Home Gardens for Seed Conservation and Supplementary Nutrition

The Revitalizing Rainfed Agriculture Network (RRAN) is a growing network of civil society organizations, research institutions, policy makers, donors and individuals engaged in evolving a differentiated agricultural policy with enhanced public investments and support system for rainfed areas in India. The Comprehensive Pilots (CPs) are part of the RRA Network's action research programme that seeks to establish evidence and experience on the ground, in support of the various propositions that the Network has developed. In order to offer support for CPs a set of organizations have been identified as Nodes on specific identified themes such as – seeds, soils, water, millets, fisheries, livestock, credit, markets and institutions.

The Centre for Indian Knowledge Systems (CIKS) has been identified and functioning as the nodal anchor for the theme of seeds. A series of booklets is being published on various technical and institutional aspects of seed systems to build the capacity of the CPs as well as various field groups who are involved in the efforts to build community managed seed systems.

This book provides an overview regarding the setting up of an integrated home garden, its importance for the conservation and utilisation of indigenous varieties of seeds and its role in providing herbs for primary health care as well as the benefits in terms of supplementary nutrition and income generation. Details are given about the impact of the home garden programme with case studies specifically from rainfed areas.






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Revitalising Rainfed Agriculture Network
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PREFACE

The Revitalizing Rainfed Agriculture Network (RRAN) is a growing network of civil society organizations, research institutions, policy makers, donors and individuals engaged in evolving a differentiated agricultural policy with enhanced public investments and support system for rainfed areas in India. Based on the vast experience on the ground and analysis of issues, RRA Network is evolving specific propositions on various aspects of rainfed agriculture such as seeds, soils, water, crop systems, millets, livestock, fisheries, credit, markets and institutions. The Comprehensive Pilots (CPs) are part of the RRA Network's action research programme that seeks to establish evidence and experience on the ground, in support of the various propositions that the Network has developed. In order to offer support for CPs a set of organizations have been identified as Nodes on specific identified themes such as – seeds, soils, water, millets, fisheries, livestock, credit, markets and institutions.

The Centre for Indian Knowledge Systems (CIKS) has been identified and functioning as the nodal anchor for the theme of seeds. The CPs started functioning in the year 2012 and in June 2012 the seed node convened a meeting of representatives of CPs for an inception workshop in Chennai. During this workshop the CPs shared their proposals and plans of work as well as their thinking about the work that they plan to undertake in the area of seeds. Presentations were made during the workshop on how to undertake a situation analysis with respect to seeds, the elements of designing a robust seed system for rainfed areas and also about undertaking a planning exercise through which each CP can proceed towards the establishment of a robust community managed seed system in its area of work. A part of the workshop was to identify the specific needs expressed by each of the CPs in terms of the support and help they would need in the area of seeds. A beginning was made in terms of the capacity building exercise through a series of presentations.

Beginning from the early part of the year 2012 Dr. G. Venkat Raman of the Seed node had started making a series of visits to various CPs. During the visits he provided help and assistance to the CPs for performing situation analysis, evolving a plan for a robust seed system for the area undertaking capacity building exercises and also trying to create linkages between the groups and scientists and institutions who could provide technical support. During this process he also identified various needs in the form of topics on which training and capacity building was required.

Subsequently, on two different occasions when the seed node team met the CPs – in Bagli in Madhya Pradesh in November 2012 and in Tiptur in Karnataka in December 2012 there were opportunities to review the progress of each CP as well as provide technical inputs and training. Earlier this year, towards the end of July 2013 a workshop was held by the seed node in the CIKS Technology Resource Centre in the Kancheepuram district of Tamil Nadu. In this workshop a series of technical trainings were provided on various aspects of seeds. The training was not only in the

form of lectures and presentations but also included field work, experiments, visits to government and private seed farms and seed production centres as well as meetings with the officials of the Directorate of Agriculture and Seed Certification departments. During these meetings drafts of some of the technical training modules that were prepared were circulated and comments and suggestions were sought from the CPs. Based on these efforts and also building upon discussions that took place during the visits to CPs a set of topics had been identified to produce training modules. We expect this process to be dynamic and interactive so that changes can be made based on the suggestions received from the various user groups. A series of reports and books that have been circulated and discussed as drafts and presentations are now being brought out as publications.

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About this Book

This book provides an overview regarding the setting up of an integrated home garden, its importance for the conservation and utilisation of indigenous varieties of seeds and its role in providing herbs for primary health care as well as the benefits in terms of supplementary nutrition and income generation. Details are given about the impact of the home garden programme with case studies specifically from rainfed areas.

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CHAPTER I : INTRODUCTION

Home gardens have been an important part of not only our agricultural landscape but also our cultural and social landscape. It has been nurtured not only by the farmers but also the house wife, the children and even residents in towns and cities. In one sense it is important as a source of vegetables but equally it has also been a source of flowers, an excellent hobby and it even lays claim to a certain therapeutic quality. In recent years its importance is being rediscovered not only as a source of vegetables but also as being important for supplementary nutrition and additional income.

Vegetables occupy an important place in our daily life particularly for vegetarians. Vegetables are the only source to increase not only the nutritive values of foods but also their palatability. For a balanced diet, an adult should have an intake of 85g of fruits and 300g of vegetables per day according to the dietary recommendations of nutrition specialists. But the present level of production of vegetables in our country can permit a per capita consumption of only 120g of vegetables per day. In India one of the consequences of the green revolution was that it brought in mono-cropping leading to a drastic reduction of crop diversity of farm lands. This shift in agriculture focusing on a market-driven economy where cash crops took precedent, had its toll; household needs for a range of cereals, pulses and vegetables were not met from the farm but had to be purchased from the market.

According to the Indian Institute of Vegetable Research (IIVR) at Varanasi there is a large diversity of indigenous vegetables. They have in the collection about 350 varieties of brinjal, 373 varieties of lady's finger, 176 varieties of bitter gourd and 127 varieties of cowpea to cite just a few examples. Of course, the actual number of indigenous vegetables is significantly greater since only a limited amount of this diversity has been collected in institutions such as IIVR. What we see in the field is that there has been a sharp and alarming decline in the diversity of seeds – what gets cultivated locally and what is seen in the local market. A smaller number of varieties are being cultivated more extensively in larger areas. Also, the choice of vegetable varieties is strongly dictated by trade considerations. For example, a large variety of delicious tomatoes are being replaced by one single variety because it has a very thick and tough skin – this means that it suffers very little damage during harvest and transport! In this process taste and nutritional properties have suffered and the biodiversity has declined. Similarly, one observes that many local varieties of – bitter gourd, gourds, beans, brinjal, etc., have become rarer and some have disappeared completely. Thus it is also important to revive home gardens to strengthen local diversity.

More recently it is also proving to be important as a source of herbs cultivated for primary health care as well as a source of supplementary nutrition and income specifically in less fertile and rainfed areas.

Overview of this Book

This book is structured as follows :

In the introductory chapter we have outlined the importance of home gardens particularly for rainfed areas. Following this we trace the beginnings of the CIKS work in this area as well as the FRLHT programme for Kitchen Herbal Gardens (KHGs).

In the second chapter we have provided an outline of how a home garden should be set up starting from planning the garden and layout. Following this we have provided guidelines about cultivation techniques for common vegetables and pest and disease management in vegetables using natural products.

In the third chapter we start out with case studies on home gardens, the specific role and importance of women, new efforts such as a community vegetable garden and also provide an overview of FRLHT efforts relating to KHGs. In the second part of this chapter we provide details regarding

studies that make an assessment of the impact of home gardens in terms of savings on expenses, supplementary income and supplementary nutrition.

