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results from a pilot and action research project in Nepal**

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Customer of tree seed in small bags, Kaski

Title

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Abbreviations

CBO	Community Based Organisation
CPFC	Community and Private Forestry Component
DANIDA	Danish International Development Assistance
DFO	District Forest Officer
DFSC	Danida Forest Seed Centre
FECOFUN	Federation of Community Forest Users, Nepal
FLD	Danish Centre for Forest, Landscape and Planning, KVL
FUG	Forest User Group
HMG	His Majesty's Government of Nepal
ICRAF	International Centre for Research in Agroforestry (World Agroforestry Centre)
IGO	International Government Organisations
INGO	International Non Governmental Organisation
KVL	Royal Veterinary and Agricultural University, Denmark
NAFSCOL	Nepal Agroforestry Seed Co-operative Limited
NARMSAP	Natural Resource Management Sector Assistance Programme
NGO	Non Governmental Organisation
SEAN	Seed Entrepreneurs Association in Nepal
TISC	Tree Improvement and Silviculture Component of NARMSAP
VAT	Value Added Tax

Preface and acknowledgements

This report describes and discusses the results of a pilot and research project, which was carried out by the following institutions:

- The Tree Improvement and Silviculture Component (TISC) of the Danida supported Natural Resource Management Support programme in Nepal (NARMSAP).
- The two TISC supported tree seed co-operatives NAFSCOL-Kabhre and NAFSCOL-Kaski.
- Danida Forest Seed Centre (DFSC), which, on the 1st January 2004 became part of the Danish Centre for Forest, Landscape and Planning, KVL (FLD).

The main purpose of the pilot project was to test a new approach to tree seed distribution: Commercial distribution of tree seed in small bags. The main purpose of this report is to describe and discuss the experience and lessons learned from the pilot project. Furthermore, the report provides a number of recommendations in support of the operations of the two co-operatives.

It is assumed that the results from the pilot project could be of interest to a wider public apart from decision-makers involved in NARMSAP activities and its components including TISC and the co-operatives. Some space is therefore devoted to describing the pilot project, its methods and results, and to discuss the chances for the project to gain 'social impact' and 'financial viability'.

The approach of distributing tree seed in small bags together with guidelines on how to germinate the seed has probably not been tried before. The pilot project can therefore be seen as the first step in a learning-by-doing process. The implementing agencies are acknowledged for their focal role in the experiment, for their willingness to overcoming practical problems, and for their flexible attitude towards the project.

The report is based, among other things, on data collected during a visit to the Central and Western Regions of Nepal November-December 2004.

A debt of gratitude is owed to all persons met who have provided their kind support and valuable information. Special thanks are owed to Nuchhey K. Shrestha, Pauline Tamang, Søren Moestrup, Kirsten Thomsen, Dorthe Jøker and Lars Schmidt for their professional contributions.

Iben Nathan
February 05

Summary of conclusions

Access to quality tree seed implies specific problems for tree planting farmers in developing countries. Since most of them are smallholders, they need only few seed. Distribution networks usually do not exist for such small quantities. In 2001 it was decided to test a new approach to distribution of tree seed on a pilot basis in Nepal: Commercial distribution of tree seed in small bags through commercial enterprises dealing with horticultural and agricultural seed. In Nepal, such enterprises are known as agro-vets. The development objectives were (a) to increase access to high quality tree seed for farmers, FUG and other small-scale tree-planters, and (b) to support the operations of two tree seed co-operatives, NAFSCOL-Kaski and NAFSCOL-Kabhre by contributing to their increased turnover. The research objectives were to assess the financial, viability and social biodiversity impact of the approach cf. the project description in *annex 1*.

The pilot project ran from 2003-2004 and had two phases. During phase 1, the pilot project was prepared and implemented. Small bags were designed, produced and packed with tree seed from five different fodder species. Agro-vet dealers located in all the different regions of Nepal sold the bags. During phase 2, lessons learned from the pilot project were collected and analysed.

Distribution channel: the pilot project confirms that agro-vets can work as channels for reaching small-scale tree planters. There is scope for developing the market further through advertisement and by targeting FUG more directly.

Species: the project included five fodder tree species. The choice of these species was appropriate in the sense that the species sold well. Dealers and customers suggested more species to be included.

Size of bags: two sizes of bags were produced and distributed with a view to testing which of them would be the most suitable. The smallest bags contained seed for 50 seedlings, the larger bags for 500. The smallest size appeared to be the most suitable, especially for private nurseries, farmers and other small-scale tree planters. The larger size was useful but not required for targeting large-scale tree planters.

Design: dealers and customers appreciated the aluminium material and the colourful and attractive design of the bags. The design and the dealers helped convincing the customers to buy the seed.

Information on the bags: the respondents found that the information printed on the bags was useful, but requested additional information on sowing season. Some dealers had ordered a second lot of small bags. These bags were not packed properly, which may have implied loss of credibility.

Guidelines on germination: guidelines on how to make the seed germinate were elaborated as part of the project. Brochures containing the guidelines were added to the bags and distributed to dealers and other interested persons. Only few of the interviewed customers consulted the guidelines. These customers were literate and had

some previous experience with tree seed. Experienced nursery managers did not need the guidelines. Seed users without experience and little or no education needed the guidelines but did not (bother to) understand them. Dealers required more knowledge and skills to be able to advise their customers.

Price: the agro-vet dealers and their customers found that tree seed in small bags was cheap. The co-operatives and some of their regular customers found that the seed in small bags was expensive. This was probably because they could compare with the cheaper price of loose seed, which they are used to buy. Nevertheless, almost all the bags were sold. The price was lower than actual costs. This is not financially viable, but the pilot study indicates that there is scope for increasing the price.

Sustainability: if the co-operatives decide to distribute tree seed in small bags through agro-vets after the end of the pilot project, they will have to solve two main problems. The first is to find funds for initial investments for new species. The second is to find a way of settling accounts regularly with agro-vet dealers scattered all over Nepal.

There are at least three options for finding funds for initial investments for new species: to apply to NARMSAP for continued funding, to borrow the money from NARMSAP or from a bank or to delegate production and distribution of small bags to one of the agro-vet dealers.

Seen from the perspective of NARMSAP's general budget, the initial investment required to include new species is not considerable, but this model has the risk of making the co-operatives dependent on funding and thereby hampering financial sustainability. The model of borrowing the money is hardly feasible given that the co-operatives are not yet fully confident with the private market, the small bag approach, nor with taking the risk of borrowing money. None of these models solve the problem of settling accounts with agro-vet dealers, but the investment could include a membership of SEAN, which is an experienced network of vegetable seed co-operatives in Nepal.

The third model is for NAFSCOL to delegate the task of producing and distributing the small bags to a dealer. The co-operatives as well as the dealers can draw on the technical expertise of TISC.¹ This model implies that it is an agro-vet dealer, not the co-operative, who gets the profits from producing the bags. On the other hand, the model eliminates both the problems of finding funds and settling accounts. Moreover, it draws on the relative strengths of the co-operatives (collecting quality tree seed), TISC (technical knowledge), and the dealers (packing, marketing and network distribution). Finally, it takes the financial risk away from the co-operatives.

Conclusion: the pilot project was a study of a commercial distribution system targeting small-scale tree planters operating with small quantities of seed and using existing distribution networks. The project was carried out during a relatively short period of one year. The project included 5 key species, which are much used and relatively easy to handle. Within this framework, the pilot project indicates that the approach of distributing tree seed in small bags has the potential of reaching small-scale tree planters and to become financially viable but also that there is need for adjustments for the approach to get real impact.

