Strategy to Ensure Secure and Sufficient Supply of Tree Propagative Material for Agroforestry Development in Kenya

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ABSTRACT

The principle of provision of High quality tree seed[4] in sufficient quantities and on Time to meet the demands of tree planting rings true for both Agroforestry and Plantation forestry. The challenge however to interpret the theme in the case of Agroforestry is rather complex unlike in Plantation forestry. The supply of seed to raise plantations can easily be executed by a formal institution through observance of a strict code of conduct that guarantees quality. For plantations the quantity required, species in question and timing can be worked almost to the exact detail. Moreover, the range of species is narrow and the actual quantities required far less compared to the Agroforestry demand.

In the case of Agroforestry seed, the multi-various end uses aimed for and the concomitant diverse ecological environments in which agroforestry is practised demand a wide range of species. Beside the audience to use the seed is large and spread all over the country requiring therefore massive quantity of seed at the grass roots. A formal institutionalised and centralised supply will be over-burdened and over time tire especially if it is caters for both categories of seeds. This paper discusses a strategy and activities for various players that if implemented would secure the supply of Tree Propagative Material (TPM) for good quality and quantity and accessible as close as possible to farmers, the final back stoppers in Agroforestry. The point of departure is towards the Privatisation of seed collection and supply of Agroforestry species. This without compromising the basic requirement that quality of seed in its entirety is the most important issue to safe guard even in Agroforestry. Historical and present conduct of some major stake holders in the field of germplasm provision in Kenya has been analyzed and their strengths and weakness have inspired the bias taken in the recommended strategy

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[4]In this paper seed is taken to mean any Tree Propagative Material

List of Abbreviation

FD:	Forest Department
FESD:	Forestry Extension Service Division
GRU:	Germplasm Resource Unit
GTZ:	German Agency for Technical Cooperation
ICRAF:	International Centre for Research in Agroforestry
KARI:	Kenya Agricultural Research Institute
KEFRI:	Kenya Forestry Research Institute
KFSC:	Kenya Forestry Seed Centre
KWAP:	Kenya Woodfuel and Agroforestry Programme
KWDP:	Kenya Woodfuel Development Programme
MMM:	Miti Mingi Mashambani Project
MOALDM:	Ministry of Agriculture, Livestock Development and Marketing
MOE:	Ministry of Energy
MPTS:	Multi-purpose Tree Species
NFTSC:	National Forestry Tree Seed Committee
NGO:	Non Governmental Organisations
TPM:	Tree Propagative Material
TPP:	Tree Planting Project
TSSP:	Tree Seed and Seedling Producer
VI:	'We' a Swedish NGO

STRATEGY TO ENSURE SUFFICIENT SUPPLY OF TREE PROPAGATIVE MATERIA FOR AGROFORESTRY DEVELOPMENT IN KENYA

1.0 Introduction

1.1 Provision of TPM: The National Outlook

It is generally acknowledged now that farmers in Kenya have good and long-standing experience in tree planting (Mung'ala 1987, Van Gelder, 1990). Moreover other studies confirm that in the densely populated areas of Kenya's highlands the volume of planted woody biomass on farms is significant and on the increase: the standing volume of planted woody biomass on farm land is even larger (about 160 million m^3) than that found in the industrial plantations (about 40 million m^3 Holmgren et al, 1994). The latter study concludes that the future of forestry development in Kenya rests, to a large extent, with the Kenyan farmers. But many constraints bedevil this desirable scenario, chief of which is availability of tree seed. Although other methods of tree propagation are in use by farmers, like cuttings and wildings (Kamondo 1993) seed remain the most obvious method to tree propagation and these other methods are limited in scale.

The difficulty of acquiring seeds of tree species for agroforestry or indigenous fruit trees is a common cited problem. The Kenya Forestry Seed Centre (KFSC) is unable to respond fully to the recent surge in demand for multipurpose tree species suitable for integration into farming systems. Currently, the production and supply of seeds of some popular species in high demand such as *Calliandra calothyrsus*, and *Grevillea robusta* remain bleakly below the market demand (see table 1 for KFSC shortfalls). Consequently, local communities have beer left to do their own collection to satisfy their seed requirement. This situation has in turn created a case in which a lot of seed is being collected and handled without regards for the basic rules of seed collection.

