and the traditional capsicum variety known as *eth-honde* (meaning 'elephant trunk' in Sinhala) are able to withstand salinity of soil. Another rice variety known as *devaradderi* can remain alive when submerged and was cultivated in paddy fields that are at risk of being flooded during heavy monsoonal rains. There are also rice varieties that mature in a short period and can withstand dryness, such as *suduru samba* (70 days) and *heete de wee* (60 days) that were grown in the dry zone during the Yala season.¹

These are other traditional crop varieties that have special qualities making them appealing to consumers. The rice variety known as *suwandel* is known for the pleasing aroma when it is cooked. Varieties of rice such as *suduru samba* and *puwak mal samba* are also known as *heen kekiri* and noted for their pure, white short grain of high quality and taste. A number of red rice varieties known as *heenati* were known for the medicinal properties;

1. Personal Observation.

while the variety of orange known as *Bibile dodang* is known for the juicy, sweet, tasting fruits.²

The distribution of traditional varieties shows that some are widely dispersed while others show regional or limited spread. For example, rice varieties such as the salt-tolerant *pokkali* and flood-tolerant *devareddari* have wide distribution in areas where such problems exist. However the salt-tolerant capsicum *eth-honde* is grown only in the Kalpitiya area in the Puttalam District in the North Western Province. It is also seen that different varieties with the same type of traits are sometimes known by the same name. For example, the name *heenati* is given to about 10 different rice varieties and the name *lane-iri* is given to several brinjal varieties that have white and purple stripes.³

Although traditional crop varieties have a wide range of traits that made them appealing to both farmers and consumers, some have drawbacks as well. A common drawback is the low-yield in comparison to some of the new high-yielding varieties. Another is the susceptibility to some pests and diseases, and low sensitivity to fertiliser. Therefore when new high-yielding varieties were introduced, many farmers abandoned traditional varieties. In some areas, the spread of pests or disease made them adopt new resistant varieties. There were other instances when new varieties were made with traditional varieties. These new varieties were improved versions of traditional varieties and had replaced the latter because of their improved characteristics.

The introduction of new, high-yielding varieties has been happening for the past five decades and most of the traditional varieties have been replaced by new varieties. Knowledge on traditional varieties is also disappearing from farmers, making them less likely to revert to growing these varieties or growing both traditional and new varieties. The best practice to conserve and protect traditional varieties is their *in-situ* conservation: that is, to continue to grow them in the areas where they were traditionally grown and evolved. The other option is their cultivation in a selected locality or keeping samples in gene banks or both.

2. Personal Observation.
3. Personal Observation.

There is no conscious effort on the part of the authorities (that is, the Department of Agriculture and the ministry in charge of the subject) to develop and implement the programme to encourage and adopt practices for the *in-situ* conservation of traditional crop varieties. Collections of some varieties are maintained in crop research stations. A large *ex-situ* collection (germplasm collection) is maintained at the plant genetic resources centre (PGRC) at Gannoruwa, Peradeniya.⁴

There are no co-ordinated efforts on the part of the non-governmental organisational sector in preserving traditional varieties such as Heirloom Varieties Protection in USA. There, a loose coalition of non-governmental groups helps maintain traditional varieties through planned and co-ordinates efforts such as seed exchange, sales, special preparations, and through leaflet and newsletters. Traditional varieties are described as heirlooms because they consider that they have inherited them and should pass them on to their descendants as part of their heritage.

Several non-governmental groups in Sri Lanka have been collecting and growing some varieties of several crops, most notably the traditional rice varieties that have appealing traits that confer added value to the rice. There is an emerging market for organically grown traditional rice varieties that possess special traits (such as aroma, colour and taste) not found in new high-yielding varieties. Some of them can fetch higher prices that compensate for the comparatively lower yields. To take advantage of the higher demand, some of these efforts should be co-ordinated and strengthened. The creation of niche markets and the popularising of some varieties with special and unique taste will also encourage farmers to both retain their traditional varieties and also to take up growing some promising varieties that could give them a good income even if the harvest is lower due to higher prices and fewer inputs^{5 6}.

A number of naturally growing relations of crop plants are found in Sri Lanka and these are collectively known as *Crop Wild Relatives*. Most are quite similar to a crop and share some characteristics with them while others are not easily associated with a crop by looking

4. See chapter by Dr. Hitinayake in this publication.
5. Interview with Mr. Podinilame, Human Development Centre, Tolangamuwa.
6. Interview with Mr. Seneviruwan, Saruketha Movement, Matugama.

at them. These grow in a wide variety of habitats, from the wet zone forests to wetland and grasslands. There are some Crop Wild Relatives that are the ancestors of cultivated crops. Modern bio-technology has made it possible to isolate genes that confer specific traits and transfer them to other crops. The wild relatives of crops are a potentially rich source of genetic material, both to be used in the improvement of the related crops and for use in other unrelated crops.⁷