¹ *Dicpal Trading in Kathmandu suggested this model.*

Summary of recommendations

1. The co-operatives are recommended to continue selling tree seed from their own outlets in combination with agro-vets in order to reach different types of customers.
2. FUG can be informed about the approach or they can be targeted directly with sale of small bags through relevant organisations and networks, e.g. FECOFUN and CPFC.
3. Advertisement for tree seed in small bags can be done low cost by linking up with NARMSAP's forest extension radio programmes. Activities aiming to develop the market should be done with due consideration to NAFSCOL's (limited) capacity to meet increasing demands for tree seed.
4. All stakeholders, including agro-vet dealers, should be consulted on species selection for a next phase.
5. In the future, emphasis should be on small bags only, or on small and large bags in combination.
6. For new species, the small bags could be produced with a less fancy and less costly design, but the value of a professional and attractive look should not be underestimated.
7. The bags should include photos of the trees to avoid mistaking the content for flowers. Characteristic flower pictures could be inserted for identification.
8. TISC should do a small research to document seed viability and cost-effectiveness of different packing materials. The results will be of interest to producers, sellers and users of tree seed in Nepal and elsewhere.
9. Information on sowing season should be added to the bags. Packing, sealing and stamping must be done properly to ensure a professional look of the bags.
10. The seed handling guidelines must be redesigned to attract the attention of even illiterate seed users.
11. TISC, who has expertise in tree seed, should take responsibility to revise the guidelines and elaborate guidelines for new species as part of its regular tasks. CPFC, who has the expertise in extension work should design and test the guidelines in close collaboration with TISC. NARMSAP is required to approve relevant budget lines before these activities can be carried out.
12. In addition to distributing the guidelines inside the small bags, TISC could distribute them as an independent extension material, for instance, through CPFC, DFO, FECOFUN, and other networks relevant to small-scale tree planters.

13. TISC and the co-operatives may offer training to agro-vet dealers free of charge. A cheaper option is for TISC or the co-operatives to pay regular visits to the dealers following up on problems related with selling and handling tree seed. TISC could distribute the booklet "Species Leaflets for 131 Woody species" to the dealers as soon as the Nepali version is completed.
14. The price of tree seed in small bags should be raised to cover cost including commission/profits. If, contrary to expectations, customers are not able or willing to pay the higher price, then the approach should be reconsidered. NARMSAP could assist the co-operatives in determining a realistic price.
15. Producers should acknowledge that quality packing and increased access to tree seed have certain values, and that some customers are willing to pay the price.
16. During the project, TISC stopped its practice of distributing tree seed free of charge for the five selected species. The general practice among organisations in Nepal of distributing tree seed and seedlings free of charge may, to a certain extent, conflict with the present commercial distribution of small bags. TISC may take the initiative, e.g. by organising workshops for these institutions to come to a consensus on how to balance between free and commercial distribution.
17. If the co-operatives decide to delegate production and distribution of the small bags to one of the agro-vet dealers, the model requires as a minimum a good written agreement. Such an agreement should address issues of payment, price, profits, branding, limitations in a dealer's right to purchase seed from other sources, etc. The agreement should be made valid for a limited time-period only. NARMSAP staff with knowledge about law and marketing could assist the co-operatives in negotiating with more dealers and formulating the agreement with one of them.
18. NARMSAP could support NAFSCOL to become more confident with and skilled in marketing. This would benefit their activities no matter which model they will follow.

1. Introduction and background

Farmers constitute a large part if not a majority of tree planters (Simons 1997). Many rural people depend on products from trees. Even marginal improvements in productivity can be important to their livelihoods (Foster and Kjaer 1995, Kjaer and Nathan 2000). Applying high quality planting material is one way to improving stability and productivity of tree plantation (DFSC 2000).

National tree seed programmes with the objective to supply high quality tree seed exist in most countries, but these programmes usually have difficulties in reaching farmers and other small-scale tree planters (Aalbæk 1997, ICRAF 2000). One of the problems relates to the fact that the minimum amount of seed distributed by tree seed centres at a time is usually far higher than what is needed by individual small-scale farmers. Another problem relates to distance: It does not pay for small-scale tree planters to travel to National Tree Seed Centres in order to get hold of small amounts of seed (Nathan 2001). As a result farmers have problems getting tree seed of good quality, of special tree species or of any tree species they need. Hence, there is a need for new approaches to distribution of tree seed (Place and Kindt 1997). This report is the result of a test of such new approach: Commercial distribution of tree seed in small bags through shops dealing with horticultural and agricultural seed. In Nepal, these shops are known as agro-vets (Joshi 2000).

The method of distributing vegetable seed in small portions and its advantages to small-scale farmers have been discussed, for instance, by Sperling *et al.* (1996). On tree seed, the idea was conceived, e.g. in its present form, in a concept note by Nathan and Thomsen (2001), discussing advantages, problems and limitations of packaging tree seed in small bags and distributing it through commercial channels. Although referring mainly to Tanzanian conditions the points raised appear to be valid for other countries as well, including Nepal.

Analyses of the seed market in Nepal have shown that most tree seed is used with little regard to quality, and that the best fodder species are hardly marketed at all (Lillesø *et al.* 2000). The Tree Improvement and Silviculture Component (TISC) of the Danida supported Natural Resource Management Support Programme (NARMSAP) has supported a decentralised tree seed supply system through two tree seed co-operatives, NAFSCOL-Kabhre and NAFSCOL-Kaski.

In 2001 and 2002, a marketing and networking consultancy was carried out for TISC. The objective was to improve seed distribution to forest user groups and farmers, e.g. by developing guidelines for appropriate marketing by the co-operatives (DFSC 2000). The consultant concluded that seed sales had increased steadily since the inception of the two tree seed co-operatives and that in particular one of the co-operatives (NAFSCOL-Kabhre) was close to reaching the break-even point. Still, there was a need to increase cost-effectiveness and turnover for the two co-operatives. There was also a need for the two co-operatives to target a more diversified market, as the main customers were HMG, INGO and NGO. It was suggested to introduce a quality control/certification system and brand name packaging (Nicholson 2001).

In 2001, it was decided to test commercial distribution of tree seed through agro-vets. An application was submitted to and approved by NARMSAP. The pilot project was planned as an action-research type of project and was to be carried out by TISC in collaboration with the two NAFSCOL co-operatives. Danida Forest Seed Centre (DFSC), which later became a part of the Danish Centre for Forest, Landscape and Planning, KVL (FLD), was the Danish partner on the project. The project description is attached as *Annex 1*.

2. Objectives

The development objectives of the pilot project were (a) to increase access to high quality tree seed for farmers, forest user groups and other small-scale tree planters², and (b) to support the operations of the tree seed co-operatives in Kaski and Kabhre by contributing to their turnover. The research objectives were to assess the financial viability and the social and bio-diversity impact of the approach.

Due to the limited time and scope of the project (one year), it was decided not to undertake the objective of testing bio-diversity impact. 'Social impact' and 'financial viability' were understood in simple terms of whether the seed reaches farmers and other small-scale tree planters, and whether the approach is likely to become profitable.