Three basic points are important in provision of germplasm for any afforestation program, *Quality, Quantity* and *Time*. All must be correct for any system that aims at providing propagative materials to users. These materials must be of high quality, enough and provided when required.

As far as provision of agroforestry TPM is concerned, the challenge on above mentioned 3 scores is rather more compounded than in plantation forestry. The predictability value is higher in plantation forestry as afforestation follows procedures that are well defined in terms of species, time and area to plant. Given that the provision of seed to this seemingly clear cut usage still poses many challenges, it can then be appreciated that provision of seed for agroforestry purpose where demand in term of

species, time and volume is very eclectic is no easy task at all.

In a recent National Survey carried out by KFSC (Ahenda and Omondi 1994), it was shown that a lot of agroforestry seeds are in circulation apart from those emanating from KFSC. However, the exact quantities could not be ascertained as most of the seeds stock are not documented. The general impression was that reliance on KFSC appear to be on the decline. The majority of the seed dealers and recipients attribute this to the distance to KFSC and the unavailability of seeds of the high demanded tree species.

The provision of TPMs to farmers has been of interest to both the government and the Tree planting projects alike. That there is a bottleneck in the seed and seedling distribution system from KFSC (seed) and forest department nurseries (seedlings) to the farmers and hence the need for re-accessing the supply system needs no gain saying. The establishment of more seed sources and the increased collection of seeds of agroforestry species is urgently needed. The current distribution system is not efficient as only a few farmers are able to obtain seedlings through the forest department.Although various ideas and initiatives have been mooted by various actors to alleviate this problem, a consolidated and collaborative venture among majority and key stake holders can only be traced recently when in 1994, a National workshop on Tree Seed Distribution and Marketing was held (Kamondo B.M, Rik Thijsen 1994). This has been recently followed up in February 1996 by a policy workshop which formulated policy guidelines to enable the implementation of recommendations suggested in 1994 (Kamondo B.M et al 1996). From both workshop the problem with availability of TPMs can be summed thus:

There is insufficient and insecure availability of Tree Propagative Material to meet the demand for on-farm tree planting.

In this presentation the authors have borrowed heavily from the proceedings of these 2 workshops and are basically reporting to the wider audience the ideas the key stake holders envisage for provision of TPMs to farm forestry in the future.

1.2 Characteristics of Agroforestry TPMs in production and Use in Kenya

In summary the following characterises the prevailing facts about TPMs used in agroforestry

>> The production of the TPMs is under very many actors principle of which are: KFSC, Tree Planting Projects, Forest Department, and Individuals.

>> The utilisation of the TPMs is chiefly a one actors domain, the Farmer, although other actors especially the Tree Planting Project use them during the life span of the project.

>> The Total (National) demand of the TPMs in terms of quantity is difficult to Ascertain and also Predict. Although the Real demand must be far much lower than the Total demand due to exaggerated requests, there exists a shortage of TPMs for agroforestry purposes. The demand is also skewed towards a few explosive species chief of which are *Grevillea robusta, Calliandra calothyrsus, Casurina spps* and recently *Azadirachta indica*. The demand of seed both for agroforestry and plantation has been placed anywhere between 18-85 tonnes of seed. (Oyalo 1994)

>> The Total (National) supply of the TPMs in terms of quantity is also difficult to Ascertain and Predict. With so many actors joining in and a few winding up their activities, it is difficult to put a figure of how much is produced annually. The supply is skewed with some areas having quite a good share of production of particular species which could be totally missing in other areas. In terms of species, exotics have a strangle-hold over indigenous in terms of demand.

>> The TPPs have had a big influence on trends of demand and supply of the TPMs of agroforestry species.

>> The improvement of TPMs used in agroforestry lags behind and the quantity of seed from any improved sources (however elementary the improvement work is) is very scanty. Most seed is currently coming from sources that are not well authenticated.

>> Beside not being source identified, most TPMs are used without quality control or determination. Some particular cases are due to ignorance or neglect of proper seed collection and handling rules as stipulated in the Tree Seed Handbook of Kenya (Albrecht 1993). However in some cases, the doubt on quality especially genetic qualities is due to the unsuitable basic material introduced. Kioko (1993) gives worrisome figures on the exotic species of *Grevillea robusta* which emanated from a handful of individuals. This can be worsened by the reproductive biology of a species with further narrowing of genetic base within the population. This holds true for *Leucaena leucocephala*. The species is predominantly self-pollinating (Wolf, 1992), yet it

had initially been introduced from materials descended from one or only few trees in northern Mexico (Simons 1992).