In the concluding chapter we have provided an overview of the importance of this area and the newer dimensions that are emerging today in terms of nutrition gardens and urban agriculture and its recent emergence as an important area.

Home Gardens and Rainfed Areas

A key feature of agriculture in rainfed areas is that the uncertainties that are found in agriculture everywhere are significantly increased because the irrigation is not assured. Moreover the development of infrastructure is poor and the state machinery also caters to these areas in a very limited manner since the design of the agriculture extension system is something which normally caters only to irrigated areas even in its very conception. In this context one of the key elements of the approach of the Revitalizing Rainfed Agriculture Network (RRAN) has been that in order to minimize risks and improve the status of income and livelihoods we need to follow an approach where food and income can come through diverse sources and not depend only on increasing production or productivity of one type of crop (such as cereals) or one single crop (such as paddy). The approach of RRAN is to diversify into varied areas to provide food and income, including – cultivation of several crops – main crop, intercrop and a variety of them including millets, oilseeds and pulses, animal husbandry, poultry, fisheries and also home gardens.

In this context home gardens constitute a very important component due to several reasons including the following.

1. Home gardens can arrest the trend of declining diversity of vegetables and lead to greater local diversity and local consumption of vegetables.
2. We can cultivate vegetables that form an important source of supplementary nutrition.
3. Income can be increased due to decrease of expenses in the purchase of vegetables.
4. It is possible to include some herbs in the package that is cultivated in the home garden which is important for primary health care and also results in savings on health related expenses.
5. Supplementary income is also possible to a small extent through the sale of vegetables and production and sale of vegetable seeds.
6. It helps in the promotion of a non-monetary economic activity in which women are the key players and leads to their active involvement and empowerment.

The Beginnings : CIKS Efforts on Home Gardens

During a survey to collect and document indigenous rice and vegetable varieties in Tamil Nadu the CIKS researchers came across a very disturbing trend. The backyard gardens which rural women used to maintain for a regular supply of vegetables for their family were fast vanishing. Women were no longer able to maintain them and only families that could afford purchasing them from the market had vegetables as part of their regular diet. This was also contributing to the malnutrition of the family. On detailed investigation it came to light that after the introduction of High Yielding Varieties (HYV) of vegetables, farmers had given up their indigenous varieties. Over a period of time these varieties had been lost. However, farming families had to purchase the seeds of HYV of vegetables year after year from the market. The HYV and hybrid vegetables that they purchased were highly pest and disease prone. Seeds were expensive, germination capacity was very poor and they had to use chemical pesticides and fertilizers for cultivation which meant an additional expense. Fulfilling all these requirements and maintaining a backyard garden was an unviable proposition and women had given up cultivating vegetables in their backyard which had led to a different dietary composition of the family meal. We also realised that the use of herbs for treating primary health conditions was also fast deteriorating. The distance between a medical facility and the villagers was also a negative factor in having access to modern medical facilities.

This was an alarming situation and CIKS decided to make an intervention. Strengthening Women Self-Help Groups (SHGs) was part of CIKS's programme on community-led natural resources management. CIKS decided to involve these

women in SHGs to revive the backyard gardens. The Centre conceived a programme wherein cultivation of vegetables in homesteads along with herbs would be taken up by women farmers. Women would be trained in growing vegetables and herbs in their homesteads as well as using the herbs for treating primary health conditions. The technology of vegetable seed production would also be provided so that they would have access to seeds year after year and not have to depend on external sources. Spending money for the purchase of seeds in every season would also be avoided. The concept of integrated home gardens involving women was started in the year 1999 which has currently grown into a large programme spread over five districts of Tamil Nadu. It is a 90% women oriented programme.

While the CIKS programme started out with a package of only vegetables in course of time we incorporated a small number of herbs. To begin with these were herbs that are commonly in use in rural areas such as – *Tulsi, Adathoda, Aloe* etc. In due course this package was enlarged and enriched due to interaction with the Foundation for Revitalization of Local Health Traditions (FRLHT) which has been implementing a systematic programme for setting up Kitchen Herbal Gardens (KHGs) for over 20 years. This is outlined below.

Kitchen Herbal Garden for Home Health Care

Health care expenses form a considerable part of the household budget for many people in India. Statistics show that individuals are paying for 82% of the total per capita health expenditure, more than four times that of the Government's share (18%). Large numbers of the rural population are unable to access the public health system and cannot afford private health services. A study by the National Bank for Agriculture and Rural Development (NABARD) of India points out that the second most important cause of rural indebtedness is health expenditure.

The FRLHT Initiative

Based in Bangalore, the Foundation for Revitalisation of Local Health Traditions (FRLHT) has been working since 1993 in 10 States to conserve local health cultures and to promote their sustainable use, among others through the Home Herbal Garden Programme. FRLHT works in collaboration with State Forest Departments, Non-Governmental and Community Based Organisations and Research Institutes. Its work is based on the understanding that:

- Biodiversity and cultural diversity go hand in hand and the erosion of local health cultures hastens the loss of biodiversity;
- Revitalisation of medicinal plant based local health cultures holds the key to re-establishing the health security of the resource-poor rural people;
- Use of ecosystem-specific medicinal plants is a very important poverty alleviation and livelihood strategy.

A benchmark study was undertaken in March 2001 with the help of a Rural Development Expert and a reputed Community Health Expert to assess the impact of the home herbal gardens under the Community Outreach Programme in the southern state of Tamil Nadu. According to the findings, rural households spend an average of 150 rupees per course of treatment of any of the primary health care related complaints. Even if the 190,000 participating households only use the home herbal garden once a year to treat common aliments, this amounts to an annual saving of around 29 million rupees. In the project villages, where an agricultural labourer earns 30 rupees per day, this simple saving equals one day's food expenses. Considering that 76% of the home herbal gardens were adopted by economically very poor (35%) and poor (41%) households, this is indeed an encouraging result. The participants who benefited most medically were the women and children, who accounted for nearly 70% of the cases treated with home grown herbs. Regarding sustainability, the study showed that an overwhelming 91% of participants contributed fully to meet the cost of raising medicinal plants.

Towards an Integrated Home Garden

Currently, the package of plants that are promoted by CIKS is an integrated package consisting of both indigenous varieties of vegetables as well as herbs. These herbs are drawn from packages promoted by FRLHT as well as herbs that are seen to be important and significant in the field area.

CHAPTER II : HOME GARDEN – SETTING UP AND MAINTENANCE

In this chapter we provide an overview to the setting up and maintenance of a home garden. The major aspects covered are the following:

1. Planning a vegetable garden including layout,
2. Cultivation techniques for common vegetables
3. Pest and disease management in vegetables

While there will be a lot of regional variation that is possible and even required, this overview provides broad general guidelines regarding the approach.

Planning a Vegetable Garden

A vegetable garden supplies fresh vegetables which constitutes an important part of the food in every house. The size of the vegetable garden is not defined because it depends on the space available at the backyard. One can conveniently design a kitchen garden depending on the availability of space. As far as the shape is concerned a rectangular garden is preferred to the square one. Normally for a family of 5 - 6 persons, 2 cents (870 sq.ft.) may be adequate to supply vegetables throughout the year.