3. The two phases of the project

The pilot project ran from 2002-2004 and had two phases:

- Phase 1 was a phase of preparing for and implementing the approach of selling tree seed in small bags through agro-vets in all regions of Nepal.
- Phase 2 was a follow up phase. Following up was done partly with a view to support the market operations of the co-operatives suggesting improvements based on lessons learned, partly with a view to reach conclusions regarding social impact and financial viability.

3.1 Methods of phase 1

Phase 1 started up with a workshop for all major stakeholders (TISC 2003). The four partners on the project signed a partnership agreement. A local consultant from SEAN carried out a marketing study with TISC staff. They identified 16 dealers to become involved with the project including the two outlets run by NAFSCOL, and made suggestions on the best method for packing the tree seed. The marketing consultant designed the small bags (Hada 2003).

² 'Quality seed' refers to seed of good physiological and genetic quality. Physiological quality improves seed germination. Genetic quality improves desired inherited traits such as good form, growth and production.



Figure 1. Photo of small bags for four of the five selected species

The bags were made of aluminium foil and the design was colourful and attractive. The local and botanical name of the species, the name of the co-operatives, and photos of the flowers of the trees were printed on the front of the bags cf. figure 1. Information about the contents was printed on the backside including purpose of the species, weight of seed, number of plants to be germinated from the seed, price, packing date, and date of expiry. Moreover, the bags were provided with the name, address and telephone number of Department of forest/TISC for technical support, cf figure 5.

TISC and the two tree seed co-operatives selected five fodder species to be sold in small bags. The species are listed in Table 1. They were selected because they are indigenous, have many different uses, and have relatively small and orthodox seed which are easy to handle, store, and germinate. Moreover, previous experience by TISC and NAFSCOL shows that these species are in demand.

Table 1. List of species included in the pilot project

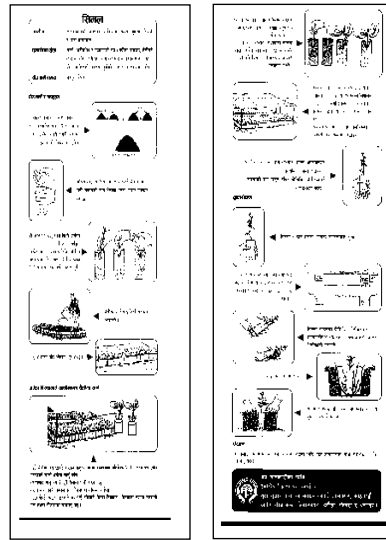
Local name of species	Latin name	Seed required for 50 plants (g)	Seed required for 500 plants (g)
Kalo Siris	<i>Albizia lebbek</i>	25	250
Nimaro	<i>Ficus auriculata</i>	2	20
Raikhainyu	<i>Ficus semicordata</i>	2	20
Simal	<i>Bombax ceiba</i>	10	100
Tanki	<i>Bauhinia purpurea</i>	50	500

The partners decided to distribute two sizes of seed bags, small bags containing seed for approximately 50 seedlings and larger bags containing seed for approximately 500 seedlings. The purpose of having two sizes of bags was to test which size would be most suitable for commercial distribution. For instance, it was supposed that one group of potential customers (small-scale tree nurseries) would need to grow more than 50 seedlings at a time.

It was important for the project that the content of the bags was defined in terms of number of seedlings. Small-scale tree planters cannot be expected to know how many seedlings can be grown from a certain amount of seed from each species. Moreover, they are likely to be more interested in how many seedlings they can grow than in knowing the weight of the seed.



Figure 2. Examples of guidelines (two designs)



TISC/FLD elaborated two types of brochures containing simple guidelines on how to make the seed germinate for each of the five species and on how to transplant the seedlings. One type of brochure was printed on thick colourful paper and distributed to the dealers and other stakeholders. The other was printed in black and white on thin paper and added to the inside of the bags. Figure 2 shows the two designs. Directions for elaborating the guidelines and an example for *Kalo siris* are shown in *annex 2*.

In total, 15 dealers participated in the project. These dealers included the two co-operatives themselves, 13 agro-vet dealers, one recently formed tree seed co-operative in the Eastern Region of Nepal, and one forest extension programme. One more agro-vet dealer had been selected for the project but could not participate in the project as planned. The two co-operatives retained some of the bags for sale through their own outlets in Kabhre and Kaski. They and TISC distributed the rest of the seed bags to the participating 13 commercial dealers in all the different regions of Nepal by courier (bus). The dealers and their locations are listed in Table 2 and illustrated in figure 3.

Table 2. List of dealers involved with the project

Name of dealer	District	Region
Das Trading Concern	Dhanusa	Central region
Terai Private Forest Development	Dhanusa	Central region
NAFASCOL-Kabhre	Kabhre	Central region
Dicpal Trading, Kalimati	Kathmandu	Central region
GM Agro Vet	Kathmandu	Central region
Bikash Seed Store, Hetauda	Makwanpur	Central region
Ilam Seed Co-operative	Ilam	Eastern region
Krishi Vatika, Dharan	Sunsari	Eastern region
Krishak Sahayog Kendra, Dhangadhi	Kailali	Far western region
Rural Livestock and Agro Vet, Dhangadhi	Kailali	Far western region
NAFASCOL-Kaski	Kaski	Western region
Rakshyak Agriculture Equipment Store	Kaski	Western region
Unnati Agro Vet	Kaski	Western region
Siddhartha Seed Store, Bhariaba	Rupandehi	Western region

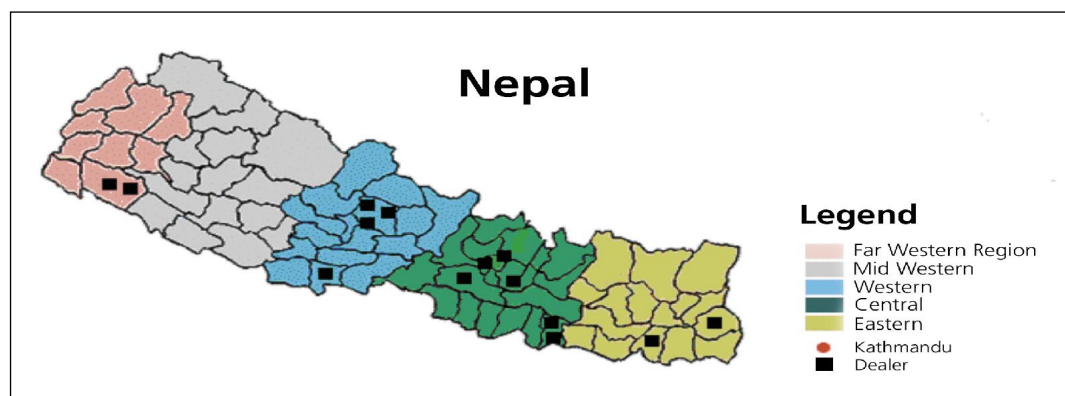


Figure 3. Map of Nepal showing location of dealers involved with the project

The coloured brochures and a board designed by a ranger in TISC for displaying the bags were distributed to each dealer together with the seed bags. The board can be seen in the middle picture of Figure 4. TISC bought the seed to be packed in the small bags at the co-operatives, and the bags were distributed to the dealers on commission. Hence, the co-operatives and the dealers ran no financial risk by participating in the experiment.