There is a wide diversity of crop wild relatives in Sri Lanka. For example, cinnamon (*cinnemomum verum*) the only endemic spice in the country has eight species of wild relatives, all of which are endemic to Sri Lanka.⁸ The nutmeg has three wild relatives, one of which is endemic to Sri Lanka.⁹ The mango has endemic wild relatives and so have the durian and breadfruit.¹⁰

Some of these wild relatives have utility values of their own and hence are unknown to the people. For instance, two of the wild relatives of cinnamon are also used as spices in some parts of the country.¹¹ Wild relatives of the mango and rambutan produce small but edible fruits and valued timber. The wild relatives of breadfruit have an edible seed and are valued as a fruit. A number of wild relatives are used in traditional medicine and are known as medicinal plants rather than crop wild varieties.

The identities and the importance of crop wild relatives as a group is still largely known; and their potential value is neither acknowledged nor recognised. Hence they remain mostly neglected and therefore unprotected. Most are destroyed when their habitats are degraded and this is the most prevalent threat facing them. Some species, such as the wild relatives of the mango and rambutan have been extensively felled for timber and are now quite rare

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7. Wijesundara, Cyril (2005) Presentation made at Workshop of 31.03.2005 of the Crop Wild Relatives Conservation Project.
 8. Wijesundara, Cyril (2005) Presentation made at the Workshop of 31.03.2005 of the Crop Wild Relatives Conservation Project.
 9. Wijesundara, Cyril (2005) Presentation made at the Workshop of 31.03.2005 of the Crop Wild Relatives Conservation Project.
 10. Wijesundara, Cyril (2005) Presentation made at the Workshop of 31.03.2005 of the Crop Wild Relatives Conservation Project.
 11. Personal Observation.

in some areas having disappeared altogether from other localities.¹²

A number of crop wild relatives are found in protected areas as declared under the Fauna and Flora Protection Ordinance,¹³ Forest Ordinance,¹⁴ and National Heritage Wilderness Areas Act.¹⁵ Since it is an offence to disturb the habitats, damage, or collect any plants or parts within these areas, they offer protection to any crop wild relatives found within. This has, at times contributed greatly to the protection of some species. A case in point is *cinnemomum sinharajense*, discovered in 1978,¹⁶ which is a wild relative of cinnamon. It is found only in the Sinharaja forest, declared as a National Heritage Wilderness Area in 1988, and thereby enjoys full protection. The Fauna and Flora Protection Ordinance can also afford full protection to a species, which makes it an offence to uproot, destroy or damage such plants. However, it is seen that only a few species of crop wild relatives such as three species of plants related to cinnamon and relatives of nutmeg have been protected so far.¹⁷

The main reason for such little attention to conservation of crop wild relatives is the lack of knowledge on the part of some authorities and the public. There is no material available to the general public that gives them the ability to identify these plants and to learn about their importance. If there is any value, people tend to take an interest and protect them. An example is two species of *horsfieldia*, which are relatives of the Nutmeg. Both of these have separate male and female trees. The male tree produces clusters of scented flowers while the female tree produces fruits. The flowers are valued as they are offered at temples, but there is no use for the fruits. Hence people let that the male trees remain but cut the

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12. Personal Observation and also articles on "Crop Wild Relatives: a vital but neglected resource, *The Island* 08.05.2002, and "Crop Wild Relatives and legal protection", *The Island* 15.05.2002.
 13. Fauna and Flora Protection Ordinance, No 02 of 1937 as amended.
 14. Forest Ordinance.
 15. National Heritage Wilderness Areas Act.
 16. Dassanayaka M.B, Fosberg F.R, Clayron W.D (1995) A Revised Handbook to the Flora of Ceylon Volume IX.
 17. Schedule V, under s. 42, Fauna and Flora Protection Ordinance.

female trees. When shown that it is essential to keep the female trees too, they often refrain from harming them.¹⁸

Other problems facing traditional crop varieties and crop wild relatives, is the theft of the plant material and the application of intellectual property rights over varieties and their genetic wealth. The first issue is known as *bio-theft* while the second is known as *bio-piracy*. Bio-theft is the export of plant genetic material without proper authorisation. It involves physical matter such as plants, seeds or tissues, and is an offence because the export is carried out in violation of the law and in a surreptitious manner just as in other types of theft.

The term bio-piracy has been widely used since being coined in 1993.¹⁹ Initially defined as “the use of intellectual property laws (patents and plant breeders’ rights) to gain exclusive monopoly control over genetic resources that are based on the knowledge and innovation of farmers and indigenous people”,²⁰ it has now been broadened to include the acquisition of intellectual property rights over any living being, any compound, genetic material or other part of a living being found in one country by a person or organisation of another country. In bio-piracy, what is lost is not physical material but rights covering the material. These rights are held as monopoly rights by the assignee of the patents or plant breeders’ rights and even the country of origin cannot engage in any activity that transgresses those rights.