Layout

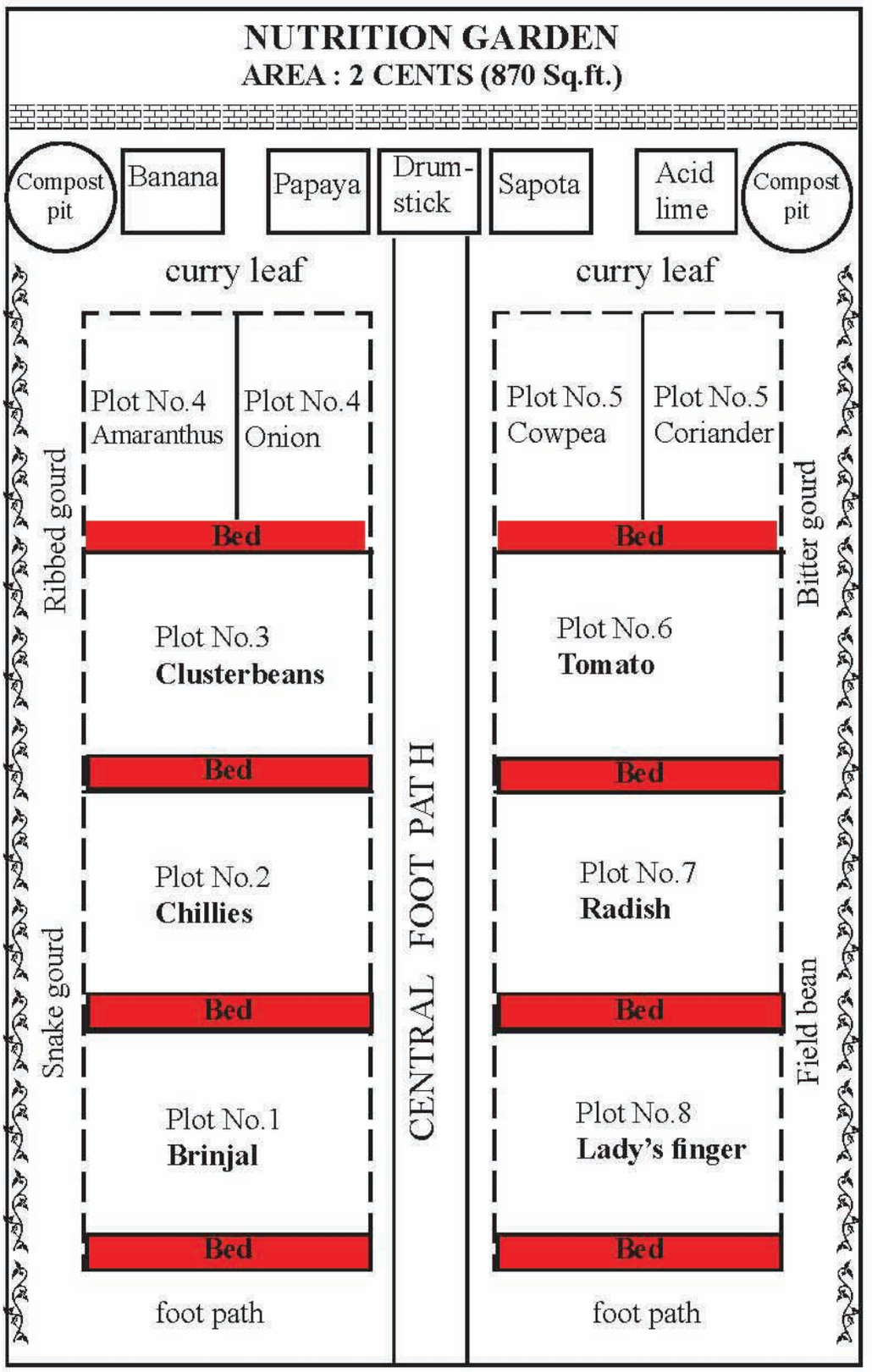
The main purpose of planning a layout for a vegetable garden is to obtain maximum output and a continuous supply of vegetables. The principles that are to be followed are given below:

1. Perennial plants such as drumstick, banana, papaya, curry leaf, gooseberry, mango, guava, custard apple, sapota etc., should be located on one side of the garden. Usually they should be planted at the rear end of the garden, so that they may not shade other crops.
2. The adjacent space near the central footpath (See diagram) can be utilised for growing different short duration varieties such as coriander, amaranthus, fenugreek, mint etc. These crops can be cultivated in different seasons.
3. The fence surrounding the garden can be utilised for growing creepers and gourds such as coccinea, sponge gourd, bitter gourd, snake gourd etc.
4. The compost pits should be placed in the corner of the garden.
5. The garden should be divided into small plots with raised bunds. In the bunds one can grow root crops such as onion, turmeric, ginger etc.

A sample layout of a vegetable garden is provided. Ofcourse this can be modified depending on the space available and also the crops can be grown depending on the soil and climate.

Potted Plants

If we do not have adequate space at the backyard, we can cultivate vegetables in pots too. For cultivating plants in pots, we need to select suitable containers. Readymade containers/ pots are available in clay, plastic etc. The best container is the one made of clay. The clay pots can retain moisture for a long time. There are many shapes available in clay pots. Large sized ones may be used for plants such as lady's finger, brinjal, tomato etc. Smaller size pots can be used



Courtesy *: Mr. A. Rajangam, Asst. Prof., Horticulture Research Station, Periyakulam*

for growing plants such as greens, coriander, fenugreek etc.

A good pot mixture is essential for good growth. It constitutes of one part soil, one part leaf mould, one part cowdung manure and one part sand. Mix this well and fill it in the containers properly. After that water it for seven days with occasional stirring. Sowing can then be done in these pots. In the case of tomato and brinjal the seeds should be sown and raised in pots or seedbeds for 25 days. After that they are transplanted into separate pots at the rate of 3 - 4 plants per pot. Weeding is done only with hands to avoid damage to the roots.

Cultivation Techniques and Pest Management

Table 1 provides an overview of the cultivation techniques for 21 common vegetables. For each of the vegetables we have provided the common English name and the Latin name, the season, the method of planting, spacing and seed rate, hints about fertilizer management and the general duration of the crop. Following this Table 2 provides a list of common pests and diseases that occur in vegetables and suggested management measures using natural products. We have confined ourselves to suggesting herbal products based on materials that are commonly available in rural areas such as neem, garlic, chilli and ginger. In addition we have also suggested the use of cow's urine for some specific cases. This section is supported by two appendices - one that provides common and scientific name of plants and another that provides procedures for preparing some common botanicals and animal products.

TABLE 1 : CULTIVATION TECHNIQUES OF COMMON VEGETABLES

Please also see Appendix – I which lists common and scientific names of vegetables

Sl. No.	Vegetable	Season	Method of planting	Spacing	Seed rate	Pit size	Fertilizer management (for 1 cent area)	Duration of crop	Duration of crop
1.	Amaranthus *Amaranthus viridis*	All	Seeds should be mixed with sand and broadcast in beds	-	10-15 gms/ cent	-	Farm Yard manure 100 kgs or compost 50 kgs with 2 kgs of neem cake	-	Varies according to variety
2.	Ash gourd *Benincasa hispida*	July-Nov Dec-April	Seeds to be dibbled in pits	2.5 x 2 mts	3-4 seeds/ pit	30 x 30 x 30 cms	1 kg of FYM and 100 gms neem cake	Compost or vermicompost 250-500 gms / plant	140-150 days
3.	Beans *Phaseolus vulgaris*	July-January	Seeds to be dibbled in pits	2 x 2.5 mts	3-5 seeds/ pit	30 x 30 x 30 cms	1 kg of FYM and 100 gms of Neem cake per pit	Vermicompost-500 gms / pit	6-7 months
4.	Bitter gourd *Momordica charantia*	Dec - Mar	Seeds to be dibbled in pits	2 x 2 mts	3-5 seeds/ pit	0.5 x 0.5 x 0.5 feet	1 kg of FYM and 100 gms of Neem cake per pit	Vermicompost – 500 gms/pit	90-125 days
5.	Bottle gourd *Lagenaria siceraria*	July-Aug Oct-Nov	Seeds to be dibbled in pits	2 x 2.5 mts	3-5 seeds/ pit	1 x 1 x 1 feet	1 kg of FYM and 100 gms of Neem cake per pit	Vermicomponst-500 gms/pit	120-150 days
6.	Brinjal *Solanum melongena*	Dec-Jan	Sown in nursery and transplanted after 28-30 days	75 x 60 cms	2 gms/ cent	-	100 kgs of FYM and 1-1.5 kgs of Neem cake	Groundnut cake – 1 kg/cent	165-180 days
7.	Carrot *Daucus carota*	July-Feb	Seeds to be sown in ridges	30 x 10 cm	16 gms/ cent	-	100 kgs of FYM and 1-1.5 kgs of Neem cake	Vermicmpost 10 kg /cent	100-120 days