Figure 3. Agro-vet shops in Makwanpur, Dhanusha, and Kaski. Please note the board for exposing the small bags on the desk in the middle picture

3.2 Methods of phase 2

Phase 2 was designed to follow up on lessons learned through phase 1. Lessons learned were approached in terms of the following questions:

- How many bags were distributed and sold, and were there any farmers and other small-scale tree planters among the customers?
- Was the choice of species appropriate?
- Was the size of the bags suitable?
- Was it the right design and material?
- Was the information printed on the bags sufficient?
- Were the guidelines helpful to dealers and customers?
- Was it the right price?
- How should production and distribution be organised after the end of the pilot project?

The follow-up study was organised as a questionnaire survey combined with in-depth interviews. The questionnaires were distributed to all the dealers together with the small bags, i.e. in the beginning of phase 2. The dealers were requested to fill in a questionnaire for each customer. The main purpose of 'the Dealer Survey' was to keep track of how many bags of each size and species each customer bought. Moreover, it was the aim to get a preliminary impression about the type of customers, and to be able to locate them for the purpose of follow-up interviews. Assuming that the agro-vet dealers would not have much time for filling in questionnaires, the questions were kept as few and simple as possible. A copy of the English version of the questionnaire is attached as *Annex 3*. TISC rangers collected the questionnaires.

In-depth interviews included nine dealers and eleven customers. The visits and interviews were prepared and carried out over a period of two weeks in November-December 2004. The responding dealers included six agro-vets, one extension project and the two co-operatives. The responding customers were identified on the basis of the Dealer Survey. They were selected mainly among those who could be classified as farmers and other individuals. One customer interviewed was a DFO nursery manager. The interview team included two of the authors of this report. The interviews were carried out on location that is, in the shops of the dealers and in the homestead/working place of the customers in and on the route between Kathmandu, Hetauda, Dhanusa and Pokhara. The main purpose of having in-depth interviews was to get direct feedback from dealers and customers on the various aspects of lessons learned.

The follow-up study moreover includes written information provided by the tree seed co-operatives and TISC, information provided by TISC staff, and comments provided by staff from other NARMSAP components who took part in a wind-up meeting at TISC.

3.3 Major constraints of phase 1 and phase 2

Initiation of Phase 1 was delayed due to the need for adjusting the project to the main sowing season (March-April). Some further delay was caused by the co-operatives facing problems to procure the required amounts of seed in time. This meant that the small bags were distributed to the dealers in the middle instead of in the beginning of the sowing season.

In NAFSCOL-Kaski, the staff member responsible for the pilot project left without passing his knowledge about the project to other staff members. This constrained their involvement. As a result, NAFSCOL-Kaski distributed and sold only few small bags, cf. section 4. The other co-operative, NAFSCOL-Kabhre, was able to work according to the plans. This report therefore relies mainly on results from the activities of NAFSCOL-Kabhre.

During the project period, Nepal was seriously affected by the Maoist Insurrection. The two co-operatives reported that lack of security was a constraint to seed collection and distribution especially in the Far Western and in the Eastern Region.

For phase 2, the Dealer Survey resulted in reports covering 1002 (69%) of 1461 bags sold. This was more than expected, taking into consideration that the respondents are businessmen participating in research for the first time. The follow-up study indicates high reliability of the Dealer Survey, as it was actually possible to locate customers on basis of the information from the survey, and because the information corresponded to the information gained through the in-depth interviews.

Time constraints and the large distances between the customers resulted in the low number of customers and dealers who could be visited. Interviews could be carried out with customers only in the Central and Western Region, in areas located less than two hours drive from the highway, and in areas that were not high-risk due to the Maoist insurrection. Still, the in-depth interviews did provide some interesting information that complements the Dealer Survey, and which – although based on a relatively small number of interviews - can be assumed to have some general validity, cf. section 5.

4. Lessons learned

An analysis of individual questions pertaining to the project design and implementation, cf. section 3, gave the following results.

4.1 How many bags were distributed and sold, and were there any farmers and other small-scale tree planters among the customers?

NAFSCOL-Kabhre procured, packed, sealed and stamped in total 1467 bags. They and the agro-vet dealers together sold 1395 (95%) of these bags. NAFSCOL-Kaski distributed 141 bags and sold 66. During the follow-up study, all the agro-vet dealers apart from one informed that they had sold the bags relatively easily, and customers had asked for more. The dealers are optimistic that provided they receive seed timely they can sell even more. However, it is a new market since people usually buy seedlings, and it will be a process to change peoples' habits.

Table 3 shows how many customers from different categories bought tree seed in small bags directly from the two co-operatives (NAFSCOL) and from the other dealers respectively. Table 4 shows how many small bags NAFSCOL and the other dealers sold to the different categories of customers.

Table 3. Types of customer³

Category of customer	NAFSCOL	Other dealers	Total n	Total %
Farmers and other individuals	2	50	52	37
HMG and IGO	16	7	23	16
NGO	14	3	17	12
Not known	3	13	16	11
Private enterprises excluding private nurseries	10	5	15	11
Private nurseries	1	12	13	9
Multilateral organisations	3	0	3	2
FUG and other community based organisations	2	0	2	1
Total	51	90	141	99

Source: Dealers Survey

It appears from table 3 and 4 that the main customers to NAFSCOL were HMG, IGO, NGO and private enterprises. Only two farmers/other individuals and one private nursery were customers to NAFSCOL. Together, they bought 5 bags. When looking at the other dealers, the picture is different. Here, table 3 and 4 shows that farmers/individuals constitute the major part of the customers (50 out of 90) and that this category of customers bought more than one third of the small bags. Moreover, 12 private nurseries were customers buying 45 bags. It appears from the tables that organisations and enterprises were also important customers to the agro-vets.

It can also be noted from the two tables that only two community-based organisations/FUG bought tree seed in small bags, that they were customers to NAFSCOL, and that they bought a relatively large portion of small bags, in total

³ Tables 3 and 4 are based on results from the Dealer Survey. The dealers noted the name and organisation on behalf of the customer who bought the seed. TISC/FLD subsequently defined the categories of customers.

92. It can be added, that two of the visited customers had private forests, while the rest of them had farm lands only.

Table 4. Number of bags sold per category of customer

Category of customer	NAFSCOL	Other dealers	Total	%
National and international government organisations	296	55	351	35
Private enterprises excluding private nurseries	117	59	176	18
Non Governmental organisations	124	16	140	14
Farmers and other individuals	3	114	117	12
Forest user groups and other community based organisations	92	0	92	9
Not known	28	44	72	7
Private nurseries	2	45	47	5
Multilateral organisation	7	0	7	1
Total	669	333	1002	100

Source: Dealer survey

The responding agro-vet dealers all informed that small-scale farmers constitute the main part of their customers. Moreover, these dealers agreed that there is scope for further developing the market for tree seed for instance through advertisement: ‘people are not aware about the approach’ or ‘are not yet accustomed to using tree seed’.

It can be concluded, that HMG, NGO and private enterprises were the main customers to the co-operative outlets, while farmers/individuals and private nurseries constituted an important part of customers to the agro-vets. The in-depth interviews indicate that there were small- as well as large-scale tree planters among the customers, who were classified as farmers/individuals, but it cannot, on the basis of available data, be concluded at what ratio. In any event, the results indicate that agro-vets can work as channels for reaching small-scale tree planters; that the project at this initial stage had some success reaching the key target group: small farmers; and that the channel of distribution matters.