Patents were initially meant to be defensive tools that gave an inventor of a new invention a fair chance without competition for a limited period of time to profit by the invention in return for its disclosure. It allowed the inventor to reap profit for the time, effort, and resources spent. In return, the disclosure made it possible for anyone to use it freely after the expiration of the patent. It is not possible to get patents on genetic materials in a number of developed countries.

18. Personal Observation in the Kalutara District.

19. RAFI Communique of 30.11.1993, “Bio-piracy: the story of coloured cottons of the Americas”.

20. RAFI Communique.

However patents are increasingly being used to undermine competitors by preventing them from entering a market or excluding them from the market. This is achieved by obstructing and preventing research, preventing the introduction of similar products, denying access to research materials, and to exhaust smaller opponents by lengthy legal actions. It is seen that many of the patents on genetic materials have not been exploited commercially and only serve to stifle activities of others.

The other type of monopolies on plants is through taking Plant Breeders' Rights. Although these are available only to new varieties, the scope and availability of a Plant Breeders' Right (PBR) is decided by how each law interpret key terms such as varieties, novelty and distinctness. In some countries plants that differ from the other by one trait are considered as distinct and thus qualify as a new variety. This is the situation in countries which have Plant Breeders Rights Acts based on the UPOV (1991) convention.²¹

In countries such as Sri Lanka which have a large diversity of traditional crop varieties, it is difficult, if not impossible, to document all the traits of different traditional crop varieties. It leaves room for others to manipulate these inadequacies gaining a PBR on an already existing variety by pointing out one or more existing traits as new traits. The authority that grants PBR would not be able to verify the claim as they may not have the necessary reference material. The same situation may prevent other parties from challenging such a PBR effectively. However the assignee of the PBR would therefore make a claim on the traditional variety. More than 100 such PBRs granted in Australia have been identified by the Heritage Seed Curators of Australia (HSCA) and the Rural Advancement Foundation International (RAFI).²² Thus a variety that had been cultivated for generations runs the risk of becoming intellectual property of an individual or company in a far off country.

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21. The Sri Lankan authorities drafted a Plant Breeders Rights Act in 2001 based on UPOV (1991). It was not brought before parliament due to public protest from environmental groups. A new Bill is presently being drafted.
 22. RAFI News Release 16.09.1998 "Plant Breeders Wrongs". A full list of the PBR and pending applications is contained in the annex to the document titled 'Plant Breeders Rights and Wrongs, the result of investigation by RAFI and HSCA'. Hankin, Bill (1998) "Australia bungles Plant Breeders Rights", *The Curator*, Journal of HSCA, Harvest 1998.

A PBR can only grant a monopoly over a variety as defined by the law of the country that grants these rights. Thus, they do not give monopoly control over the traits, nor to the genes that are responsible for the particular traits. A PBR does not extend coverage to progeny, unless they are substantially similar to the patent that is given protection. Hence inventive breeders can use such varieties to confer a particularly useful trait to an already existing variety or a new variety that would not be substantially similar to the variety covered by the PBR. Hence some breeders always try to get a patent to cover plants in countries where this is lawful.²³ An example is the patenting of Basmati rice in USA. Rice Tec made an application for a patent in July 1994 and patent US 5,663,484 was granted in September 1997. They also applied for a PBR in November 1995, and were awarded PBR certificate PVP 9600077 in 1996. They abandoned the PBR after obtaining the patent.

There is no legal requirement to make a disclosure about the origin of any genetic material that is intended to be covered by the patent. Even TRIPS and the Convention on Biological Diversity are silent on this issue. There is no way to obtain such provision in a national law unless a state voluntarily takes such a decision which is highly unlikely. This deficiency in the patent law is what helps bio-theft to become bio-piracy by making it possible to get patents on material stolen from other countries. However it is seen that some patents do mention the country of origin in their description.²⁴ This is done in order to help them prove an infringement and not as a grateful acknowledgement; and the country of origin cannot take any action even when such facts are mentioned.

It has been suggested that a system should be introduced to make it mandatory to disclose the source of any genetic or other biological material that is intended to be covered by a patent. One such suggestion is to introduce Certificates of Origin to protect the rights of owners of genetic resources and traditional knowledge.²⁵ This term was originally introduced to certify in the patent application procedure that *Prior Informed Consent* (PIC) had been obtained for use of genetic material. Certificates of Origin can also be used to track

23. The scope of a patent and PBR has been compared and discussed in the decision of Pioneer Hi-Bred International vs. J.E.M. Supply Inc., H.S. Patents Quarterly Edition vol.53, p.1440 (Fed. Cir.2000).

