

**INITIATION OF THE COMMUNITY CONSERVATION OF FORESTS
PROGRAMME**

BY

**THE NATIONAL GENE BANK OF ZIMBABWE AND COMMUNITY TECHNOLOGY
DEVELOPMENT TRUST**

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1.0 INTRODUCTION

It is important to note that most national genebanks and curators have been focusing on the collection and conservation of cultivated crop diversity and related wild relatives. Little or no work has been covering non cultivated plant diversity. It is appreciated that to date there has been a paradigm shift in thinking among the scientists. Tree species diversity important for community needs has been recognised for conservation and sustainable utilization.

In Zimbabwe conservation of forests has been in the custody of the Forestry Commission, which is a parastatal, much of their work has been the conservation of natural forests in non inhabited state lands. The communal area outreach programme focused on planting *Eucalyptus* based on the fact that they were fast growing and could provide straight poles and firewood (McGregor, 1991). To the contrary most communities have not been able to harvest these woodlots, they were usually neglected, eaten by goats and posing ownership problems (Mandondo, 1993). The truth being that the communities preferred indigenous species and yet no one had done any research on the population dynamics of indigenous species.

The Community Technology Development Trust (CTDT) and The National Genebank of Zimbabwe (NGZ) has mooted the idea of **Forest Gardens**. This concept came as a result of the realisation that Zimbabwe's forests are being depleted at a devastating rate, with little or no reforestation. Post independence reforestation projects have been a failure, mainly because they did not address the root causes of deforestation. Reforestation focused on monoculture plantations of *Eucalyptus spp* that did not offer diverse use to the communities where forests had been depleted. Problems of ownership and management led to failure of these programmes (Mandondo, 1993). The practice of **Forest Garden/Analogue Forestry** (an artificial forest close to the community mimicking the role of a natural forest) was proposed as an agroforestry method to combat the problems that other reforestation methods had not been able to address. The analogue forestry moves beyond today's agroforestry practices as it includes a focus on identification and incorporation of biological diversity. It also seeks to identify specific functions of the structure and ecology of the natural forest and models to meet with community needs.

A community baseline survey was conducted as a way of verifying, causes to forestry products depletion, assess potential for the adoption of the forest garden concept and source funds to initiate sustainable forest management practises.

1.1 Aims and Objectives of the Baseline Survey were to

1. To establish the social structure of the communities where the pilot projects will be established
2. To have an understanding of the economic activities that these communities are engaged in so as to design a project that extends and/or complement their existing economic activities.
4. To assess the level of knowledge by communities of general principles of forestry product management, availability and use of forestry products, environmental awareness and availability of land where the forest gardens can be established.
5. Selection of two optimal sites for the first two pilot districts

Villagers have their own way of doing things, their own methods, tools and technologies and they have been sharing them with each other for decades. How can we try to share technologies with people without knowing anything about their own age-old experience? Can a new technology be appropriate to people without being a meaningful extension of their own experience? The study sought to find out what the people have and what they hope to have then build up on those experiences and aspirations.

1.2 The Forest Garden Project

The Community Technology Development Trust(CTDT) in conjunction with the National Genebank of Zimbabwe (NGZ), will be promoting the Forest Garden Programme in two districts in Zimbabwe. These districts are Goromonzi and Nyanga (*Figure 1*). This programme aims at providing economically viable and environmentally sound opportunities for raising agricultural incomes, restoring degraded land, building farmer resource and “re-greening” of rural communities. Outreach and training will foster local leadership, on-farm forestry improvement, agricultural enterprises and marketing and build food security through enhanced land management at village level. Forest gardens will benefit rural people as well as watersheds and local biodiversity through nursery and seed bank development, drought mitigation strategies and community management of watersheds, forests and agricultural land, building on indigenous systems of resource husbandry and complement to subsistence crops. Forest Gardens are tree dominated plots with a mix of plant species that produce food crops, firewood, timber, medicines and other natural products. The forest garden methodology will be

adapted to community defined needs and site specific conditions thereby strengthening economic, ecological and community vitality and ensuring sustainability. Forest Garden programmes have been a success in Sri Lanka, Philippines, Ecuador and Bosnia. The experiences gained over a period of 15 years in the above countries will be valuable in the development of the Zimbabwe chapter of this technology that has not been tried in many countries in Africa.