- It is recommended that the co-operatives continue selling tree seed from their own outlets in combination with agro-vets in order to reach different types of customers.
- FUGs can be made aware about the approach, or the co-operatives can target them directly through relevant organisations and networks, such as FECOFUN and CFPC.
- Advertisement for tree seed in small bags can be done at low cost by linking up with NARMSAP’s forest extension radio programmes. Activities aiming to develop the market should be done with due consideration to NAFSCOL’s (limited) capacity to meet increasing demands for tree seed.

4.2 Was the choice of species appropriate?

Table 5 is based on written information from NAFSCOL-Kabhre. It shows that the five species was a good choice in the sense that 94-100% of the small bags were sold. Some of the respondents made the point that the choice of Simal was not appropriate because it is a protected species under government rules. Nevertheless it appears from table 5 that all Simal seed was sold.

Table 5. Species distributed by NAFSCOL-Kabhre and sold by all dealers

Species	Number of bags distributed	Number of bags sold	Bags sold %
Tanki	232	217	94
Kalo Siris	177	169	95
Simal	75	75	100
Raikhanyiu	588	563	96
Nimaro	395	371	94
Total	1467	1395	95

Source: NAFSCOL-Kabhre, TISC 8/10/2004

Results from the in-depth interviews with the agro-vet dealers suggested that more different species should be packed and sold in small bags in the future: 'Why only five species? There should be more'. After having received the first lot of tree seed in small bags, three of the responding agro-vet dealers had ordered tree seed from other species such as Ipil-ipil (*Leucaena leucocephala*), and Lapsi (*Choerospondias axillaris*). They all complained that this seed had not arrived in time for the sowing season, and that the quality of packing was not good (cf. below section 4.4).⁴ For that reason, they had not been able to sell it.

The customers generally approved of the five selected fodder tree species, but they too requested for more species. Suggestions and preferences differed from individual to individual and from region to region.

It can be concluded that the five species was a good choice, and that there is scope for including more different species for distribution in small bags in the future. Which species to include should be subject to a demand analysis.

- All stakeholders including agro-vet dealers should be consulted on species selection for a possible next phase of the project
- The results of the pilot study are not useful for assessing which species should have priority. It is recommended to hear all stakeholders before selecting new species. The agro-vet dealers are among the important stakeholders and know much about their customers' preferences.

⁴ The reason for this delay is not clear: The dealers may have ordered the seed too late, the co-operatives may have reacted too late, or there may have been a problem of communication. The co-operatives complained that some dealers had ordered such small amounts of tree seed that it was too costly to send by courier.

4.3 Was the size of the bags suitable?

The cooperatives and the dealers dealt with two sizes of seed bag.

Table 6 shows the number of small and large bags distributed by NAFSCOL-Kabhre. NAFSCOL-Kabhre distributed many more small bags (1217) than large ones (250) and that relatively more small bags (97%) had been sold compared to the large ones (85%).

NAFSCOL-Kaski informed that the 141 bags they had distributed included 98 small and 43 large bags. In total, 66 bags were sold including 64 small and 2 large bags (65 % : 5 %). It is not known why so few large bags were distributed.

Table 6. Number of seed bags distributed by NAFSCOL-Kabhre and sold by various dealers

Species	Distributed	Sold	Sold %
Total small	1217	1182	97
Total larger	250	213	85
Total	1467	1395	95

Source: NAFSCOL-Kabhre, TISC 8/10/2004. Small bags contain seed for 50 seedlings, large bags for 500 seedlings.

The results from the Dealer Survey indicated that the customers were slightly more interested in buying the small seed bags rather than the large ones. This difference is not very significant, but the in-depth interviews confirm the impression that agro-vet dealers and customers prefer small size bags: 'The small size is the right size. My customers are mainly small-scale farmers. They do not need large amounts of seed'. The dealers assured us that even small-scale nursery owners prefer small bags. One of the dealers explained this in the following way: 'this is because the small bags enable nurserymen to germinate and sell one portion before sowing the next'. The dealer, who was the exception (cf. footnote 4), was of the opinion that the large bags were useful but only for those among his customers who were organisations. Hence, he preferred to have the combination of small and large bags. None of the dealers recommended other sizes than those defined by the pilot project.

An interview was carried out with a DFO nursery manager, who is a customer to NAFSCOL-Kabhre. The manager did not care whether the seed was packed in small or large packages as long as she could access good quality seed. She found that, in general, the co-operatives provided a high quality of tree seed, and that the quality has improved over the years.

Table 7 is based on results from the Dealer Survey. The table shows how many bags of different sizes have been sold to different categories of customers. It clearly appears that farmers and other individuals as well as private nurseries, have preferred the small to the large bags. Other types of customers' preferences are less clear but also less important in this context.

Table 7. Which types of customers have bought which size of bags?

Type of customer	Small bags	Large bags	Total
Government organisations	155	196	351
Private enterprises excluding private nurseries	121	55	176
NGO	39	101	140
Farmers and other individuals	116	1	117
Community based organisations	35	57	92
Not known	58	14	72
Private nurseries	46	1	47
Bilateral organisations	0	7	7
Total	570	432	1002

Source: Dealer Survey

It can be concluded that the small size of bags was suitable for targeting private nurseries, farmers and other small-scale tree planters. The large size was useful but not required for targeting organisations. It is relatively costly to produce both types of bags, cf. below section 4.7.

- In the future, emphasis should be on small bags or a combination of small and large bags.

4.4 Was it the right design and material?

The dealers approved of the design, which they found very useful for marketing purposes. They all found that packing and germination are the single most important factors in convincing the customers about the quality of the seed. During the follow-up study, a seed exhibition was held in Kathmandu, and a market was held in Pokhara. The bags proved very useful for the co-operatives for the purpose of promoting tree seed on these occasions.

The customers, too, liked the design of the bags. Two of the responding customers who were small-scale farmers had not opened the seed bags at the time of interview. At that time, the seed had expired according to the printed information. They may have bought the seed because the dealers and the attractive design had convinced them to do it. A participant at the debriefing meeting made the comment that the photos printed on the front could cause people to mistake the content for flowers instead of tree seed. In this respect the design of the bags may have been almost too attractive.

The agro-vet dealers preferred aluminium foil to plastic for the purpose of storing the seed, but the co-operatives called for an actual test of viability of tree seed in different types of packing. Due to time constraints such tests were not undertaken.

It can be concluded that there was great satisfaction with the material and design of the small bags among dealers and customers. In some regards, however, the design may have been too attractive: Some seed bags may have been bought because of the wrapping rather than the content!

- For new species, the small bags can be produced with a less fancy and less costly design. Still the value of a professional and attractive look should not be underestimated.
- Photos of the trees and their flowers could be printed to avoid customers mistaking the contents of the bags for flowers.
- TISC could test and document seed viability and cost-effectiveness of different packing materials. The results will be of interest to producers, sellers and users of tree seed in Nepal and elsewhere.

4.5 Was the information printed on the bags sufficient?

All respondents found that the information printed on the bags was largely sufficient and relevant, but some of them called for additional information on sowing season.

Some dealers ordered a second lot of tree seed in small bags, but had not sold them due to late arrival of the seed cf. section 4.2. In one of the agro-vet shops, it was observed that the small bags of the second lot contained much more seed than was stated on the bags in print. The actual weight and other vital information such as date of expiry were added by hand writing, and there was no brochure inside. The different looks of the first and the second lot of small bags is seen in Figure 5.