Table 1. Average Yearly Shortfall of supply of some MPTS seeds from KFSC, and the amount of money needed to meet the shortfall.

Species	Demand kg	Shortfall kg	Cost of collection (ksh.)*
Albizia gummifera	20.0	15.0	7,800
Grevillea robusta	200.0	150.0	78,000
Dovyalis caffra	250.0	200.0	104,000
Calliandra calothyrsus	60.0	50.0	26,000
Markhamia lutea	50.0	20.0	10,400
Melia azedarach	90.0	50.0	26,000
Azadirachta indica	250.0	100.0	52,000
Gliricidia sepium	20.0	10.0	5,200
Prosopis chilensis	50.0	30.0	15,600
Others			20,000
		Total	355,000

Source: KFSC records

2.0 STRATEGIES TO PROMOTE AVAILABILITY OF TPMs:

2.1 Historical and Present Perspective

The following text discusses the historical and present perspective and strategies in place in seed provision by various actors.

Forest department's Policy

The importance of farm forestry as the possible source of forest products was first recognized by the government in the sessional paper no 1 of 1968. This led to the formation of the Rural Afforestation and Extension Scheme in 1971 which has since then undergone several policy, technical and approach changes to evolve to the present day Forestry Extension Service Division. (Mung'ala 1995)

To alleviate the crisis in availability of seedlings, FESD up to the early eighties established huge nurseries to stock the required seedlings but by the late eighties (Nyaga 1988), had realised the practical constraints for this procedure. Astronomical costs aside, the idea was wanting in that the farmers far removed from the nurseries never received the seedlings in time. Then as it is now, FESD advocated, at least in principle to education to as many individuals and self help groups as possible in order to place rural tree planting on a fully participatory and sustainable basis.

KFSC strategies

This is the most formalised seed producer both for Agroforestry and plantation species. The mandate however spills over to research, and training in tree seed technology.

To supply seed, the centre has in the last three years established seed stands for the production of improved germplasm (see table 2). The centre has facilities for medium and long term bulk storage of seeds at its headquarters at Muguga.

KFSC occasionally purchases seed from private dealers but it does not have a well defined policy in this regard. If a seed purchase system to supplement its own efforts was formalised, this would close the gap between supply and demand. Training has been adopted as a strategy for increasing seed collection country-wide and to reduce total dependence on KFSC for seed

supply. Training courses on seed collection techniques and handling have been designed by the centre as a means of encouraging and promoting local seed collection in a professional way. However the centre has no training budget and participants are expected to pay a tuition fee. This has resulted with limited coverage. Only a few farmers from Laikipia and Meru have benefited from this training. In fact the training attracts steady enrolment from outside the country than within. Some TPPs like KWAP also conduct training and simple manuals like that prepared by Mwangi et al (1994) can go along way in sensitising people on important issues in tree seed handling.

Due to its structure, (centralised out-let), and its customer priority remaining FD (in principle), a lot of farmers in the country side can not buy seeds from it (Kamondo 1993). There has been insistent calls for decentralisation of its supply system (Holding and Kareko 1996) but logistical implications especially the awesome financial burden mitigates against.

To do research and publish guidelines for each species of interest is a difficult task. To expect KFSC to single handily shoulder this and further to collect tree seed to satiate demand is unrealistic. Awareness has already been created by the centre as a source of both seeds and technological information on forestry tree species and many customers are crest fallen when they can not obtain some popular seeds from the centre. It is a fact that the centres capability is limited and can not cope with all the ever increasing demand for high quality tree seeds.

TPP strategies

Only a little seed moves directly from farmers to farmer at a price. Seeds from farmers is sold to projects which re-distribute to farmers. Where there are tree projects involved in seed provision their seed budgets are a testimony of how much seed farmers at large are collecting. If the projects were to suspend their operations, there would definitely be a significant reduction in marketing opportunity and then reduction in seed availability. Given that this TPPs are transient, the mode of operation of this TPPs, if not altered means a permanent insecurity in the supply of TPMs.