24. For example US 4,293,546 and US 4,385,122 both state that the new micro-organism *streptosporangium fragile* was discovered in Jaffna, Sri Lanka. U S 5,541,181 states that the new strain of *micromonospora* spp.M990-6 was found in Sri Lanka.

25. Tobin. B (1994), "Alternative Mechanism for Protection for Indigenous Rights", Paper presented at "Indigenous People, Biodiversity and Intellectual Property in Bolivia Conference", September 1994.

the flow of genetic material and to document the right to use genetic resources. However their use for this purpose has yet to be incorporated into access regimes and is still under consideration.²⁶

Box 1

Patenting rice varieties: an unknown instance

The Patenting of Basmati Rice lines and grains by Rice Tec Incorporation of Texas, U.S.A and the subsequent successful challenges by the Indian government are well known. But there are other instances where traditional rice varieties have been subjected to patents in other countries.

The Japanese patent JP 11169003 of 29.06.1999 assigned to New Aque Gijustu Kenkyusho is one such example that has gone unnoticed to all. It covers an indica rice variety known as Black Lily that is a traditional rice variety grown in China, known for its excellent flavours and health properties.

The 'invention' that has been made is to cultivate the original variety in paddy fields in Japan, select the larger seed and continue the process every session for a period of eight years.

Thus, the 'invention' that they claim is just the end of a continuous process of selective cultivation which has resulted in a larger seed.

26. The Sixth Conference of the Parties (COP-6) of the CBD, held in The Hague in 2002 tasked the Secretariat to undertake an analysis of the feasibility of an International Certificate of Origin. COP-7 in 2004 has decided to examine this further.

Box 2**Rice genes: a hot intellectual property**

A large number of genes from the rice plant (*oryza sativa*) have been patented by companies, research institutes and universities. The past few years saw a marked increase in numbers, especially by Syngenta which stated that they have described the genome of rice. A list of some are provided below.

| Number/date | Assignee | Title |
|--------------------------------|--------------------------------|---|
| WO 03/048319 (12.06.2003) | Syngenta | Nuclear molecules from rice encoding proteins for biotic stress tolerance, enhanced yields, disease resistance and altered nutritional quality and uses thereof |
| WO 03/007699 (03.01.2005) | Syngenta | Transcription factors of cereals |
| WO 2005/030968 (07.04.2005) | Monsanto | Acting regulatory elements for use in plants |
| WO 2004/005515 (15.01.2004) | Japan Tobacco Inc. Syngenta | Sterility recovery genes to rice BT type male sterile cytoplasm |
| WO 2005/017167 (24.02.2005) | Monsanto | Promoter molecules for use in plants |

Box 3**Patenting of Nutmeg genes**

Nutmeg (*Myristica Fragrance*) is a spice originating in Asia and is known for the fragrance and taste caused by substances known as myristates.

Two patents covering two genes that code for the enzymes creating the metabolic pathways for the production of myristates in plant cells have been obtained by a US company. The patents are numbered HS 5,654,495 of 05.08.1997 and US 5, 850,022 of 15.12.1998 and are titled, "Production of myristates in plant cells" with the same abstract, assignees, description and summaries.

The patent claims that these genes can be introduced successfully to oil-producing plants and myristates produced in these modified plants. They have identified crops such as Canola, Sunflower, Safflower, Cotton, Soybean, Peanut, Corn, Oil Palm and Coconut.

CHAPTER III

TRADITIONAL CROP VARIETIES, INTELLECTUAL PROPERTY RIGHTS AND INTERNATIONAL CONVENTIONS

Mr Jagath Gunawardena

The increasing importance of traditional crop varieties and their wild relatives has led to different parties trying to acquire such patents and their genetic materials and to take monopolies over the genetic material and their use. The search for biochemical genetic materials with potential economic values is known as *bio-prospecting*. The ability to search for, find, take and use these bio-chemical compounds and genetic materials is known as *access*.

Though the terminology seems to be novel, this is only a continuation of a process that has been ongoing for more than five centuries. This continuous process has resulted in an anomalous situation at present. That is bio-diversity poor developed countries have accumulated 70% of the world's genetic material, 75% of which originated in bio-diversity rich developing countries.¹

The biological and genetic materials found in different animals, plants and micro organisms were initially considered the common heritage of human kind and were freely provided and exchanged between nations – although the laws of countries such as Sri Lanka have asserted and acknowledged sovereign rights over them.²

The situation started to change due to several interconnected reasons. First and foremost was the realisation by the provider countries that they do not receive their due benefits from the donation of important material to others. The second was increasing intellectual property claims over donated material that gave stronger monopolies to users, often to the

1. RAFI Communique.

2. Articles 27 and 28 of the Constitution of the Democratic Socialist Republic of Sri Lanka.

detriment of the providers. The third was the failure of such users to share any of the benefits with providers.