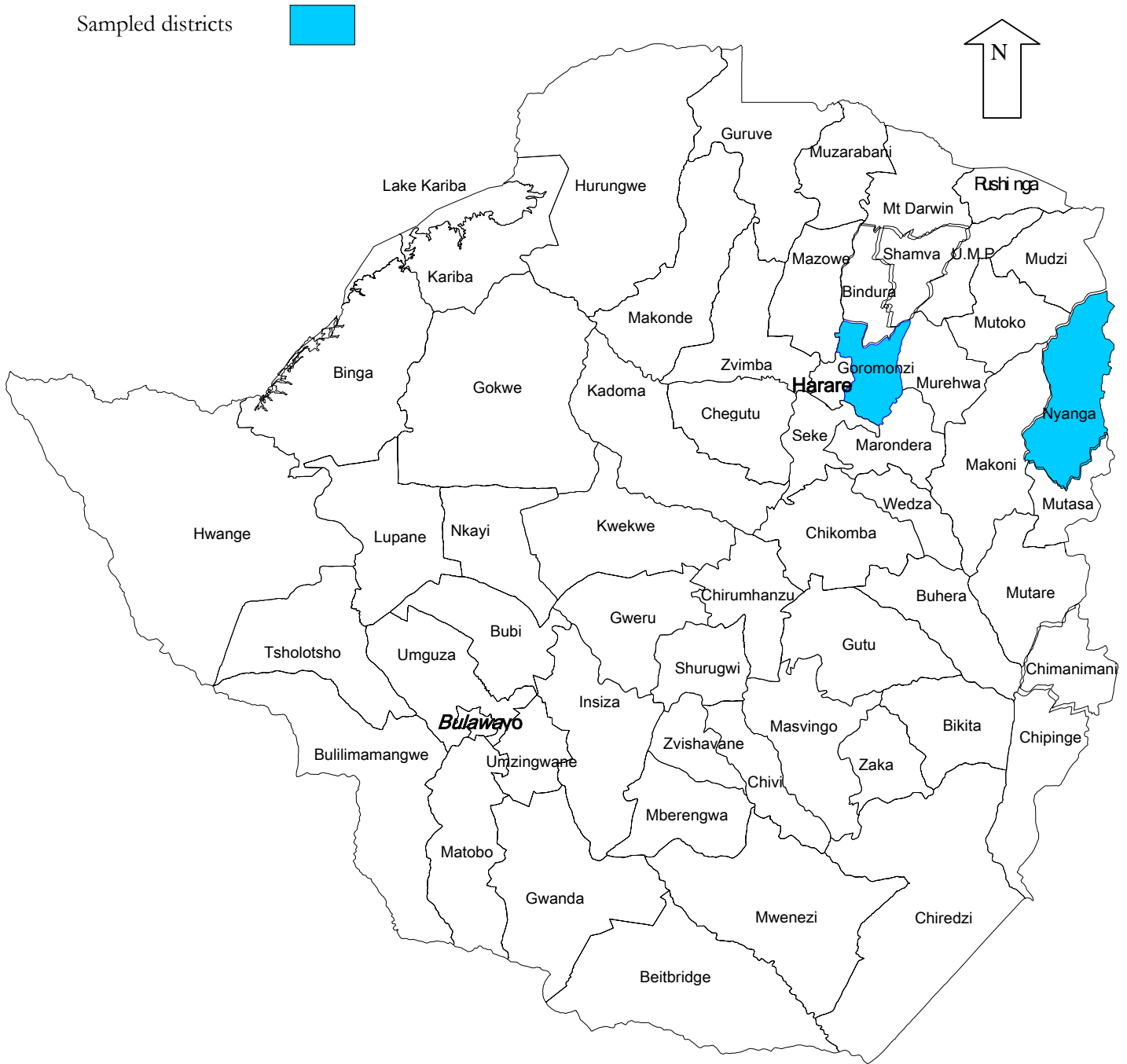


Fig. 1. Forest Gardens Project Sites

2.0 METHODOLOGY

2.1. Site Selection

Two districts were selected for the study: Goromonzi and Nyanga. These districts represent a cross-section of ecological socio-cultural and varying farming systems within the country. Goromonzi District is situated in Mashonaland Central Province while Nyanga is situated in Manicaland Province. Fig.1 shows the location of the two districts. These districts are made up of 15 to 32 wards each, therefore a sample had to be taken for the study. The selection process took into consideration that the selected villages had between 50 to 60 households and as a result, a deliberate decision to administer the survey instrument for the project baseline at every household in the selected villages was taken. The selected districts, wards and villages are depicted on the table below.