Luckily TPPS offering free seeds or seedlings are on the decline but a few claim that the donors policy bind them to offer free seeds in support to affcrestation. New TPPs if not guided by past experiences and recommendation that advocate less

direct subsidy could reverse any realised gains.

Only 1 agency the VI projects has a fairly bulk handling facility with a store. However the design only allows for short term storage and as with KWAP uses ordinary fridges to prolong storage where need be, but not for long term storage. Most TPPs procure, store for a short term and use or redistribute the seed to farmers.

Role of the Private sector

Commercial seed dealers:

They buy and sell seed locally or externally, purely based on profit making.

Seed Retailers

This was attempted by KWDP and the Women and Energy Project of Special Energy Project in the Ministry of Energy. Seed (most of which was supplied at cost by KFSC) was supposed to be packaged and retailed from selected retail 'shops' in various places in the country. The project, suspected to have been highly subsidised is not operational any more.

The farmer:

According to Schnier (1991), about 70 % of seeds bought by Ngos is from farmers. Their role in tree seed supply to themselves and to the National demand is increasingly being recognised but its institutionalisation is yet.

The seed sources of farmers are of limited sizes and of inadequate constitution in terns of varied genotypes. Farmers are not conscious of need for genetic diversity . The physiological concerns fair better. From a survey done in 1993 (Kamondo 1993), only 5 out of 28 samples attained the minimum standards suggested by KFSC for germination. The purity of the seed compared relatively well with recommended figures and 20 samples out of 24 samples had the purity within 5 points of recommended figures. None of the seed samples had MC that can be considered injurious.

Role of ICRAF

The MPT-GRU section within ICRAF takes the leadership role (Simons 1995) in the improvement of agroforestry species fondly referred to as MPTS. This takes place in collaboration with several division of KEFRI.

However as noted earlier, improved Agroforestry TPMs are hardly in use. The only improved germplasm available to farmers is from KFSC, from its established seed stands. The multiplication of the improved varieties from ICRAF and its dissemination channel is expected to be through KEFRI, specifically by KFSC inheriting the stands and using the same as own seed sources. The development of improved germplasm is an indispensable step towards better yields. Some agroforestry systems prefer particular tree architecture. Research activity especially on agroforestry being participatory will mean that once a variety is 'discovered', its demand will be spontaneous. The need to make this available means that the TPM multiplication should not be left far behind the research, and experimental designs that enable conversion of experimental plots into seed production units should be favoured (Kioko 1993). Although the ideal case should be a situation where only improved germplasm is distributed to users the present practice relies on the use of germplasm from unbred sources. Reasons being that development and evaluation and multiplication is a long time horizon, constrained by shortage of resources, human, material or financial.

Table 2 The distribution of seed stands of some popular MPTS established between 1982 and 1992

Source: KFSC records

Species	Site\District	P. year	Area (ha)
Acacia mangium	Gede\Kilifi	1988	2.5
Albizia falcataria	Gede\Bukura	1988	1.0
Calliandra calothyrsus	Kakamega Forest	1991	0.5
Cassia siamea	Jilore\Kilifi	1989	1.5
Cassia siamea	Gede\Kilifi	1989	1.0
Grevillea robusta	Njukiini\Kirinyaga	1992	4.0
Grevillea robusta	Kitale\Trans-Nzoia	1992	4.0
Gliricidia sepium	Kakamega Forest	1987	2.0
Grevillea robusta	Kakamega Forest	1990	2.0
Grevillea robusta	Naro Moru\Nyeri	1988	3.0
Grevillea robusta	Ragati\Nyeri	1988	6.0
Leucaena diversif. K156	Gede\Kilifi	1989	0.5
Leucaena hybrid Kx3	Gede\Kilifi	1989	1.0
Leucaena leucoceph. K636	Kibwezi\Machakos	1989	0.5
Mimosa scabrella	Kitale\Trans-Nzoia	1990	1.5
Parkinsonia aculeata	Kibwezi\Makueni	1989	0.4
Parkinsonia aculeata	Kibwezi\Makueni	1987	0.4
Prosopis chilensis	Kibwezi\Makueni	1987	0.9
Prosopis chilensis	Kibwezi\Makueni	1987	0.1

3.0 Emerging context of the TPM

Borrowing on the proceedings of the 2 workshops alluded to earlier the following salient features captures the backdrop in to which TPMs for farm forestry are in at the moment.