The increasing reluctance and refusal by the provider countries to bio-prospecting efforts by developed countries has placed them in an awkward situation. Although developed countries have resources (both monetary and technological) they are short of suitable biological material to create wealth. Therefore different approaches have been mooted to induce the provider countries to part with their biological material by getting their consent either directly through monetary benefits or indirectly through non-monetary benefits, and through “common systems” and “common regimes” in granting access that provide a regime for sharing benefits with providers.

International legal instruments that deal with access to genetic resources and the sharing of benefits are the Convention on Biological Diversity (CBD) and the International Treaty on Plant Genetic Resources in Food and Agriculture (ITPGR). Sri Lanka has signed and ratified the CBD but has not signed the ITPGR.

The introduction of intellectual property rights (IPR) over genetic resources has become an important and controversial issue in discussions on access and sharing of benefits as they sometimes interfere with both these issues and causes problems. The international legal instrument that deals with IPR issues is the Trade Related Aspect of Intellectual Property Rights Agreement (TRIPS) under the World Trade Organization (WTO). The TRIPS agreement also deals with patents on living beings and similar IPR on plant varieties. Hence, it is important to enlarge the present discussion to include the relevant provisions of TRIPS as well.

CONVENTION ON BIOLOGICAL DIVERSITY (CBD)

The objectives of the Convention are the conservation of biological diversity, sustainable use of genetic resources and the fair and equitable sharing of benefits from the use of genetic resources.³ It is important to note that although the CBD deals with the conservation of biological diversity, the scope of access and benefit sharing is narrowed down to genetic resources. This Convention defines genetic resources as genetic material with actual or potential economic value;⁴ a definition that is based not on science but on commercial value.

The CBD does not call for any direct action from members. Rather it provides a set of policies and objectives and members can take necessary action within the context provided. It therefore acts as a framework convention. In this regard the CBD provides a set of responsibilities for the conservation of biological diversity and sustainable use, access and benefit sharing as well as a set of corresponding rights.

Although the scope of the CBD is to cover all types of genetic resources, there is an important exception that serves as an exclusive clause. This is article 15.3 which says that the provisions of articles 15, 16 and 19 apply only to those genetic resources “acquired in accordance with the convention.” This, in other words, excludes all the ex-situ collection that have been acquired before the ratification of the Convention⁵ which accounts for the majority of the ex-situ collections held in almost all the gene banks in the world. This is a great disadvantage to a country like Sri Lanka which has readily and freely donated crop germplasm to others for more than four decades.

The articles of the CBD make clear that it sets out a bilateral approach in providing access

3. Article 1 (Objectives) of the CBD.
4. Article 2 (Use of Terms) of the CBD.
5. CBD was ratified on 29.12.1993.

to genetic resources and the sharing of benefits that has to be on “mutually agreed terms”.⁶ This is nothing new and amounts to the usual approach in bilateral agreements. It also authorises national governments to determine access to genetic resources, subject to national legislation and to create conditions to facilitate access. Thus, a country can decide on how to set about negotiating a bilateral agreement. It does not call for any new legislation or even for an amendment of any existing legislation but only to create a system. Even though there are moves to make a new access law in Sri Lanka this is not a requirement under the CBD. These moves are afoot although Sri Lanka has provided and still continues to provide crop genetic resources through bilateral agreements.

The need for *Prior Informed Consent* (PIC) has been established as crucial when requesting access. This means that the potential recipient must inform the providing party about the intended use and related issues prior to the agreement. Implicit in this are the fact that recipient should tell the truth and the information needs to be sufficient for the provider to get a clear idea of the issues involved. The Convention does not say, either explicitly or implicitly that the provider has to get the PIC of the actual holders of a genetic resource such as a community, family or even an individual.

The issues of PIC have to be dealt with on several levels. The first is the country level and then comes regional, community, family group and then individual levels. For example, if a particular variety of paddy is available in the hands of several communities. Can some or any one community give PIC and material thereby excluding others from sharing? This is of essential importance from the point of view of sharing the benefits. The Draft Access and Benefit Sharing Act of 2000⁷ restricted PIC to the government, a move that was criticised for its inadequacy and the possibility of it leading to malpractices such as the government being under no obligation to share benefits derived with the holders of traditional knowledge from whom the source material and information on its uses had been obtained in the first place. Fortunately this scenario has been averted when the authorities abandoned the 2000 Bill.

6. Article 15 (2) of the CBD.

7. Recommendation on new legislation. Genetic Resources- access and benefit sharing act, draft version of 26.07.2000.

The aims of benefit sharing in the CBD is to channel benefits that are provided to the provider of a genetic resource to be used for the conservation of biological diversity with part of it to be channelled to the owners of the genetic resource. The Convention places two obligations on the provider countries and two on user countries. The two obligations on the providers are for the utilisation of traditional knowledge⁸ practices and innovations and form laws that facilitate the exploitation of genetic resources.⁹ The two obligations placed on user countries are to share the benefits accrued from the use of genetic resources¹⁰ with the provider and also to share the technologies, including bio- technologies, based on the genetic resources of the providers.¹¹

There was widespread hope in the provider countries that the access and benefit sharing regime of the CBD would bring them rapid and substantial monetary rewards as returns for providing genetic resources and that illegal and unethical appropriations of genetic resources and rights would be reduced or stopped (the so-called “granted bargain” predicted by some commentators).