Sl. No.	Vegetable	Season	Method of planting	Spacing	Seed rate	Pit size	Fertilizer management (for 1 cent area)	Duration of crop	Duration of crop
8.	Chilli *Capsicum annuum*	Nov-April	Sown in nursery and transplanted after 40-45 days	30 x 30 cms	5-6 gms/ cent	-	Farm Yard manure 100 kgs or compost 50 kgs with 2 kgs of neem cake	25 kgs vermicompost with 4 kgs of well decomposed poultry manure	210-240 days
9.	Cluster beans- *Cyamopsis tetragonoloba*	July-Aug Nov-Dec	Seeds to be sown in the ridges	45 x 30 cms	40-50 gms/ cent	-	Farm Yard manure 100 kgs or compost 50 kgs with 2 kgs of neem cake	-	90-105 days
10.	Coriander *Coriandrum sativum*	June-July Oct-Nov	Seeds to be sown in ridges	20 x 15 cm	50-100 gms/ cemt	-	100 kgs of FYM and 1-1.5 kgs of Neem cake	Vermicmpost 10 kg /cent	30-40 days
11.	Cucumber *Cucumis sativus*	June-July Jan-April	Seeds to be sown in ridges	60- 90 cms	4 gm/ cent	-	100 kgs of FYM and 1-1.5 kgs of Neem cake	Neem cake – 1 kg/cent	90 – 100 days
12.	Curry leaf *Murraya koenigii*	June-July	Seedlings to be raised in the nursery. One year old seedlings to be transplanted in the main yield	10-12 feet	-	1.5 x 1.5 x 1.5 feet	3 kgs of FYM and 300 gms Neem cake before planting	-	20 years
13.	Drumstick *Moringa oleifera*	June-July	Cuttings to be planted in pits	10-12 feet	-	1.5 x 1.5 x 1.5 feet	3 kgs of FYM and 300 gms Neem cake before planting	-	10 years
14.	Lady's finger *Abelmoschus esculentus*	Jan-Feb July-August	Direct sowing in the main field	30 x 30 cms	40 gm/ cent	-	100 kgs of FYM and 1-1.5 kgs of Neem cake	Neem cake – 1 kg/cent	100-110 days

Sl. No.	Vegetable	Season	Method of planting	Spacing	Seed rate	Pit size	Fertilizer management (for 1 cent area)	Duration of crop	Duration of crop
15.	Pumpkin *Cucurbita maxima*	July-Jan Dec-April	Seeds to be dibbled in pits	2 x 2.5 mts	3-5 seeds/ pit	1 x 1 x 1 feet	1 kg of FYM and 100 gms of Neem cake per pit.	Compost or vermicompost 250-500 gms / plant	Varies according to variety
16.	Radish *Raphanus sativus*	June-July Sep in Plains	Seeds to be sown in ridges	15 x 10 cm	40 gm/ cent	-	100 kgs of FYM and 1-1.5 kgs of Neem cake	Vermicompost 10 kg /cent	45-60 days
17.	Ribbed gourd *Luffa acutangula*	July-Dec Dec-April	Seeds to be dibbled in pits	2 mts between pits	3-4 seeds/ pit	-	1 kg of FYM and 100 gms of Neem cake per pit	Vermicompost-500 gms/pit	125 days
18.	Snake gourd *Trichosanthes cucumerina*	July-Dec Dec-April	Seeds to be dibbled in pits	2 x 2.5 mts	3-5 seeds/ pit	30 x 30 x 30 cms	1 kg of FYM and 100 gms of Neem cake per pit	Vermicompost-500 gms/pit	135-180 days
19.	Tomato *Lycopersicon esculentum*	Dec-Jan May-June Oct-Nov	Sown in nursery and transplanted after 28-30 days	60 x 75 cms	2 gms/ cent	-	100 kgs of FYM and 1-1.5 kgs of Neem cake	Groundnut cake – 1 kg/cent	125-145 days
20.	Vegetable cowpea *Vigna unguiculata*	June-July Feb-Mar	Seeds to be sown in ridges	45 x 15cm 60 x 30 cm	80 gm/ cent		1 kg of FYM and 100 gms of Neem cake per pit	Vermicompost-500 gms/pit	75-90 days
21	Watermelon *Citrullus lanatus*	Dec-May	Seeds to be dibbled in pits	2 x 2mts	3-4 seeds/ pit	30 x 30 x 30 cms	1 kg of FYM and 100 gms of Neem cake per pit.	Compost or vermicompost 250-500 gms / plant	120 days

Indigenous Varieties of Vegetables and Fruits

An important aspect of the package that we are promoting is the incorporation of indigenous varieties of vegetables and fruits. While there are large local variations we give below examples from our field experience in Tamil Nadu several illustrations about varieties that are practically been used.

1. Varieties of Snake gourd – *Kotthupudal, Naipudal, Pandripudal* etc.
2. Varieties of Ash gourd including *Vaidyakumabalam.*
3. Varieties of Bitter gourd including – *Midhipagal, Kuruvithalaipagal.*
4. Varieties of Tomato including – *Kuzhithakkali.*
5. Varieties of Beans including – *Kozhi avarai*, Belt *avarai*, etc.
6. In terms of fruits there is a great variety of bananas and medicinal properties are attributed to many of them.
   - *Sevvazhai* (Red variety) – useful in Jaundice
   - *Palayam Kottai* – increases digestion
   - *Thuluvan* variety – given to girls obtaining puberty
   - *Malaivazhai* – Hill variety – extremely tasty, suitable for children since it does not aggravate kapha and is used in making Panchamirtham particularly in temples.
7. A variety of Chilli called as *Gandhari milagai* – it fruits in great abundance, is tiny in size and very hot in taste.

Table 2 : PEST AND DISEASE MANAGEMENT IN VEGETABLES

Please also see Appendix – II which provides preparation procedures of botanicals and animal products.