3.1 Seed and Seedling Production and Distribution

* Many TPPs and FESD are now in the process of shifting away from large tree nurseries to small on farm nurseries managed by farmers. However the existing government nurseries that might be juxta-positioned discourage this private initiative as free or subsidised seedlings wipe out marketing opportunities.

* TPPs cause temporary bliss in availability of TPMs and its marketability. Post project supply is still left to chance by most TPPs unwittingly eroding their long term objectives of promoting agroforestry practices among the farmers. However the TPPs are getting increasingly concerned with sustainable seed supply or acquisition with some opting to reduce their own involvement and rather encourage local seed collection, use and exchange. Among them are CARE, KWAP and MMM (Mwangi 1996).

* KFSC proposes to gradually decrease its involvement in active procurement of agroforestry species by collecting less or totally leaving out species best collected by farmers (e.g *Dovyalis caffra)* and act more as a facilitator of the technical knowledge and marketing.

3.2 Farmers interests in seed and seedling production

* Only a limited group of farmers seems to be interested and capable to collect seed and raise seedlings by establishing local nurseries. The majority of farmers for practical reasons prefer to acquire seedling from nurseries.

* The use of alternative propagative material (cuttings, wildings, coppicing etc) has received very little attention from farmers. However the use of these alternatives takes place albeit at a small scale at the farm level.

3.3 Effects of free or highly subsidized seed and seedling

* Farmers accept free or subsidized seed but as to whether they make good use of it is doubtful.

* Free or subsidized seeds kills the local seed market and seed collection; the same applies to seedlings.

* The practice of free or subsidized seed distribution has encouraged 'recycling' of seed, where distributed seed is resold to TPPs

* Even without subsidies, popular species will be sought by farmers while subsidies rarely encourage farmers to try unpopular ones, until they are convinced of the benefits.

* It needs to be emphasised that most TPPs are convinced of the need to shift to full-cost seed distribution.

3.3 Seed Quality Concerns

* Seed quality issues and documentation especially for agroforestry seeds have not been receiving adequate attention. Documentation by other actors apart from KFSC which emphasises on this is still inadequate and haphazard. Physiological quality of some seeds obtained from other actors and tested at KFSC show mixed results. From very good to very poor (table 3).

* The implementation of the promulgated Seed Act should be done quickly and the control organ named in the act mobilised. In pursuance of the drafted seed Act, the control has to be gradual and in an educative way rather than in a punitive way.

* It is important to sensitize policy makers and donors on the need to coordinate efforts to come to a more effective and quality oriented supply system to seeds and seedlings.

Table 3: Results of Quality tests on seed samples from farmers. Figures in brackets = Recommended minimum standards of seed testing results. Figures rounded to nearest whole number.

Sple# & species	germin(%) Lab	MC	Purity
1 *Acacia lahai*	12 (70)	9.0	98.3 (95)
2 *Acacia mearnsii*	85 (65)	5.9	94.1 (99)
3 *Acacia tortilis*	5 (88)	8.8	98.7 (88)
4 *Acacia albida*	74 (70)	8.7	98.7 (95)
5 *Acacia mellifera*	63 (89)	9.1	97.9 (99)
6 *Acr. frax.*	14 (30)	7.5	97.4 (99)
7 *Calliandra calothyrsus*	90 (90)	8.1	99.7 (98)
8 *Calliandra calothyrsus*	92 ("")	-	99.7 (")
9 *Calliandra calothyrsus*	52 (")	8.0	98.8 (")
10 *Cassia siamea*	77 (91)	7.6	92.7 (97)
11 *Cupressus lusitanica*	20 (48)	10.6	96.1 (97)
12 *Cupressus lusitanica*	1 (")	10.3	80.5 (")
13 *Cupressus lusitanica*	11 (")	11.0	91.4 (")
14 *Dovyalis caffra*	33 (93)	8.8	86.3 (88)
15 *Dovyalis caffra*	8 (")		80.0 (")
16 *Dovyalis caffra*	0 (")		32.6 (")
17 *Eucalyptus saligna*	3 (87)		-
18 *Eucalyptus saligna*	10 (")		
19 *Grevillea robusta*	0 (78)		
20 *Grevillea robusta*	0 (78)	8.2	72.2 (86)
21 *Jacaranda mimosifolia*	37 (83)	6.6	80.9 (97)
22 *Leucaena leucocephala*	60 (90)	8.4	99.3 (99)
23 *Leucaena leucocephala*	93 (")	8.3	99.9 (99)
24 *Mimosa scabrella*	78 (-)	5.9	98.4 (-)
25 *Olea africana*	0 (-)	8.7	98.2 (97)
26 *Schinus molle*	3 (41)	11.6	95.4 (98)
27 *Sesbania sesban*	36 (65)	10.6	99.7 (99)
28 *Terminalia mentaly*	0 (39)	-	98.7 (99)