More than ten years after the signing of the CBD, none of these have been realised. Some provider countries have established national laws for the granting of access (that is so-called access laws proposed and actively pursued by several international bodies) but reciprocal measures have not been made by user countries.

The problems in implementing the access and benefit sharing issues has led to the adoption of the Bonn guidelines for access and benefit sharing at the Sixth Conference of Parties in 2002.¹² The Bonn guidelines for access and benefit sharing are intended to assist countries to develop their own access regimes and benefit sharing regimes. They are to help in issues such as PIC and on *mutually agreed terms* (MAT), to provide necessary guide lines for the participation of different groups, their roles and responsibilities. These guide lines do

8. Article 8 (j) of the CBD.

9. Article 15 (2) of the CBD.

10. Article 15 (7) of the CBD.

11. Article 16 of the CBD guide lines were adopted

12. These guide lines were adopted of the sixth COP in April 2002. Decision VI/24.

not elaborate the necessary measures but only point them out in general terms. The more important fact is that those guide lines are, as the name implies, voluntary in nature.

INTERNATIONAL TREATY ON PLANT GENETIC RESOURCES IN FOOD & AGRICULTURE

The objectives of this Convention are the conservation and sustainable use of plant genetic resources in food agriculture and the fair and the equitable sharing of benefits arising from their use, in harmony with the Convention on Biological Diversity for sustainable agriculture and food security.¹³ The scope of this Convention is limited, relating only to *plant genetic resources in food and agriculture* (PGRFA).¹⁴ This term (PGRFA) is defined as any genetic material of plant origin of actual or potential value for food and agriculture.¹⁵

The access regime proposed by the ITPGR is different from the access regime proposed by the CBD. The approach in the ITPGR is a multilateral system to which all the parties are privy to instead of the bilateral agreements proposed by the CBD.¹⁶ The bilateral approach in the CBD is driven by market forces, that is, a party or company enters into a bilateral treaty to gain access only if there is a real or potential value in the genetic resources they request. The term sharing of benefit means that there should be benefits to be shared with the provider. Instead, the ITPGR functions under the assumption that no market driven demand can be created for the most important PGRFA (which are included in Annex D). It is an implicit recognition of monopolies in the crop breeding sector, where

13. Article 1 (Objectives) of ITPGR.

14. Article 3 (Scope).

15. Article 2 (Use of Terms).

16. Part IV of ITPGR. Articles 10 to 13.

those who possess important germplasm could create monopolies over them and refuse to share them with others, especially the poorer parties.

The ITPGR proposes a system of providing open access to PGRFA. This will make it easier for all parties to access needed genetic resources, to keep access costs low and to encourage research and the breeding of new crop varieties that would ultimately lead to global food security.

The ITPGR has proposed a four-pronged approach in benefit sharing.¹⁷ These are:

1. Exchange of Information
2. Access to and Transfer of Technology
3. Capacity-Building
4. Sharing of Benefits of Commercialisation.

The central idea of the Treaty is to establish a multilateral system for all countries that would deal with issues, exchange and benefit sharing for PGRFA. It implies that there is no need to exchange or provide access to genetic material through bilateral agreements, as access will be free of charge. It also proposes a system of standard Material Transfer Agreements (MTA) which could be used by all parties. Although neither the CBD, nor the ITPGR has any explicit exemptions, it is clear that the ITPGR has created a different and alternate system of access to PGRFA and has in effect exempted them from the CBD system.¹⁸

The Treaty also aims at establishing a fund for the ex-situ and in-situ conservation of PGRFA.¹⁹ This fund is intended to be financed through two means:

1. A core contribution made by developed countries;

17. Article 13 (Benefit Sharing in the multilateral system) of ITPGR.

18. Articles 13 (2) together with 12.3 (b) makes this position clear.

19. Article 13 (2) (d) of ITPGR (sharing of monetary and other benefits of commercialisation).

2. A recipient who commercialises a product based on PGRFA obtained from the multilateral system should pay a fair and equitable share of the benefits if the product is covered by IPR in a form that restricts availability for further research and breeding.

In other words this means that a recipient of PGRFA from the multilateral system can obtain a patent or Plant Breeders Right for a variety that uses genetic materials and could commercialise it without sharing the benefits if the product is available for further research and breeding. The ITPGR leaves room for such a person or body to restrict or prevent the use of such product in cultivation even by subsistence farmers and still not contribute to the fund. It could have been fairer if anyone who commercialises a product protecting their interests through IPR were required to make payments to the fund calculated on the availability of material.