Sl. No.	Common Pests and Diseases	Management Measures
1.	**Shoot borer** Caterpillars bore into petioles and midribs of leaves and shoots. They also bore into flower buds and fruits and cause damage.	• *Andrographis paniculata* (known as *Siriyanangai* in Tamil) decoction 3-5% or *Sida spinosa* decoction 5% • Neem kernel extract 500 – 1000 ml per tank (10 litre capacity) • Garlic, Chilli, Ginger extract 500 – 1000 ml per tank (10 litre capacity)
2.	**Fruit borer** Larvae feed on the leaves and bore into the pods and fruits and cause damage.	
3.	**Stem borer (on Ribbed gourd)** Larvae on hatching, bore into the stem, tunnel inside along the central pith and eat away the surrounding tissues.	
4.	**Hairy caterpillar (on Drumstick tree)** Larvae feed on the leaves and also scrape the bark and feed on them.	
5.	**Army worms** These caterpillars eat the growing leaves and gives an appearance as if the crop has been grazed.	
6.	**Aphids** Tiny green / yellow / black insects found in clusters around the tips of new leaves or buds. They suck the sap and cause deformation of plants.	• *Sida spinosa* extract (known as *Arivalmanai poondu* in Tamil) 5% • Neem kernel extract 500 – 1000 ml per tak (10 litre capacity) • Garlic, Chilli, Ginger extract 500 – 1000 ml per tank (10 litre capacity)
7.	**Green plant hopper** Nymphs and adults suck the sap from leaves and cause curling of the leaves. Affected leaves dry up.	
8.	**Mealy bugs** Soft bodied bugs found as a cluster covered with white wax. Nymphs and adults suck the sap and cause yellowing and drying of leaves.	
9.	**White flies** Greenish white nymphs start sucking the sap of the leaf and affected parts become yellowish. Leaves wrinkle, curl downwards and ultimately shed.	
10.	**Leaf beetle (Pumpkin beetle)** Adult beetles which are yellowish brown feed on the leaf and flowers by making irregular holes.	• Cow dung extract • *Andrographis paniculata* extract 3 – 5% • Neem kernel extract 500 – 1000 ml per tank (10 litre capacity)
11.	**Pod sucking bug** Adult bugs which are brown or black suck the sap from the developing seeds through the pod wall and affect germination capacity of seeds.	
12.	***Epilachna* beetle** Pale yellow beetles mottled with black spots scrape the chlorophyll from the leaves, leaving the veins and veinlets and form ladder like windows.	

13.	**Wilt in tomato** Caused by a fungus in the soil. Clearing of veinlets occur. Leaves become pale yellow or white.	• Fumigation combined with other organic methods • General methods to control bacterial and fungal diseases • 10% cow urine is sprayed once in 10 days thrice. • Half litre cow's urine along with ½ litre sour buttermilk is mixed with 9 litres of water. This is sprayed once in 7 days twice. • Cow's urine and water is mixed in the ratio of 1 : 2. The seeds or the roots of seedlings are soaked in this for half an hour before sowing or transplanting. • 40 kgs of neem cake per acre is applied as a basal manure for vegetable crops to prevent diseases. • If there is a disease attack in the nursery, then add 10% cow's urine extract along with the water that is used to irrigate the nursery.
14.	***Fusarial* wilt in chilli** Caused by a fungus. Initial slight yellowing of foliage, wilting of the upper leaves and progression into a permanent wilt with leaves attached.	
15.	***Cercospora* leaf spot** Caused by a fungus. Greyish brown spots appear on upper surface of leaves gradually covering the entire leaf surface and cause withering. Spots also appear on pods of field bean, cowpea, cluster bean etc., affecting yield.	
16.	**Yellow mosaic** Viral disease. Early symptom is vein clearing, stem becomes short and a plant remains stunted.	
17.	***Alternaria* leaf spot** Common fungal disease. Spots appear on leaves and fruits and also result in rotting symptom.	
18.	**Fruit rot** Fungal disease. Water soaked dark green lesions appear on the upper surface of the fruits and gradually fruits decay.	

CHAPTER III : IMPACT OF HOME GARDENS

In this chapter we provide an overview of the impact of home gardens which includes the following :

1. Case studies
2. The specific role and importance of women in the home garden effort
3. Community kitchen garden effort
4. The FRLHT effort to promote Kitchen Herbal Gardens and its implementation and impact.
5. A summary of the assessment of the impact of the home garden programme in two rainfed areas in Tamil Nadu.

Case Study – Home Garden of Mr. N. Rajaraman, Nagapattinam District

CIKS has been supporting the home garden programme in the Nagapattinam district extensively through organizing the supply of initial seeds, training programmes and follow up visits during the first one year. We share the case study of a successful home garden from Sirkazhi taluk of the district.

The conservation efforts of Mr. Rajaraman, an organic farmer in Thandavankulam village of Siddivinayakapuram, Sirkazhi taluk definitely needs appreciation and support. For several years now, Mr. Rajaraman has been growing a range of vegetable crops in his backyard. He has been saving seeds of these vegetable crops and exchanging/distributing/ selling these seeds in his village and adjoining areas. Inspired and influenced by leaders like Jayaprakash Narayanan, Mr. Rajaraman along with a few like-minded individuals from the village set up the *'Manavar Podupani Manram'* (Students Association for Public Work) a grass-roots organization working to eradicate illiteracy among the villagers. They also conducted classes for school children. It is

through these school children that Mr. Rajaraman first started the 'seed exchange' program.

Along with their academic subjects, Mr. Rajaraman also got the children interested in plants/ gardening/agriculture. Most rural households (in the 1970's) had backyard kitchen gardens, where they grew vegetables required for home consumption. Kids were encouraged to bring small quantities of seeds of all the vegetable varieties grown in their kitchen gardens. Mr. Rajaraman multiplied the seeds in his garden and stored them in labelled containers. As a result of this activity Mr. Rajaraman was able to assemble a wide diversity of vegetable seeds, sometimes about 8-10 different varieties of a single crop! These seeds were distributed free of cost to any one who was interested. Over a period of time he started to charge a nominal fee for the seeds. A packet of 15 different kinds of vegetable seeds is now sold at Rs. 20/-. Mr.Rajaraman recalls how in the initial years, he used to cycle and make house to house calls to sell his seeds. Now, people come to him when they have a requirement. Mr. Rajaraman is so passionate about seed saving that in spite of it not being a profitable income generating activity he has persisted with it for a very long time. Recently, through some 'value addition' measures – raising a nursery of vegetable seeds and fruit trees - he has been able to bring in some additional income into the household. Villagers now place an advance order for his seedlings and saplings as they are of standard good quality.

He has seeds of the following varieties – Okra, brinjal, chilli, cluster bean, pumpkin, bottle gourd, ash gourd, ridge gourd, bitter gourd, snake gourd, lab lab, cow pea, tomato, a wide variety of green leafy vegetables and some root crops. He uses traditional methods of seed saving with ash and cow dung. The seed production and conservation activities are carried out around his house as it requires continuous monitoring and attention. He has about 2 acres of land a little distance away from his residence where he cultivates paddy and blackgram organically.

Role and Importance of Women in the Home Garden Effort

Unlike the large scale cultivation of vegetables which takes place in the main field where the male farmers are the predominant actors and decision makers, the home garden is almost invariably an activity very close to the household. The home garden is usually laid out in a small piece of land which is part of the household and often adjoining the kitchen or wash area. Thus it evolved naturally as an activity in which the women play a predominant role since it does not require them to make a separate trip to take care of this garden. We are summarizing herein the specific role of these gardens in terms of the involvement of women.

Women feel developing kitchen garden has given them more access to the use of vegetables and knowledge of the importance of vegetables. It has empowered them both economically and also socially. They are able to speak more confidently in meetings of their self-help groups. Women also explain how men of their household help them in procuring water for irrigation and also in ploughing the garden before sowing. When asked on how men take their participation in the kitchen garden, they said that men are very supportive.

There are also men who have taken up kitchen gardening in their homes. According to them it is a joint effort of both men and women. They have realised the importance of consuming vegetables as it also keeps illness and other diseases at bay. They give the entire credit for this to the women of the village, CIKS and more particularly to the women of their household. Here are a couple of voices from the field.

Major Outcomes in Terms of Benefits for Women

- All the beneficiaries have learnt to establish home gardens in their home backyard and get good organically cultivated indigenous varieties of vegetables for home consumption.
- Women involved in seed production and seed conservation have also earned income from the sale of vegetable seeds.
- Women's knowledge about seed production has improved. They now follow cultivation standards, processes and method to store vegetable seeds for use in the next season.