MC = moisture content :Source: Kamondo B.M, (1993)

3.0 THE ALTERNATIVE VISION

The alternative vision presented here wholesomely adopts the resolution of the workshop held in Eldoret in February 1996 on Diversified Policies for Tree Propagative Material in which the authors participated. Annex 1 has tried to reproduce as close as possible the Recommendations on policy proposals and plan of action that were advanced from the meeting and which if adopted would ensure sufficient and sustainable availability of tree propagative material to meet demand for on-farm tree planting in Kenya.

The ultimate objective of the vision presented here is sustainable and effective on farm tree planting to meet farmer demands for good quality tree products. It will also serve to provide a healthy genetic base for tree and forest development in contribution to sustainable natural resource management. In specific terms it hopes to satisfy the 3 requirement of ***Quality, Quantity*** and ***Time*** important in a seed provision system. For purpose and objective the vision is not different from what the previous strategies have been aiming for but the avenues to follow are radically different. The vision aims to shift progressively seed production of agroforestry from the formal and institutionalised control to the hands of some private people, referred to as Tree Seed and Seedling Producers (TSSP). In totality the final analysis in the tree seed industry is as in Annex 2. The exact steps for various actors to move through to achieve this state is as in Annex 1.

The establishment of a community seed collection system as earlier proposed for CARE Kenya (Alitsi E.M 1991) is a good idea now as it was then when it was proposed but we would like to point out that although it would be best for the community to view such a system as their own, it is more practical to have seed collection and seedling production left only to a few well motivated players in a given community. This TSSP should be helped to influence markets outside the local communities through linkages. Ahenda and Omondi (1994) identified a category of farmers who are active in seed collection and distribution at local level. They deal with both seed and seedlings. Unlike most stockist and vendors, they have a rich local knowledge on seed handling. They know quite a lot on seeding patterns of tree species in their localities. This category should be the fulcrum to rest the future supply of Agroforestry TPMs. However they need some training to improve the quality of seeds they collect and distribute.

Much effort should be spent in strengthening this group of individuals aptly called Tree Seed and Seedling Producers (TSSP). They should act as the main seed dealers in different parts of the country. It follows therefore they

will be dealing with bulk quantities. TSSP handling bulk seed should have efficient storage facilities which donors and projects can support in their establishment . This would reduce the rate of decline in the quality of stored seeds.They should be registered as seed dealers as allowed in the Seed Act and controlled (in an educative way) to safe guard the interests of the user, the environment and themselves. Again it should be emphasised that what is being described here is a **process** and not a **revolution.** Some parts of Western Kenya where such groups informally exist are obviously far ahead than other places and better poised to set a private seed supply system afoot. The role of KFSC should then be to act as the National Buffer to oversee a smooth transition. This would be by advising any new TPPs on exact condition of seed supply in their area of operation and the general way to move whilst still collecting and providing seeds to smoothen out shortages which might be caused by many factors. KFSC should always be on hand to bail out in cases where the seed dealers falter. With its cold storage where long term storage is easy, this should not be difficult to achieve.

Since as mentioned earlier agroforestry TPMs are seriously wanting in terms of genetic integrity, ICRAF, KFSC, Ngos, FESD and TSSPs need to in the future collaborate on establishment of appropriate seed sources of the highly demanded tree species. This would ensure that seed sources meet the standards as stipulated in the Seed Act of Kenya, Tree Seed Regulation 1993 and allow participatory approaches in this venture. A lot of germplasm is also found in farms. Farmers especially TSSPs should be involved in the identification and conservation of good seed sources.

To succeed all above depends on tree seed being given the value it deserves. To impart some value to tree seeds, they should be issued at a cost. The prices should be set according to the cost of production, seed quality, and a species demand. It should be made a policy that all Tree seed should be sold to all consumers.