Table 1. Demographic Information of Districts Under Study

| DISTRICT | WARD | VILLAGE | SAMPLE SIZE | AVARAGE SIZEH/HOLDS | FEMALE: MALE RATIO |
|-----------|------|---------|-------------|---------------------|--------------------|
| NYANGA | 19 | KADZIMA | 48 | 4.41 | 1:1.14 |
| GOROMONZI | 10 | Gwamura | 57 | 4.58 | 1:1.03 |

Consultations were held with the local authorities and leadership, which include Rural District Councils Officials, District Administrators Office, Agricultural Technical and Extension Services (AREX) and farmers. The sites were identified and selected on the basis of intensity of environmental degradation, food insecurity and deforestation prevalence. The number of households living in these villages had to be established for the sampling frame. The rule of thumb used during the creation of the Ward Development Committees in 1984, was that approximately 60-100 households should form one village and six villages together make up one Ward (large area).

3.0 BACKGROUND INFORMATION TO THE STUDY AREAS

The survey was carried out in 2 of the 5 natural farming regions in Zimbabwe, which are regions 1; 2; 4 and 5. These natural regions cover the following provinces Mashonaland East where Goromonzi is situated (region 2), Manicaland (see fig.1) which covers Nyanga is in region 1.

3.1 Natural Region One

Covers about 700 000 hectares in the country (less than 2% of the land area) with low temperatures and high rainfall. Areas lying below 1700 metres receive rainfall in excess of 1000mm per annum whilst those above receive in excess of 900mm per year. Agro activities include forestry, fruit, horticulture and intensive livestock production. Coffee and tea are grown in frost-free areas. There is one study site in this region which is Nyanga.

3.2 Natural Region Two

Covers the Northern Highveld and represents about 16% of the country. This region experiences moderate rainfall (750-1000mm/yr) that occurs in summer (November -April). This area is suitable for intensive cropping and animal husbandry. The Forest Garden study has identified the Goromonzi area.

3.3 Natural Region Three

Is a mainly midlands and covers about 18 % of the country with an annual rainfall of between 500-750 mm per year. This rainfall will be characterised by mid season dry spells and high temperatures. The area is most suited to livestock production, fodder and cash crops with good moisture retention capabilities. Conditions are marginal for maize, tobacco and cotton.

3.4 Natural Region Four

This region stretches for about 14,780,00 hectares with relatively low rainfall (450-600 millimetres per year) with periodic seasonal droughts and severe dry spells during the rainy season. The uncertain rainfall presents a great risk for cash crops, except those, which are drought resistant, or in areas of soils with better moisture retention. The region is most suited to livestock production.

3.5 Natural Region Five

These are low-lying areas covering about 27% of the country. They receive erratic rainfall which is below 650 mm in the Zambezi Valley and below 600 mm in the Sabi-Limpopo Valley. The rainfall is too low and erratic for reliable crop production. The best farming option for this region is cattle ranching and wildlife farming.

Because Forest Garden is most likely to be successful in areas that have more rainfall than those with little rainfall, the bias in choosing initial two sites has been towards areas with high rainfall, resources permitting a dry area will be targeted for comparison.

4.0 SPECIFIC BACKGROUND OF PROJECT SITES

4.1 Goromonzi District

Goromonzi is in the south west of Murehwa in Mashonaland Central Province. It has a population of 147 159 with 74 697 females. It has a population density of 59 per square kilometre. Goromonzi lies in Natural Region two. The study site in Goromonzi is Gwamura Village.