TRADE-RELATED ASPECTS OF INTELLECTUAL PROPERTY RIGHTS AGREEMENT

This agreement has made it obligatory for all member countries of the WTO to provide IPR that extend to all products and processes from all fields of technology. The stated objectives of the agreement²⁰ are the promotion of technological innovation and their dissemination to the benefit of both producers and users of technological knowledge. It is intended that the imposition of similar IPR regimes in all member countries of the WTO (the so-called minimum standards) will permit the owners of IPR to gain full benefits by the trade in covered goods and services that would contribute to their growth which will in turn increase trade.

Among the most controversial aspects of TRIPS is the extension of IPR to living beings or life patenting. This is provided in Article 27 (3) (b) which makes it:

20. Article 1 (Objectives) of TRIPS.

1. Discretionary to grant patents to animals
2. Discretionary to grant patents to plants
3. Obligatory to provide patenting of micro-organisms
4. Obligatory to bring a *sui generis* system or a combination of patents and *sui generis* system to provide IPR to plant varieties

An analysis of the real scope of this part shows that only the patenting of animals is still discretionary and all other living beings are covered by the agreement as needing IPR. The little discretion left is the design of a *sui generis* law. Sri Lanka has complied with all of the requirements of TRIPS²¹ except the *sui generis* law, which is still in the draft stage.²²

INTERACTION BETWEEN CBD/ITPGR AND TRIPS

The provisions in TRIPS on granting IPR over plants has a direct relationship with plant genetic resources as provided by CBD, and the PGRFA as covered by the ITPGR, as they can be covered by either patents or by the Plant Breeders Rights or by both. A patent can cover a gene or other genetic material²³ and in some countries even plants.²⁴ A PBR can only cover a variety and does not extend to the genetic level.²⁵ However it is possible to get patents on genes or fragments and also to get PBR on plant varieties that have been bred or made incorporating these genetic materials, leading to the amalgamation of the two IPR systems to get wider and stronger control.

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21. See the Intellectual Property Act (No 36 of 2003) that replaced the Code of Intellectual Property Rights Act (No 52 of 1979).
 22. The draft presented in July 2001 was based on UPOV-1991 Convention. A new draft version is still in preparation.
 23. Thus equating an innovation with discoveries.
 24. In USA there has been a Plant Patent Act since 1930 that provide patents for new, asexually propagated plants with the exception of tube propagated plants. Since 1985 USPTO has been granting utility patents for plants.
 25. A PBR is granted to a new variety of plant that is distinct, uniform and stable.

Both the CBD and ITPGR mention the role of IPR, but stop short of taking an explicit position as regards the extension of IPR to living beings. However both CBD and ITPGR have tacitly approved conferring IPR on genetic material and plants and have no incompatibilities or conflicts with the position set out in TRIPS.

The ITPGR states that recipients of PGRFA shall not claim any IPR or other rights that limit facilitated access in the form received from the multilateral system.²⁶ This in one stroke approves and acknowledges the need for IPR on PGRFA but only provides a proviso that they should not be subjected to the IPR regime in the form received. It has on the other hand given complete and total freedom to claim IPR rights on plant varieties, plasmid constructs and gene constructs that incorporate such genetic material. A basic requirement in both patents and PBR is that what ought to be protected has to be new (or novel) and should not be part of prior art. Thus any genetic material that is in the “form received” constitutes part of prior art and therefore not a novel thing that fulfils this criteria. It can be argued that this provision in ITPGR only gives a meaningless assurance to providers while leaving all options of pursuing IPR to recipients.

The provisions on access and transfer of technologies state that some technologies can only be transferred through genetic material; and that Contracting Parties shall provide and /or facilitate access to such technologies and genetic material. However access to these technologies, improved varieties and genetic material should be provided and/or facilitated while respecting applicable property rights and access laws.²⁷ The applicable property rights in respect of technologies are process patents while those applicable to patent varieties may be either patents or PBR. However applicable to genetic material is life patents on genes or patents covering parts of genetic material such as ‘codes’ (the part of the gene that encodes a protein) or ‘promoters’ (the control region of a gene).

26. Article 12 (3) (d) of ITPGR.

27. Article 13 (2) (b) of ITPGR (access to and transfer of technology).

The TRIPS agreement does not make it mandatory to grant patents on genes but only discretionary.²⁸ However respecting IPR on genes requires amending laws to grant patent cover to these; a position contradictory to the policy maintained by Sri Lanka. It seems that either our IPR regime must be changed to access these technologies, or we hold on the current position, and forego right of access to these technologies. In this respect, it can be said that the ITPGR while complementing TRIPS also extends intellectual property rights to living beings that are not subject to TRIPS.