- Women also earn money from the sale of biopesticides to other women.

- Medicinal plants used in primary health care were given to every farmer. Method of cultivation and use for common ailments was taught to farmers through trainings.

- Awareness was raised among beneficiaries on the use of medicinal plants leading to reduction in medical expenses.

- Some members have started preparing certain herbal medicines collectively and sell it to other villagers. Every beneficiary has established a small herbal garden along with the vegetable garden. Besides herbs provided by CIKS they also cultivated some on their own based on their interest and need.

- Farmers have also used these herbs in the treatment of their cattle. For example, *Aloe* has been used for cattle which were weak and had certain types of digestive problems.

- Apart from all the above mentioned outcomes, kitchen gardens contribute to conserve the local indigenous varieties of vegetables and greens and this serve as a local gene pool and micro conservation centres.

- This intervention has left women socially as well as economically empowered. In a month they save up to Rs. 350/- by growing their own vegetables.

Women have proven to be agents of positive change through this intervention. They not only cultivate organic vegetables in their backyard but also help other women who have not been part of the group and who are keen to start a kitchen garden. Some have become trainers and also visit other villagers to train the women there. They also share the information on herbs and the particular herbs required for specific ailments as well as on the preparation of vermicompost and biopesticides. This has been possible mainly because of their success in their kitchen garden. Being part of Self Help Groups (SHGs) encourages them to work collectively for the betterment of all women.

Community Kitchen Garden

The Nagapattinam district has a history of women engaging collectively in some activities such as – "Community Vermicompost Unit". In some locations where the individual home garden had only a limited presence, a group of women in the Aadhamangalam village of Nagapattinam district decided to try this out as a community activity.

Seven of the twelve members of the women's self-help group called *"Ponni Iyarkai Vivasaya Magalir Kuzhu"* (Ponni Natural Farming Women's Group) in Aadhamangalam village of Nagapattinam district in Tamil Nadu started a community kitchen garden. The financial assistance for this activity is from the National Bank for Agriculture and Rural Development (NABARD) and the technical support is provided by CIKS. To ensure that only organic inputs are used in the cultivation process, these women, in addition to being trained in vermicompost production, have also been trained by CIKS staff on production of other organic inputs for plant protection and soil improvement. Most of the members are knowledgeable in the production of inputs like *Panchagavya*, *Amirthakaraisal*, Five leaf extract, Neem leaf and Neem seed kernel extract, Chilli-ginger-garlic extract etc. The women see this as an experimental demonstration plot for organic techniques and are using this to try and convince other women in the village to start small kitchen gardens in their homes and grow crops without the use of agro-chemicals. They see it as a starting point to reducing the consumption of agrochemicals in agriculture.

Setting up a Community Garden

The community kitchen garden was established in about 10 cents of land (4,355 square feet).

The land belongs to one of the members of the SHG but it had not been used for a very long time and was completely overgrown with weeds and *Prosopis*. The entire area was cleaned up and readied for setting up a community kitchen garden with the active and voluntary involvement of all the members.

The initial inputs for setting up the kitchen garden – seeds and vermicompost - were provided by CIKS. Other soil amendments and plant protection inputs like *Panchagavya, Amrithakaraisal* and Five-leaf extract were produced by the women in the site itself and stored in 200 litre drums bought specifically for this purpose. The water required to maintain the garden was collected from the community water tap near the plot. In the first season the following vegetable varieties were cultivated: Lady's finger, Cluster bean, Brinjal, Radish, Bottle gourd, Bitter gourd, Snake gourd, Ridge gourd, Sword bean, Lab Lab bean, Green leafy vegetables – three varieties, Onion etc. Drumstick and *Sesbania (Agathi)* are perennial edible crops in the plot.

The entire plot was divided into a number of small manageable size beds and local seeds of the above mentioned varieties were planted. All activities – bed preparation, sowing, watering, manuring, weeding, spraying and harvesting – were done by the members of the group. The yield from this plot was shared equally among all the members of the group and excess vegetables were sold locally.

Output from the Garden

During the first growing season they harvested about 45 kg of Lady's finger, 50 kg of Brinjal, 5 kg of Lab Lab bean, 20 kg of Radish, 15 kg of Ridge gourd, 30 kg of Cluster bean, about 7-8 kg each of Bitter gourd, Snake gourds, Sword bean, Bottle gourd and Onion and several bunches of leafy greens. The yield from the plot was not very high, but the women were happy with their efforts and proud of their accomplishment – producing their own vegetables, cooperating with one another and working as a team and understanding the concept of self help and self worth. They feel that they have learnt a lot about growing vegetables with this attempt and are now better equipped to deal with production issues in the coming seasons. They are hopeful of increasing production by fine tuning the lessons they have learnt in their initial attempt.

Home Gardens for Primary Health Care : The FRLHT Initiative

In this section we provide a summary of the FRLHT experience with the respect to setting up home gardens for primary health care.

The Foundation for Revitalisation of Local Health Traditions (FRLHT), along with other Non-Governmental organisations, has been promoting the use of local health traditions, through a Medicinal Plants Conservation Programme. Under this programme, NGOs develop educational medicinal plant gardens complemented by a herbarium, and a raw drug and seeds museum. There is also an outreach component that focuses mainly on rural households to promote the growing and use of medicinal plants for both health and income-generation purposes. This activity has taken the shape of kitchen herbal gardens (KHGs) to be nurtured by rural households. The KHG package is meant to serve as a first response to a simple health problem that may occur in the household. Begun in 1997 as an integral part of the medicinal plants conservation programme, KHG was expected to demonstrate the contemporary relevance of self-reliance in primary health care. Many NGOs are now implementing this programme through self-help groups (sanghas) of 20 women each. The NGOs train the women in the use of medicinal plants for health applications and also provide a set of saplings that can be grown in and around the home. FRLHT has also developed a manual on medicinal plants in primary health care and some 20 plants have been chosen based on the experience of traditional *vaidyas* (practitioners).

First Step – An Analysis of the Situation

It was decided to use the Participatory Rural Appraisal (PRA) methodology to determine the health conditions prioritized by local rural households. To this end, trainings were organised to help NGO staff develop skills in using this method. In the course of these training programmes it was discovered that:

- Rural households were already using some medicinal plants for domestic health conditions;
- Most communities had elders who were quite knowledgeable about the use of medicinal plants;
- The availability of medicinal plants within the village premises had some influence on the final choice of plants;
- Rural households were willing to pay for the plants, provided they were of their choosing.

Evolving a KHG Package

The second step wars to evolve a package of plants that can from part of the KHG. The table provides a list of medicinal plants and the conditions for which they are found useful.