4.2 Nyanga District

Nyanga district is in Manicaland province. It has a total population of 128 467 of which 810 904 are females (2002 Population Census). It has a population density of 22 per square kilometre. Land use is largely commercial land with patches of communal land. The study site is Kadzima village. This village lies in Natural Region One. Peasant farming is the means of production in this village. The table below summarises the population characteristics of the two districts

Table 2. Population Characteristics of the two sites

| | Project Site Location | No. Of Males In district | No. Of Females In District | Total Population In District | Population Density km2 / District |
|-----------|-----------------------|--------------------------|----------------------------|------------------------------|-----------------------------------|
| District | | | | | |
| Goromonzi | Gwamura | 72462 | 74697 | 147159 | 59 |
| Nyanga | Kadzima | 59820 | 68647 | 128467 | 22 |

5.0 PROGRAMME ACTIVITIES

5.1 Formation of Project Committees

In order to ensure sustainability of all the project interventions, the first step after the completion of the baseline survey was to form project committees in the two selected sites of Nyanga and Goromonzi. A ten member gender balanced farmer's committee was elected in all sites, the duties or terms of reference for this committee is to coordinate project activities with the support and technical back-up from the National Genebank and Community Technology Development Trust. The committee manages the selected forest garden sites and the tree nurseries. The future intention is to send some of the committee members for training on basic tree, nursery management courses which are offered by the Forestry Commission in Zimbabwe. It was generally agreed by the community that an elected project committee sits for two years in control, after which they could be re-elected depending on the associated outputs or indicators set by the project beneficiaries.

5.2 Selection of Forest Garden Sites

Forest garden sites were chosen and sited after a wide stakeholder consultation, the availability of water being the main determinant factor and proximity or accessibility of the facility to the targeted beneficiaries being considered as well. In Goromonzi district, Gwamura village headman facilitated the provision of arable land of nearly two hectares, In Nyanga district, the community had already a fenced nutritional garden where an acre piece of land was allocated to forest garden activities. The timely allocation of pieces of land for the conservation of forest species showed a positive commitment to the project from the two communities. The fact that the forest garden in Nyanga was located in an already fenced area enhanced the fast establishment of the nursery and a green house to enhance seedling establishment. A fast method of collecting tree seeds and cuttings had to be employed by the project team based on the tree species preferred by the communities. This method involved the sensitisation of school children who would compete to collect seeds from the remnant forests. A token of school ballpoints had to be offered to kids who would have collected the highest number of seeds per species.

5.3 Preferred Tree Species Per Site

The uses of forests differed from village to village, even within villages and hence the preferences, a prioritisation approach had to be used based on participatory rural appraisal methodologies. This exercise enabled the ranking of the most important species which needed immediate germplasm conservation to avoid extinction.

Table 3: Tree Species Preferred in Goromonzi district

| Tree Species Indicated | Percentage of farmers preferring the species (%) | Related Uses |
|---------------------------------|--|------------------------------------|
| <i>Burkea africana</i> | 80 | Firewood, habitat for edible worms |
| <i>Ziziphus mauritania</i> | 80 | Fruits have ready market in towns |
| <i>Uapaca kirkiana</i> | 70 | High Fruit yields |
| <i>Sclerocarya caffra</i> | 65 | Nuts and Wine |
| <i>Brachystegia spiciformis</i> | 80 | Firewood |
| <i>Pterocarpus angolensis</i> | 70 | Timber |
| <i>Azanza garckeana</i> | 55 | Fruits |
| <i>Lippia javanica</i> | 65 | Medicinal |
| <i>Jatropha curcas</i> | 66 | Hedge and fencing |

The list for Goromonzi district can be described as endless, with the percentages of farmers decreasing upto 5% for some species. Herbalists tended to prefer herbs and tree species of medicinal value. Generally high yielding tree species like *Uapaca kirkiana* and *Ziziphus mauritania* are preferred since their products (fruits) bring ready cash. For the later, the species does well in semi-arid conditions, in this case in Goromonzi it could probably flourish slowly relative to its performance in the Zambezi Valley where tonnes and tonnes of fruits are harvested annually.