The provisions on access to and transfer of technologies in the CBD state that the term technologies include bio-technologies.²⁹ It states that technologies covered by patents and other IPR should be provided on terms which recognise and are consistent with adequate and effective protection of IPR,³⁰ and further states that parties should take legislative, policy and administrative steps as appropriate, with the aim of enabling the private sector to gain access to development and transfer of technologies.³¹

The provisions of the CBD on access to and transfer of technologies means that a country that wants access to bio-technologies should provide adequate legal protection to them including legislative and policy measures as appropriate to protect IPR over them. This view is reinforced by the objectives of the CBD,³² which says, among other things, that access to genetic resources and appropriate transfer of relevant technologies should take into account all rights over these resources and technologies.

All the genetic engineering technologies, and often the genes and their parts that are used in these (promoters, codes, gene constructs, plasmid constructs) are covered by the patents. Some patents even cover the resulting plants as well. The provisions of the CBD says that

28. Article 27 (3) (b) of TRIPS.

29. Article 16 (1) of the CBD.

30. Article 16 (2), 16 (3), 16 (4) and 16 (5) of CBD together with Article 19.

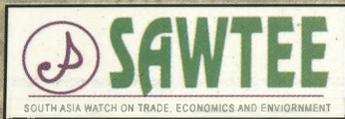
31. Article 16 (4) of CBD.

32. Article 1 of CBD (Objectives).

a country that wants the transfer of technologies has to provide adequate legal protection to them and this means that the IPR laws have to be accommodate patents on genetic material.³³

A country that adopts patents on genetic material has to think of implications as they go well beyond the access of technologies. In this regard, it is needed to look at the articles in TRIPS that makes it mandatory for parties to grant National Treatment³⁴ and Most Favoured Nation Treatment.³⁵ This means that any other party who wants to patent genetic materials has to be accorded the same treatment and any concession provided to it has to be extended to all other parties. It is thus clear that these provisions of the CBD, if implemented will go beyond the requirements of TRIPS in this area.

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33. In Sri Lanka, section 62 (3) of the Intellectual Property Act (No 36 of 2003) excludes patents on plants, animals and their parts.
34. Article 3 of TRIPS (National Treatment).
35. Article 4 of TRIPS (Most Favoured Nation Treatment).



Launched in December 1994 by a consortium of NGOs from South Asia region, South Asia Watch on Trade, Economics and Environment (SAWTEE) is a recognised, registered, non-profit, non-governmental organisation. It currently operates through its headquarters in Kathmandu and 11 network members from five South Asian countries, namely, Bangladesh, India, Nepal, Pakistan and Sri Lanka.

SAWTEE's mission is to build capacity of concerned stakeholders in the context of liberalisation and globalisation in South Asia region. SAWTEE follows a five-prong strategy to achieve its mission.

- ★ **Networking:** Establishing institutional linkage with various national, regional and international institutions that are working in the areas of liberalisation, globalisation and sustainable development.
- ★ **Capacity building:** Conducting capacity building activities at various levels through training workshop, information dissemination and internship programme.
- ★ **Policy research:** Conducting policy research on issues such as WTO rules, regional cooperation, Intellectual property rights, competition policy, environment and development dimension of trade liberalisation.
- ★ **Advocacy:** Organising conferences, seminars, policy dialogues, consultation meetings, talk programmes and interaction programmes. The advocacy at the policy level is also supplemented by publication and distribution of policy briefs on relevant issues in a timely manner.
- ★ **Sensitisation:** Publishing briefing papers, newsletters, discussion papers, monographs and policy briefs on issues related to globalisation, liberalisation, multilateral trading system, regional cooperation, competition policy, environment, intellectual property rights, food security etc.

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Law & Society Trust

The Law & Society Trust is a non-profit making body committed to improving public awareness on civil and political rights and social, economic and cultural rights, and equal access to justice. The Trust is also concerned with the consideration and improvement of professional skills within the legal community. The Trust has taken a leading role in promoting cooperation between government and society within South Asia on questions relating to human rights, democracy and minority protection, and has participated in initiatives to develop a global intellectual and policy agenda for the nineties.

The Law & Society Trust was set up in Colombo in 1982 as a Trust under the Trust Ordinance and was subsequently incorporated in 1992 under the Companies Act No. 17 of 1982.

The Trust designs activities and programmes, and commissions studies and publications, which have attempted to make the law play a more meaningful role within society, and to use the law as a tool for social change. The Trust attempts to use law as a resource in the battle against underdevelopment and poverty, and is involved in the organisation of a series of programmes to improve access to the mechanisms of justice, as well as programmes aimed at members of the legal community. These include publications, workshops, seminars and symposia.

The activities of the Trust are categorised under three Programme Areas namely Socio Economic Rights Civil and Political Rights Programme and Conflict Related Human Rights programme.

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