List of Medicinal Plants Given as Part of KHG Package

S. No.	Botanical Names of Plants Used as Single or Main Ingredients	Diseases / Ailments / Conditions Treated
1.	*Adhatoda vasica*	Cough, white discharge, fever with cold
2.	*Hibiscus rosa-sinensis*	Fever due to exhaustion, irregular or excess menstruation
3.	*Lawsonia inermis*	Boils, cracked heels
4.	*Centella asiatica*	Fever with cold and cough, memory increaser
5.	*Murraya koenigii*	Gastric trouble, early graying
6.	*Aloe vera*	Piles, eyesores, conjunctivitis, cuts and wounds
7.	*Solanum trilobatum*	Cold, cough
8.	*Punica granatum*	Dysentery, diarrhea
9.	*Andrographis alata, Andrographis ovata*	Swelling due to poisonous bites, itching
10.	*Eclipta alba*	Dhobi itch, fungal skin infection, liver toner, hair growth
11.	*Citrus limon*	Excess body heat, excess pitha, earache
12.	*Coleus aromaticus*	Cough, fever with cold
13.	*Solanum surattense*	Toothache
14.	*Psidium guajava*	Dysentery
15.	*Phyllanthus emblica*	Mouth ulcer, excess pitha
16.	*Azadirachta indica*	Boils, fever, deworming
17.	*Andrographis paniculata*	Poisonous bites - as first aid
18.	*Alpinia galanga*	Cold, cough
19.	*Tylophora asthmatica*	Asthmatic cough
20.	*Enicostemma littorale*	White discharge

Impact of the Kitchen Herbal Garden (KHG) Programme

The first round of the benchmark survey that was completed in May 2001 has been able to confirm that the KHG package:

- Was adopted by non-sangha members (44 percent) with equal interest, though it was implemented through women's self-help groups (56 percent).
- Was adopted more easily by small, nuclear families (64 percent) with 5¬6 members; large joint families were less enthusiastic.
- Was readily received by a majority of the households (76 percent) belonging to poor or very poor rural families.
- Was biased in favour of the traditionally disadvantaged and socially and economically backward sections (100 percent) of society.
- Was willingly adopted by women (100 percent).
- Was accepted (100 percent) as a first response to a primary health care problem at the household level.
- Was fully paid for by 90 percent of KHG households.
- Was known to a large number ofthe rural communities and used in local health traditions. Nearly 35 percent of KHG households planted medicinal plants on their own initiative. About 68 percent of KHG households confirmed that they knew of plant-based home remedies before adopting the package.
- Was believed by nearly 93 percent as offering effective cures for simple health problems.
- Could be extended beyond the actual KHG households to a significant extent, with more than 69 percent confirming the acquisition of knowledge from other than KHG trainers.
- Was effective in treatment of ailments like cold, cough, dysentery, stomach pain, white discharge, headache and fever.
- Was eco-system specific and listed over 106 medicinal plants and kitchen spices known for their use in home remedies.
- Enabled the rural resource poor to save on health expenditure, which households confirmed to be at an annual average of over Rs. 1,000/-.

Towards an Integrated Home Garden

As we had already indicated earlier the current home garden effort that is promoted by CIKS is an integrated model combining in itself the following elements.

1. A package of indigenous varieties of vegetables
2. A selection of herbs for primary health care drawing from the FRLHT experience
3. Additional herbs that are being added to this package based on what is found to be important and significant in each area.

In a sense the package is evolving continuously. For example, in some households certain grasses are included or plants are added specifically for their fodder value which is because the key role of cattle in that specific household or locality.

Assessment of the Benefits of the Home Garden Programme

CIKS carried out a systematic assessment of the performance of the home garden programme that had been in operation in two rainfed areas, i.e., the Vedharanyam block of Nagapattinam district and the Thiruvannamalai district in Tamil Nadu. The main findings are summarized below.

1. Vedharanyam Cluster, Nagapattinam District

The assessment study was conducted among the beneficiaries of the kitchen garden programme. The study looked into the awareness level, benefits, change in household income and expenditure and tried to determine the gaps in this programme. The survey covered four Panchayats in the Vedharanyam Cluster of Nagapattinam district with a sample size of 38 households. The Respondents were both men and women, all of whom had attended training programmes on home gardens. About half of them had medium sized land holdings, about one third of them were landless and the remaining were small and marginal farmers.

Benefits

- All the beneficiaries were aware of the benefits of the home kitchen garden. However, perceived benefits or level of awareness of the specific benefits varied. 95% of the respondents were aware about the reduction of expenses incurred on vegetable purchase, 84% cited access to fresh vegetables, 37% for the additional income from sale of the vegetables, 37% cited that these were free of chemicals, 21% for its nutritional benefits and 11% reduction in health related expenses.
- About 90% of them shared seeds and vegetables with their neighbours
- The analysis of the reduction in monthly expenditure with reference to land holdings showed that 32% of the respondents gave a figure of Rs. 100-200/- most of whom were landless, none of the small/marginal farmers indicated that they could reduce any further. The medium/larger landholding farmers were able to reduce expenses by more than Rs. 1,000/- (11%), Rs. 250-300/- (21%), Rs. 500-600/- (16%) and Rs. 700-800/- (5%). This group of farmers were also formed the majority of the respondents (53%) who benefited from the kitchen garden activities followed by the landless respondents (37%). Similar pattern can be seen among the 16 respondents who were able to gain additional income from herbal garden activities.

2. Thiruvannamalai District

The assessment study conducted among the beneficiaries of the kitchen garden programme. The study looked into the awareness level, benefits, change in household income and expenditure, and to determine the gaps in this programme. The survey covered six Panchayats in Thiruvannamalai district with a sample size of 60 households selected through random sampling method. The respondents were both men and women. In terms of land holdings 57% were small / marginal farmers, 23% were medium / large farmers and the remaining 20% were landless. Only 23% had attended training programmes.

Benefits

- 93% of the beneficiaries were aware of the benefits of the home herbal garden. The order of perceived benefits or level of awareness of the specific benefits varied and were as follows: 82% for fresh vegetables, 50% for nutrition, 50% for it being chemically free, 35% reduction in vegetable purchase expenses, 27% reduction in health expenditure, 17% income from sale of vegetables and 2% for its use in health care.
- 88% of the respondents indicated that they were benefitted from this activity: 77% reduction in vegetable purchase expenses, 52% improved nutritional status of the members, 50% reduced expenditure on health and 17% through supplementary income. The range in average reduction in household expenditure were in the range of Rs. 250/- to Rs. 300/- across the landholdings. Small and marginal landholding farmers (55%) were the major beneficiaries from the kitchen garden followed by medium and large landholding farmers (26%). However, the monthly average income from the sale of vegetables was beneficial for the small/marginal landholding farmers (49%). All the respondents indicated that they sold the suplus vegetables.
- Only about 1/3rd of the respondents shared seeds and vegetables.

Investments and Returns from a Home Garden

Is it possible to view the setting up and maintenance of the home garden in a perspective of – "Return on Investment?". In the accompanying table we have spelt out both the investments and returns into a setting up of a home garden looking at a one year cycle. It is seen that if an investment of Rs. 600/- is made in the setting up of a home garden the returns can be of the order of Rs. 2,900/-. This is realized through the reduction of the family expenses on vegetables, sale of vegetables and savings on primary health care.

Sl. No.	Particulars	Amount (Rs.)
	INVESTMENT COST	
1.	Supply of 10 types of veg. seeds (two seasons)	200
2.	Supply of water saving kit (one time supply)	150
3.	Supply of 10 types of medicinal plants (one time supply)	250
	Total investment cost / household / year	**600**
	RETURN	
1.	Reduction of family's vegetable expenses @ Rs. 150 / Month x 10 Months	1,500
2.	Sale of vegetables @ Rs. 50 / Month X 8 Months	400
3.	Savings on primary health care @ Rs. 100/month x 10 Months	1,000
	Total returns from each household / year	**2,900**

S No.	Particulars	Amount (Rs.)
	NET RETURN	
1.	Total returns from each unit/ year	2,900
2.	Total investment cost per unit per year	600
3.	Net Returns per unit per year	2,300

CHAPTER IV : CONCLUSION

Home gardens are seen to be important not only as a source of vegetables but also to access herbs that are useful in primary health care. In more recent times their significance is seen to be growing in the context of the efforts to combat micronutrient deficiency and also in the global context of increasing urbanization where agriculture is also seen as being an important part of the urban landscape.