Table 4: Trees species preferred in Nyanga District

| Tree Species Indicated | Percentage of farmers preferring the species (%) | Related Uses |
|--------------------------------|---|--------------------------|
| <i>Brachystegia boehmii</i> | 82 | Firewood, edible insects |
| <i>Piliostigma thonningii</i> | 76 | Fruits, Cattle feed |
| <i>Kigelia africana</i> | 75 | Shed, cattle feed |
| <i>Uapaca kirkiana</i> | 70 | fruits |
| <i>Psorospermum febrifugum</i> | 70 | fruits |
| <i>Strychnos pungens</i> | 65 | Fruits, medicine |
| <i>Combretum imberbe</i> | 57 | pesticide |
| <i>Pericopsis angolensis</i> | 45 | medicinal |
| <i>Pterocarpus angolensis</i> | 40 | woodwork |

Despite the geographical isolation of the two districts of Goromonzi and Nyanga, one can note the similarities in the indigenous tree species required for restoration by the communities, as exemplified by *Uapaca kirkiana*, *Brachystegia spp* and the hardwood timber species; *Pterocarpus angolensis*. The challenge for the “**Initiation of forest conservation programme**” is to ensure a sustainable availability of tree seed sources, intergerated within the forest garden concept. In Nyanga the collection of seeds through announcements and competition in schools did not target the most preferred species by the communities, however it enabled a start off point for the forest garden nursery. The collection brought both indigenous and exotic tree germplasm, it was generally agreed that tree germination studies at forest garden sites begin first before rapid collection of seeds and cuttings from the wild. This was justified to avoid the collection of non viable seeds or the species ecology associated dormancy.

5.4 Preliminary Greenhouse Experiments at Forest Garden Sites

Nursery development was focusing on the propagation of both indigenous and exotic tree species. The general tendency is that, at their homesteads, farmers usually grow exotic fruit trees such as mangoes, lemons, peaches and oranges. This culture of adding value to exotics has positively contributed to the loss of indigenous tree diversity, one can argue that if the indigenous tree species which have attained value and some recognition today, had been

realised 100 years ago, then they could have been domesticated and attained the same value as lemons and peaches. Table 5 shows the germination percentages and end use of seedlings produced in the Nyanga forest garden plot.

Table 5: Germination results of seedlings propagated at Nyanga Site

| Planting date | Species number | Species | Germination % | Plants distributed | Plants Left in nursery |
|----------------------|-----------------------|---------------------------------|----------------------|---------------------------|-------------------------------|
| 25/08/05 | 1 | <i>Carica papaya</i> | 78 | 60 | 5 |
| 25/09/05 | 1 | <i>Brachystegia spiciformis</i> | 85 | 200 | - |
| 04/10/05 | 1 | <i>Morus alba</i> | 70 | 180 | 20 |
| 10/10/05 | 1 | <i>Prunus persica</i> | 65 | 85 | 60 |
| 15/10/05 | 1 | <i>Syzigium cordatum</i> | 40 | 10 | |
| 18/10/05 | 1 | Plums | 15 | 18 | 2 |
| 18/10/05 | 1 | <i>Citrus limon</i> | 90 | 300 | 15 |
| 19/10/05 | 2 | <i>Eucalyptus spp</i> | 90 | 105 | |
| 15/11/05 | 1 | <i>Jatropha curcas</i> | 85 | 140 | |
| 15/11/05 | 1 | Granadilla | 65 | 30 | 5 |
| 16/11/05 | 1 | <i>Azanza garckeana</i> | 95 | 70 | 5 |
| 18/11/05 | 2 | <i>Psidium guajava</i> | 45 | 30 | 5 |

The germination percentages of the tree seeds in Nyanga were very impressive, all the seedlings were distributed by the farmer's committee to the individual homestead gardens, only a few remained in the nursery for further distribution. The idea of individual home gardens will act as field genebanks for the conservation of both indigenous and exotic tree species. It is important to note that the farmers responsible for the nursery failed to record the days to emergence of all the species in the nursery, for Goromonzi site, this data was captured.