For this alternative vision to work, some Policy guidelines need to be put in place and operationalised as in the plan of action presented in Annex 1. The policy guidelines are presented here and if adopted and implemented would work as the bedrock on which to build this alternative vision. All these Policy guidelines are borrowed in total from the results of the policy meeting alluded to earlier. They are:

* The government policy is to ensure improved and sustainable availability of the propagative material to farmers for on-farm tree planting. In doing so, the policy is to give emphasis to improve and conserve on farm seed sources of agroforestry species.

* The government policy is to support its agencies and NGOs in improving farmers awareness of the need to use high quality tree propagative materials and appropriate tree planting methods.

* The government policy is to develop an effective and quality oriented seed and seedling supply system at national and local level.

* The government policy is to encourage and support the private sector in all aspects of tree propagative materials. Due consideration will be given to gender issues and development of local tree seed and seedling producers, in order to promote small scale enterprise developmert in rural areas.

* The government policy is to promote and support market driven pricing mechanisms for tree propagative materials by discouraging subsidies and free issues.

* The government policy is to facilitate technical assistance, through government agencies and NGos, to design and set-up appropriate seed handling and storage facilities at the local level.

* The government policy is to make seed testing procedures available as widely as possible to NGOs and seed dealers, through improved use of existing regional laboratories.

4.0 Conclusion:

The farmers involvement in seed collection and supply is confronted by two issues. The first is the need to follow the best seed handling method that produces seed of highest quality. The other the need to involve farmers in seed collection as an instrument of improving their social condition and welfare. Both are crucial but all said and done, the farmers welfare should count very highly in any decision and the farmer should be included as an active participant in seed collection.

The vision presented is a medium to long term affair. It is radical in content but progressive in implementation. Parts of its contents is presently being implemented through initiatives of some actors. The policy backing is important which then can allow all the actors to firmly base their decision on it and unify their approaches. Order is so important in the seed market and can only come from a lot of similarity in how each player acts. Nevertheless, though the policy goodwill is important, the implementation of the actions defined in Annex 1 for each player will at the end of the day determine whether or not the principle huddle of Insufficient and Insecure Availability of the Tree Propagative Material to meet Demand for On-farm Tree Planting will be surmounted.

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Annex 1: An Action Plan based on Policy Proposal

POLICY PROPOSAL 1

The government policy is to ensure improved and sustainable availability of the propagative material to farmers for on-farm tree planting. In doing so, the policy is to give emphasis to improve and conserve on farm seed sources of agroforestry species.

Recommended action

1.1 Establish *(FD, supported by NGOs and other development organizations)* through surveys local demand by species and quantity in order to determine required production

1.2 Diversify species by initiating trial establishment of under utilized and unknown agroforestry species by Tree Seed and Seedling Producers (TSSPs) in order to widen the range of planting materials available to farmers *(under guidance of KFSC/KEFRI and supported by other relevant actors)*

1.3 Encourage a wide range of propagative materials, e.g cuttings, wildings, coppicing *(all concerned organisations)*

1.4 Identify, collect and characterise *(KFSC/KEFRI and ICRAF)* indigenous agroforestry species by zonation of seed sources and carry out ex situ as well as ir situ conservation

1.5 Encourage *(FD, KFSC/KEFRI)* farmers and especially TSSPs through participatory approaches, to corserve good quality seed sources of agroforestry species on their private lands.

1.6 Ensure *(FD)* conservation of seed sources on gazetted forest land.

1.7 Ensure *(policy makers at FD, MOE, and MOALDM)* that donors are aware of a common agenda and discourage counter effective projects.

For this actions appropriate linkages will be established between farmers-TSSPs-Extension-Research. Research will be the responsibility of KFSC, supported by ICRAF with the FESD playing a co-ordinating role and providing the linkages to NGOs, TSSPs and other relevant actors.

POLICY PROPOSAL 2

The government policy is to support its agencies and NGOs in improving farmers awareness of the need to use high quality tree propagative materials and appropriate tree planting methods.

2.1 Step up *(FESD, KEFRI, ICRAF, NGOs)* and other relevant organisations) campaigns on need for farmers to use good quality seed and other propagative material. This will be done by field days, Chiefs barazas, radio programmes, drama, newsletters and other awareness raising approaches.