Figure 5. Photos of small bags, information printed on the backside. Left: A seed bag where information has been correctly printed and filled. Right: A bag from the second lot, filled with a lot more seed and where the information is corrected by hand.

The different packing may be a result of the co-operative staff's good intentions of saving costs by adding more seed to the bags, which they consider expensive. However, the dealer assured that even if the amount of seed inside the bags seems small (it also does for some vegetable seed) and even if the bags seem costly in relation to their contents, it is more important that the customers feel confident about the quality of the seed. This depends on the professional look of the bag and actual germination of the seed. If the bags are not packed properly, it may result in loss of credibility.

- Information on sowing season should be added together with the other information.
- Packing, sealing and stamping must be done properly to ensure a professional look.

4.6 Were the guidelines helpful to dealers and customers?

The interviews of customers revealed that only two interviewed customers had consulted the brochures. These two had been through secondary school, and had some, but limited, previous knowledge about nursery techniques. Both found the brochures were very helpful although some words were difficult to understand. Both of them had followed the guidelines step by step and the seed germinate nicely. The experienced seed users had not even bothered to look at the brochures. None of them had problems in germinating the seed.

The rest of the interviewed customers had less education and less experience with nursery techniques. Some of them were illiterate but had literate members in their families. Although they had noticed the leaflet inside the bag they had made no effort to read or understand the contents. For these customers, the guidelines were too long, contained too much text and were not sufficiently attractive to catch attention. Only one of the visited small-scale tree planters had made the seed germinate.

The dealers appreciated the guidelines, but called for more information and skills as they did not feel sufficiently confident to advise their customers in nursery techniques. Some dealers suggested a booklet with more detailed information. Others made requests for training.

The interviews indicate that the leaflets were helpful only to a few. Moreover, the interviews indicate that at least some small-scale tree planters need more knowledge and skills about simple nursery techniques, and that this knowledge is quite decisive to the real impact of the project in terms of enabling the customers to germinate the seed.⁵ The most convenient and realistic option for customers who need more knowledge on nursery techniques is to get it from the seed dealers at the time of buying the seed and/or from leaflets added inside the bags. This requires the leaflets to be revised, and the dealers to be provided with more knowledge.

For targeting small-scale tree planters, the brochures must be simplified to contain less wording, they must be redesigned to draw the seed users' attention and raise their curiosity about the contents. This does not necessarily mean that the leaflets need to become more expensive. One option could be, for instance, to design them as a comic strip – but other options may prove to be more feasible.

- It is recommended that TISC takes responsibility to revise the guidelines and to elaborate guidelines for new species as part of its regular tasks. This will support the general efforts of TISC to direct its activities more towards FUG and small-scale tree planters (e.g. Danida 2001).
- In carrying out this activity TISC, who has the expertise in tree seed, should collaborate with the Community Forest Component of NARMSAP, who has the expertise in extension work. The two components should combine their skills in designing the leaflets, testing them in the field, revising or redesigning and testing them again until the most feasible level of information and the most attractive and cost-effective designs are found. This would

⁵ *It cannot be decided from this study whether this reflects the general picture in Nepal.*

also cause TISC to become more involved in collaboration with other NARMSAP components (e.g. HMG/Danida 2003).

- The new guidelines should be distributed inside the small bags, but may also be distributed independently as extension material through CPFC, DFO, FECOFUN, and other networks relevant to small-scale tree planters.
- The dealers' ability to advise the seed users is probably even more important than the leaflets. It could be considered that TISC and the co-operatives offer a training course in nursery techniques to the agro-vet dealers. At the present stage, there is hardly any incentive for the dealers to pay for such training themselves. The income from the small bags is far from substantial and it is still uncertain whether the co-operatives want to continue the approach. Training free-of-charge will depend on the willingness of DANIDA/NARMSAP or other programmes to provide financial support.
- Another option, which may turn out to be cheaper, would be for the co-operatives to pay the dealers regular visits to follow up on specific problems in connection with selling small bags.
- TISC could distribute copies of the booklet 'Species Leaflets for 131 Woody species' to the dealers as soon as the Nepali version is complete.

4.7 Was it the right price?

The question whether it was the right price has at least two aspects to it. One aspect is whether the price covers actual costs. The other aspect is whether customers are willing and able to pay the price. Both aspects are decisive to whether commercial distribution of tree seed in small bags is likely to become financially viable.

4.7.1 What was the price, and did it cover costs?

Table 8 shows the break down of costs and the selling price of tree seed in small bags. In the table, 'Cost' is calculated as the sum of seed cost and cost of packing the seed. 'Seed cost' is all constant and variable costs of collecting the seed plus commission for the co-operatives and corresponds to the price of loose seed sold from the co-operative outlets. 'Pack cost' is the cost of producing and printing the bags and corresponds to the price paid per bag to the manufacturer. 'Commission' is for the dealers and constitutes 20% of 'Total cost'.

It appears from the table that the selling price for most of the selected species was determined at a lower level than total costs. The co-operatives reduced the price by reducing their own profit margin because they were worried that the customers would find the seed bags too expensive. This makes sense for the pilot project, as the co-operative would still earn from selling seed already paid by TISC. After project end this is of course not financially viable.

It should be noted that cost in table 8 does not include costs of packing, sealing and stamping the bags (staff and electricity), self-adhesive labels (see fig. 5) printing of the guidelines added to the inside of the bags, and distribution by courier. Nor does it include the costs of writing-off initial investments for producing the bags (cylinders, sealers, and stamps).

On the basis of available information it is not possible to determine exactly how much the seed bags should cost to cover all expenses. However, some considerations can be made. For the selected five species, there is a large surplus of bags, which can be used for the next couple of years. When it becomes necessary to print more bags for these species, costs will be reduced considerably, as printing is most expensive the first time. For the smallest bags, the manufacturer informed that the cost per bag for first time printing would be 6 NR (0,09 USD) while the costs would be 2,1 NR (0,03 USD) for reprints. The co-operatives need not invest in sealers and stamps, as they have been made available through the project. Packing of seed (staff and electricity) will add to the price but can be done by unskilled labourers supervised by co-operative staff. Transportation by bus will add to total costs, and if the co-operatives decide to include new species, new bags will have to be designed and printed. This requires initial investments.

Table 8. Price list of tree seed in small bags ⁽¹⁾

Species	Required Seed (g)	Seed cost ⁽²⁾	Pack cost ⁽³⁾	Cost (Seed + pack)	Factor for 20% Commission ⁽⁴⁾	Total cost ⁽⁵⁾	Selling Price
Raikhanyu small	2	10	6	16	0,8	20	18
Raikhanyu large ⁽³⁾	20	100	8	108	0,8	135	130
Nimaro small	2	6	6	12	0,8	15	13,2
Nimaro large ⁽³⁾	20	60	8	68	0,8	85	78
Kalo siris small	25	9,25	6	15,25	0,8	20	20
Kalo siris large	250	92,5	15	107,5	0,8	134	134
Tanki small	50	12,5	6	18,5	0,8	24	21
Tanki large	500	125	15	140	0,8	175	175
Simal Small	10	10	6	16	0,8	20	18
Simal large ⁽³⁾	100	100	8	108	0,8	135	126

Source: TISC/ NAFSCOL-Kaski

⁽¹⁾ At the time of writing, USD 1 = NR 72

⁽²⁾ **Seed cost** is the price that the co-operatives charge when selling seed by loose weight. This covers all variable and constant costs for procuring and selling the seed and profits for the co-operatives.