Table 6: Germination percentages and distribution of tree seed propagated in Goromonzi

| Planting date | Species | Germination % | Period to emergence | Plants Distributed |
|----------------------|----------------------------|----------------------|--------------------------------------|---------------------------|
| 14/08/05 | <i>Citrus limon</i> | 80% | 3wks | 80 |
| 14/08/05 | <i>Carica papaya</i> | 85% | 3wks | 85 |
| 14/08/05 | <i>Berchemia discolor</i> | 30% | 4wks | 30 |
| 14/08/05 | <i>Jatropha curcas</i> | 95% | 3wks | 95 |
| 09/09/05 | <i>Sesbania sesban</i> | 95% | 2wk | 90 |
| 09/09/05 | <i>Striychnos spinosa</i> | 75% | 1 ¹ / ₂ months | 50 |
| 23/09/05 | <i>Azanza garckeana</i> | 65% | 4wk | 65 |
| 23/09/05 | <i>Ziziphus mauritania</i> | 60% | 1month | 60 |
| 11/10/05 | <i>Brachystegia spp</i> | 20% | 1 ¹ / ₂ months | 5 |
| 18/10/05 | <i>Uapaca kirkiana</i> | 55% | 3wks | 55 |
| 06/11/05 | <i>Adonsia Digitata</i> | 55% | 4wks | 40 |
| 21/11/05 | <i>L.Capassa</i> | 86% | 10dys | 55 |
| 06/12/05 | <i>Mangifera indica</i> | 80% | 3wks | 80 |
| 06/12/05 | <i>Prunus persica</i> | 7% | 1mnth | 7 |

The germination rates /percentages of most indigenous tree species were very high, however there is need to reduce the period to emergence, the shorter the period, the faster will be rate of species regeneration. If resources were permitting, there will be need to engage undergraduate students from the university who will be studying germination and dormancy characteristics, especially of indigenous tree species. Only a limited number of local tree species have been studied to some detail. The planting of *Jatropha carcus* (bio-diesel plant) coincided with the national government programme which is promoting the cultivation of *Jatropha* aimed at alleviating fuel imports in the future, the country is currently experiencing severe fuel shortages. The programme also benefited from the national tree planting week, which was on the first week of December, demand for seedlings from the nurseries was very high during the national tree planting week.

6.0 IMPACT OF THE PROJECT

It is rather too early to note the impact of the programme within the period of the fellowship, however some trends could be observed. Issues of capacity building through the training of project committees in the establishment of home forest gardens and the associated adoption rate by the communities of Goromonzi and Nyanga were impressive. The rate of seedling uptake from the nursery for the purposes of planting in home forest gardens was also encouraging. The demand was usually exceeding the supply.

7.0 FUTURE PLANS

The future plans are that the programme for the “initiation of the conservation of forests” be scaled up to target a wider geographical area, this would allow for the conservation and sustainable utilisation of forests within most rural communities in Zimbabwe. There is need to further develop the forest gardening concept as a model which could be mainstreamed in schools, and rural development programmes. It is important to note that the approach is different from the traditional practise of reforestation with *Eucalyptus* woodlots nationwide, but the farmer’s preferred tree species will be grown. There is need to conduct a series of studies on specific tree species preferred by farmers, growth habits, growth rates and the general ecology of the species. This will enhance the availability of relevant literature important in the cultivation of the specific tree species. The national genebank will have to collect the germplasm of threatened species as first priority followed by a general collection. The communities participating in the programme need further capacity building in the forestry associated enterprises such as bee keeping, and production of herbs and management of herbal gardens. There is need to develop the forest garden concept into a long term five year programme where lessons can be drawn and proper documentation on specific best practices within this broad concept and recommendations done.

8.0 CONCLUSION

Although the programme implementation had a number of challenges, which ranged from climatic, socio-political and economic shortfalls, one can still note the following in conclusion

- The concept of forest gardens has been spread not only in the sites where the project was initiated, but also in adjacent villages
- There has been significant increase in tree species diversity in areas where the programme has been implemented
- Beneficiary communities have realised that there is not only environmental benefits, but also economic benefits to reforestation
- Project beneficiaries have expressed interest in the programme through wider adoption of the forest garden concept as demonstrated by the number of home forest gardens established.
- Provision of adequate water has been cited as an important factor in the early years of tree growth.

9.0 REFERENCES

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