2.2 Enhance *(NGOs, FESD, MOE and MOALDM)* the use of MPTs within agroforestry systems through training and extension.

2.3 Ensure *(FD and KFSC/KEFRI, supported by NGOs and other development organisations)* necessary training and capacity development in all issues relevant for the proper management of the here proposed seed and seedling supply system and as specified in 3.4)

2.4 Encourage *(NFTSC and KFSC)* government organisations, NGOs and TSSPs to contribute to Seed Newsletters.

2.5 Co-ordinate *(NFTSC)* all aspects related to the seed and seedling supply system.

POLICY PROPOSAL 3

The government policy is to develop an effective and quality oriented seed and seedling supply system at national and local level.

POLICY PROPOSAL 4

The government policy is to encourage and support the private sector in all aspects of tree propagative materials. Due consideration will be given to gender issues and development of local tree seed and seedling producers, in order to promote small scale enterprise development in rural areas.

4.1 Identify and inventorize *(NFTSC supported by development organisations)*, through studies various seed delivery systems and develop mechanisms of supply and distribution.

4.2 Ensure *(NGOs and GOK projects)*, through a common and sustainable approach, that TSSPs can sustain seed and seedling supply for on-farm tree planting.

4.3 Strengthen *(KFSC and other actors)* seed vendors and dealers networks by implementation of the dealer registration and licensing system, by organizing fora and encouraging informal networks.

4.4 Encourage *(NFTSC and other actors)* exchange and trade of quality TPMs among farmers, TSSPs and seed vendors, through advertisements, newsletters, cataloguing, and by organizing training in marketing, accounting, record keeping.

4.5 Give due consideration to gender issues, in the strengthening of TSSPs and seed vendors *(all actors)*.

4.6 Study on economics and profitability of tree nurseries and on the need for local and credit system to support TSSPs *(FD, NGOs and other actors)*.

NFTSC should be revived and take up a coordinating role for this set of actions. However, other important actors as KFSC/KEFRI, NGOs, FESD and other development agencies are expected to contribute actively.

POLICY PROPOSAL 5

The government policy is to promote and support market driven pricing mechanisms for tree propagative materials by discouraging subsidies and free issues.

5.1 Develop *(KFSC/KEFRI)* recommended retail pricing, reflecting the real cost of seed procurement and handling, as a reference guide for market prices.

5.2 Develop a unified approach to be adhered to by donor, NGOs and Government projects in order to achieve the policy objectives for market driven pricing.

POLICY PROPOSAL 6

The government policy is to facilitate technical assistance, through government agencies and NGOs, to design and set-up appropriate seed handling and storage facilities at the local level.

6.1 Provide *(KEFRI)* technical back-up to NGOs and Government development projects in design of short and mid term seed processing and storage facilities.

6.2 Assist *(NGOs and GOK agencies)* TSSPs to acquire knowledge and infrastructure for improved seed processing and storage.

6.3 Facilitate *(NGOs and GOK agencies, in collaboration with KEFRI)* training of TSSPs in issues relating to seed processing and storage.

POLICY PROPOSAL 7

7.1 Provide access *(KEFRI, KARI and other government institutions)* to regional laboratories to NGOs and TSSPs for seed testing and quality determination.

7.2 Hold *(NGOs and GOK agencies, under guidance of KEFRI and KARI)* joint training courses on tree seed testing issues for NGO and GOK staff, TSSPs and seed vendors.

Certification of tree seed will be done in the locations mentioned in 7.1. Seed vendors/dealers will ensure documentation of seed with regard to species, date and location of collection, no. of seedlings per unit weight, name of collector, time to germinate and other relevant information.

Annex 2

Envisaged Roles and Responsibility of different Players in the Seed Industry contrasted with the present roles.

ACTIVITY	ORGANIZATION		
	Government	Nqos	TSSP
Research	********* **********[1]	*	**
Improvement	******** **********	*	***
Production	**** *******	* ****	******* *
Processing	**** ******	* **	****** ****
Storage	**** **********	* **	*******
Distribution	**** *******	* ****	******* *
Sales	**** **********		******** **
Quality Control	**********	**	
Extension	****** ***	****** ********	

********** Desired scenario
********** Present scenario: Scale of 12 each point captured by a star

[1] ICRAF grouped together with GCK for Research and Improvement