⁽³⁾ **Pack cost** includes the cost paid to the manufacturer for producing and printing the bags. For Raikhanyu, Nimaro and Simal, the large size bags were downsized to save the cost of an extra drum, but content was still enough to producing approximately 500 seedlings. Hence the lower cost of bags for these species.

⁽⁴⁾ **20% commission** for the dealers is calculated as $X = \text{Total cost} / 0,8$ where X is total cost including commission

⁽⁵⁾ Following costs are not included: Staff packing the seed bags (salaries and electricity), cost of printing the guidelines, transport by courier, and writing-off initial investments (cylinders, sealer, stamps, and self-adhesive labels).

It has been mentioned that the co-operative staff found the bags expensive, and did not like the customers to pay the higher price for the seed just because it was packed in bags. Also for that reason it is relevant to ask whether the customers were willing and able to pay the price determined for the tree seed in small bags.

4.7.2 Were the customers willing and able to pay the price for the small bags?

The bags sold well. This indicates that there were customers willing and able to pay the price, but not whether all types of seed users found that the price was fair and affordable. Follow-up interviews sought to clarify this.

Agro-vet dealers found that the tree seed in small bags was cheap: 'Even if you increase prices considerably, this will pose no problem on the sale. What really matters is that customers feel confident about the quality of seed. This depends on two things: appearance and germination'. The customers, too, found that the seed was cheap.⁶ Contrary to this, staff from the two co-operatives found the tree seed in small bags expensive and informed that some of their customers had preferred to buy loose seed because it was cheaper.

The different reactions of co-operative and agro-vet dealers and customers is probably because the co-operatives sell seed to regular customers who faced increased prices compared to loose seed. At the agro-vet shops, access to tree seed is a new option and customers cannot compare with the price of loose seed.

In support of this, one of the agro-vet dealers, experienced with vegetable seed projects from SEAN, recommended the co-operatives to decide on a realistic price, reflecting actual costs and commission, and then keep it constant. For marketing purposes he considers a realistic constant price is more appropriate than a low price that must be adjusted later on. According to him, customers get used to a certain price level.

In conclusion, the agro-vet dealers and their customers found that tree seed in small bags was cheap. The co-operatives found that the seed in small bags was expensive and some of their customers preferred loose seed to tree seed in small bags because it was cheaper. The small bags were sold at a price that did not cover costs. This was appropriate for the pilot project, but not financially viable after the end of the project. The pilot project indicates that there is scope for increasing the price at least for tree seed sold through agro-vets.⁷

- The price of tree seed in small bags should at least cover cost including commission/profits. NARMSAP could assist the co-operatives in determining a realistic price. If, contrary to expectations, customers are not able or willing to pay the realistic higher price then the approach should be reconsidered.
- The co-operatives may chose a less expensive design of the small bags to lower costs and thereby prices, but the value of a professional and attractive look should not be underestimated.

4.8. How should production and distribution be organised after the end of the pilot project?

During the pilot project, TISC/NARMSAP covered initial costs such as market surveys, design and production of small bags, guidelines for handling the seed, collection of seed, workshops, etc. The co-operatives had only few costs, such as delivering labour for packing and stamping the bags. After the termination of the project, the co-operatives can continue distributing the five selected species at a low cost because the project has left them with sealers, stamps and a large surplus of small bags.

If NAFSCOL decide to continue distribution of tree seed in small bags as well as to include more species, they face at least two main challenges. One is to raise

⁶ One of the farmers interviewed had bought tree seed in small bags from an agro-vet. She had a small shop in a village where she offered the bag for sale at twice the price.

⁷ The survey did not reveal if there are farmers who did not buy seed because it is too expensive.

the funds required for producing bags for new species. The co-operatives do not have these funds themselves.⁸ The other is to settle accounts with agro-vet dealers scattered all over Nepal.

There are at least three alternative options for raising funds. One is to apply to NARMSAP/TISC for funds, but this has the risk of making the co-operatives financially dependent and hence hampering their sustainability. Another option is to borrow the money from a bank, but this is hardly feasible given that the co-operatives are not yet fully confident with the private market, the small bag approach or with taking the risk of borrowing money. Neither of the two models solves the problem of how to settle accounts with the dealers. If NAFSCOL decide to go for one of them anyway, they could become members of SEAN, which is an organisation, having experience in solving related problems within the field of vegetable seed.

A third option is to apply a model similar to the one proposed by a dealer in Kathmandu, who suggested buying loose seed from the co-operatives and then produce, pack and distribute the small bags through his own network of 70 dealers located all over Nepal. He estimated that the network dealers would be able to sell at least 100 bags each. He would undertake the enterprise on two conditions, that he could get pictures of the trees and technical assistance from TISC and the co-operatives, and that he would be the only dealer to have such an agreement.

The latter model solves both problems of raising initial funds and settling accounts with dealers, but respondents from the co-operatives raised additional concerns. They fear that dealers will not be sufficiently concerned with seed quality and that dealers will procure tree seed directly from the farmers instead of from the co-operatives. Moreover, they fear that dealers do not want co-operative brand names on the packages or will misuse/not care for the reputation of the brand. Finally, there is a concern that profits for two extra layers of dealers will make seed more expensive for the end users.

It is clear that not all of the above concerns are equally well founded. It has been mentioned that seed quality has a physiological aspect as well as a genetic aspect. With regard to physiological quality, commercial seed dealers are likely to take interest because customers are willing to buy only if seed germinate. With regard to genetic quality, including such aspects as origin and source of seed, commercial dealers can be expected to be less concerned. This is because genetic quality shows only when the planted trees have matured. This can take years, and even then may be difficult to prove.

The argument here is that dealers *need not* be concerned with actual genetic quality of seed when they are packed in small bags. The users of a particular brand of tree seed (as for a particular brand of toothpaste) have no chance to understand or prove the actual effects of the product anyway. What is important for sale is that people believe in the product. Interviews carried out during the pilot study indicate that peoples' belief in tree seed depends on germination and appearance. Extension and advertisement can be seen as part of the effort to making people believe.

⁸ For each three new species packed in the same type of bag as for the pilot project one cylinder is required, which costs approximately 630 USD. The co-operatives cannot pay this amount.

Real impact will of course depend on whether the seed packed in bags is actually high quality which again depends on the producer. In this case the producer is NAFSCOL. If the producer cannot be trusted to deliver high quality tree seed it may be necessary to introduce other measures such as a control and certification system. It can be added that the small bag approach has the advantage that information and documentation including a quality or certification stamp can follow the seed all the way to the end user.

Still, there is the concern that the central dealer will bypass the co-operatives by procuring tree seed directly from farmers because they sell seed cheaper. The argument here is that it will usually be more convenient for the central dealer to buy seed from a professional co-operative in the vicinity than from random farmers scattered all over Nepal. Moreover, this will save transportation costs. Nevertheless, this and the issue of brand name should be explicitly addressed in an eventual written agreement between the dealer, TISC and the co-operatives. The central dealer could be provided with knowledge about how to handle tree seed. A further possible measure could be to include the central dealer as an object for quality control.

It is likely that end users will have to pay a higher price for the seed because of added profits to two layers of dealers. However, this concern should be weighed against a situation where small-scale tree planters have no access to high quality tree seed. Furthermore, if it should turn out that customers are not willing or able to pay the higher price, then the co-operatives can simply discontinue collaboration with the dealer without having suffered any considerable loss.