Nutritional Gardens to Fight Deficiency of Micronutrients

Recently there has been a growing body of literature suggesting that home gardens can play an important role as "Nutritional Gardens". While the availability and access to food as increased, a large section of our population still suffers from nutritional disorders. There is a phenomenon called as "hidden hunger" which is the deficiency of micronutrients. These are essential vitamins and minerals required in minute amounts. At present about 20 of them are considered as essential.

These deficiencies are widely prevalent in areas where the normal diet of the population has low variety or diversity and particularly where they are dependent on a single staple food such as cereal based diets. Such deficiencies occur when people cannot diversify their diets by including fruits and vegetables. These may result in severe consequences such as blindness, disability, increased maternal and infant mortality rates, depressed functioning of the immune system or low levels of energy. In this situation the approaches that are being recommended are fortification, supplementation or dietary diversification. Home gardens can play a crucial role in this to combat hidden hunger.

Urban Gardening

Throughout the World there is a demographic shift with an increasing percentage of the population

moving from rural areas to urban and peri-urban areas. In this context there has been a lot of interest in urban agriculture and home gardens in the urban areas. In several Latin American countries and in Cuba this has played a significant role. In India also there is a growing urban population with an increasing degree of awareness about the value of organic foods and who also see an added value of cultivating one's own food. There has been a spate of city based organizations and groups that are providing training, inputs and facilitation for urban home gardens / organic home gardens in the city. Indirectly, this is also offering an opportunity to the farming community at the periphery of big cities to find a market for their organic produce as well as inputs for organic gardens such as – indigenous varieties of vegetables, vermicompost and agents for increasing soil fertility and the control of pests like *Panchagavyam, Amirthakaraisal,* Neem seed cake / Neem seed powder etc.

Integrated Approach

In the context of rainfed areas we feel that we can combine the approach based on vegetable cultivation as well as herbs for primary health care and evolve a programme which has an integrated approach. The following may be considered as the guiding principles.

1. A key consideration is the strengthening of the local biodiversity of vegetables cultivated. The approach is to arrest and reverse the trend of neglect of indigenous varieties in favour of a smaller number of varieties that may be only important for the market.
2. The package that is provided includes both indigenous varieties of vegetables as well as herbs that are useful in primary health care.
3. While we do define and go by recommended vegetables as a whole, in specific areas there are vegetables that are popular or preferred. In that sense there has to be an area specificity to this package.
4. Similarly in the case of herbs, FRLHT is now promoting herbs at two different levels. One is called a basic package with seven herbs and another is called an advanced package with fourteen herbs. Our experience also shows that there are herbs that are preferred and used in specific localities. Sometimes these are sufficiently valuable that they are picked up for use in the general package.
5. As part of project that we are implementing in three different districts of Tamil Nadu CIKS has worked out the economics of the home garden in a – "Return on Investment" framework. We feel that it is possible to make this programme viable and pay for itself and this has been tested out in specific gram panchayats in the three districts.

In conclusion we may add that the approach is being continuously refined and enriched. For example, medicinal plants that are seen to be locally important are added to the package and more recently fodder grasses and plants that have a fodder value have also been added to the home garden package. In this sense the approach is dynamic and location specific and can adapt itself to cater to the needs of varied ecosystems.

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APPENDIX I : COMMON AND SCIENTIFIC NAMES OF VEGETABLES

Sl. No.	English Name	Scientific Name
1.	Acid lime	*Citrus aurantifolia*
2.	Amaranthus	*Amaranthus viridis*
3.	Asafoetida	*Ferula asafoetida*
4.	Ash gourd	*Benincasa hispida*
5.	Banana	*Musa paradisiaca*
6.	Bitter gourd	*Momordica charantia*
7.	Black nightshade	*Solanum nigrum*
8.	Bottle gourd	*Lagenaria siceraria*
9.	Brinjal	*Solanum melongena*
10.	Chillies	*Capsicum annuum*
11.	Clusterbeans	*Cyamopsis tetragonoloba*
12.	Coccinea	*Coccinia grandis*
13.	Coriander	*Coriandrum sativum*
14.	Cowpea	*Vigna catjang*
15.	Curry leaf	*Murraya koenigii*
16.	Custard Apple	*Annona squamosa*
17.	Drumstick	*Moringa pterygosperma*
18.	Fenugreek	*Trigonella foenum-graecum*
19.	Field bean	*Phaseolus vulgaris*
20.	Garlic	*Allium sativum*
21.	Ginger	*Zingiber officinale*
22.	Gooseberry	*Emblica officinalis*
23.	Guava	*Psidium guajava*
24.	Lady's finger	*Abelmoschus esculentus*
25.	Mango	*Mangifera indica*
26.	Mint	*Mentha arvensis*
27.	Neem	*Azadirachta indica*
28.	Onion	*Allium cepa*
29.	Papaya	*Carica papaya*
30.	Potato	*Solanum tuberosum*

31.	Pumpkin	*Cucurbita maxima*
32.	Radish	*Raphanus sativus*
33.	Ribbed gourd	*Luffa acutangula*
34.	Sapota	*Manilkara zapota*
35.	Snake gourd	*Trichosanthes cucumerina*
36.	Sponge gourd	*Luffa cylindrica*
37.	Sweet flag	*Acorus calamus*
38.	Tobacco	*Nicotiana tabacum*
39.	Tomato	*Lycopersicon esculentum*
40.	Tulasi	*Ocimum sanctum*
41.	Turmeric	*Curcuma longa*
42.	Watermelon	*Citrullus lanatus*

APPENDIX II : PREPARATION PROCEDURES OF BOTANICALS AND ANIMAL PRODUCTS

1. ***Andrographis paniculata*** **(known as *Siriyanangai* in Tamil) Decoction 3 - 5% or *Sida spinosa* (known as *Arivalmanai Poondu* in Tamil) decoction 5%**

   For preparation of these decoctions, one of the above mentioned plant is taken (the whole plant excluding roots) and cut into small pieces. One kg of this is mixed with four litres of water and placed in a mud pot. This is boiled and reduced to one litre. On cooling, 500 ml of this extract is mixed with 100 ml of soap solution and 9.4 litres of water and sprayed on the crop (measurement for one tank).

2. **Neem Kernel Extract 500 to 1000 ml per tank (10 litre capacity)**

   3 - 5 kgs of Neem kernel is required for an acre. Remove the outer seed coat and use only the kernel. If the seeds are fresh, 3 kgs of kernel is sufficient. If the seeds are old, 5 kgs are required. Pound the kernel gently and tie it loosely with a cotton cloth. Soak this overnight in a vessel containing 10 litres of water. After this, it is filtered. On filtering, 6-7 litres of extract can be obtained. 500 - 1000 ml of this extract is used for one tank (a tank of 10 litre capacity). 500 - 1000 ml of extract should be diluted with 9½ or 9 litres of water before spraying. Khadi soap solution @ 10 ml/litre (100 ml/ tank) should be added to help the extract stick well to the leaf surface. The concentration of the extract can be increased or decreased depending on the intensity of the pest attack.

3. **Garlic, Chilli, Ginger Extract 500 - 1000 ml per tank (10 litre capacity)**

   This is a mixture of three plant extracts. 18 gms of Garlic is taken, the outer skin is removed and made into a paste. A paste of 9 gms of green chillies and 9 gms of ginger is made. All the three pastes are dissolved in 1 litre of water. This mixture is stirred well and filtered before spraying. 500 ml of this extract is mixed with 100 ml of soap solution and 9.4 litres of water and sprayed on the crop (measurement for one tank).

4. **Cow Dung Extract**

   Take 1 kg of cow dung and mix it with 10 litres of water. Filter the extract with a gunny cloth. Add 5 litres of water to the filtrate and again filter it with the same cloth. The filtrate will be a very clear solution. Spray the filtrate on the plants.