An additional concern is that if it is the dealers who pack and distribute tree seed it is they, not the co-operatives, who earn the major profits. On the other hand, if the model results in increased sale of tree seed, then the co-operatives will benefit too.

- In sum, it is recommended for the co-operatives to delegate the task of producing and distributing the small bags to a dealer along the lines suggested by the dealer in Kathmandu.
- NARMSAP staff with knowledge about the law and the private market should assist NAFSCOL in negotiating with more than one dealer and in making a good written agreement with one of them. This agreement should address issues such as payment, price, profits, branding, and limitations in dealer's right to purchase seed from others. The agreement should be renegotiable
- NARMSAP should support NAFSCOL to become more confident and skilled in marketing.
- Producers need to acknowledge that quality packing and increased access has a value in itself, and that some customers are willing to pay the price for the added value.
- NARMSAP/TISC should take initiatives to stop the general practice of various organisations in Nepal distributing seed and seedlings free of charge, among other things because this approach is not sustainable and distorts the market.

5. A few considerations about the reliability and general validity of the results

The research objective of this paper was to assess the financial viability and the social impact of tree seed in small bags on the basis of the experiences and lessons learned from a pilot project implemented in Nepal. When reading the results and conclusions from the project, it is important to keep in mind that it was undertaken and studied as a one-time experiment. This means that the results of the project can be analytically not statistically generalised.⁹

Likewise, with regard to the in-depth interviews, it can be noticed that it was possible to visit only few customers who were located in a relatively concentrated area. Nevertheless, most of the conclusions drawn from the in-depth interviews, such as those concerning customers' lack of understanding of the guidelines, their ideas about prices etc. are likely to be valid also to rural people living in remote areas, usually being less educated and who have little access to information. Still, the in-depth interviews must be viewed as embedded single case studies, which again can be analytically not statistically generalised.

There are factors, which may have affected some of the results systematically in one way or another. Thus, the dealers participated in the project on favourable conditions. They made 20% commission and took no financial risk by participating. This may have made them commend the project more than they would have done if the conditions had been less favourable, for instance as a result of negotiations between two actors in the private market. Some customers may have bought tree seed in small bags just to try out the new approach. Both factors may have led to overestimating the potential for selling tree seed in small bags.

On the other hand, the dealers earned very little from the project, which required extra work on their part like filling in questionnaires. This, together with the delayed start of the pilot project, the lack of involvement of NASCOL-Kaski, and the situation concerning the Maoist resurrection added constraints to the pilot project. Moreover, the bags were sold without much public relation. Seen in this light, it is more likely that the pilot project underestimates the potential for selling tree seed in small bags in Nepal.

The fact that almost all the distributed bags were sold, and that the questionnaires did not produce information on demand exceeding actual sale, means that the pilot-project is not useful for an exact assessment of the potential of the market. If the co-operatives decide to continue the approach they should therefore expand with care.

⁹ *Case studies, like experiments, are generalizable to theoretical propositions and not to populations or universes. In this sense, the case study, like the experiment, does not represent a 'sample' and the investigators goal is to expand and generalize theories (analytical generalization) and not to enumerate frequencies (statistical generalizations) (Yin 1990)*

Many other aspects than those coming out of the pilot project are relevant to discussing the financial viability and the social impact of distributing tree seed in small bags in general. Some aspects relate to the characteristics of the seed (e.g. is it orthodox or recalcitrant?). Other aspects relate to the market (e.g. is there a risk of declining turnover if tree planting increases to a certain level?) and yet others to the situation of the customers (such as land use and land tenure). A discussion of some of these issues is undertaken in Nathan and Thomsen (2001).

In sum, however, the pilot project indicates that the approach of distributing tree seed in small bags through commercial dealers has the potential of reaching small-scale tree planters and of becoming financially viable, but also that there is a need for adjustment if the approach is to get real impact. Hence, there is also a need for continuing the learning-by-doing process, which started off with the pilot project in Nepal.

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Annex 1. Project description

Proposal for a Research and Development Project on
Commercial Distribution of Tree seed in Small bags
To be implemented by TISC, Tree Seed Co-operatives, and DFSC

1. A brief description of the project

This proposed research and development project aims to test the financial viability of and the social and bio-diversity impact of commercial distribution of tree seed in small bags. The bags will be designed to include pictures of the trees in question. Guidelines for handling and using the seed will be printed at the back. The seed will be produced by the two tree seed co-operatives in Kaski and Kabhre. The most suitable methods of packing the seed and the most suitable channels for distribution will be explored as a part of the project. Emphasis will be put on selected fodder species, tree species with small seed, and seed that are viable.

2. Development objectives

The main development objectives of the project are

- (1) To increase access to high quality tree seed for small-scale tree planters, forest user groups and other tree planters by testing a particular approach to distribution.
- (2) To support the operations of the tree seed co-operatives in Kaski and Kabhre by contributing to increase their turn-over.

3. Background and justification

Analyses of the seed market in Nepal have shown that most tree seed is used without regard to quality, and that the best fodder species are hardly marketed at all. TISC has plans to support a decentralised tree seed supply system through two tree seed co-operatives in Kaski and Kabhre, and possibly also private seed suppliers that can co-ordinate and distribute quality seed of the best fodder species to address smallholders' demand (DFSC, 2000).

A marketing and networking consultancy was carried out in 2001 and 2002. The objective was to contribute to the improvement of seed distribution to forest user groups and farmers, among other things, by developing guidelines for appropriate marketing by the co-operatives (DFSC, 2000). It was concluded that seed sales have increased steadily since the inception of the two co-operatives, and that in particular one of the co-operatives is close to reach the break-even point. Still, there is a need to increase cost-effectiveness and turnovers. There is also a need for the two co-operatives to aim at a more diversified market and to aim more directly at smallholders, as HMG, INGO and NGO presently consti-

tute the main customers. Introduction of a quality control/ certification system and brand name packaging are among the suggested strategies to reach these aims (Nicholson, 2001).

In a concept note, which is attached to this application as *annex 1*, the approach of supplying smallholders with quality tree seed through commercial distribution of tree seed in small bags is discussed and recommended (Nathan and Thomsen, 2001). Although the note refers to the situation in Tanzania, many of the considerations are valid also in the case of Nepal. Thus, the approach of commercial distribution of tree seed in small bags has potential advantages for producers, distributors, and small-scale seed users in Nepal.

For producers and distributors, brand name packaging would be advantageous as part of a marketing strategy (Nicholson, 2001). Moreover, the small bags could be provided with information crucial to ensure the quality of the seed, such as information on where the seed can be applied geographically, date of expiry, etc. If, in the future, a certification system will become introduced, it will be a relatively simple matter to provide small bags with a certification stamp.

If tree seed were packed in small bags, handling of the seed and transport would become easier. This would enable the distributors to use different distribution channels. These channels could, for instance, include agro-vets who already have experience in distributing agricultural and vegetable seed in small bags to many kinds of users (Joshi, 2000).

For most small-scale tree seed users it is not convenient to travel far in order to get hold of small amounts of seed even if they are convinced that the seed is of premium quality. It would therefore be an advantage to them if they could purchase seed in small amounts, and if seed would “travel” to them instead of the other way around. Getting access to a greater variety of fodder species would mean that smallholders increasingly could plant trees according to their own needs and preferences. Finally, it would be an advantage to the users if the bags were provided with clear directions with regard to how to they should handle and germinate the seed.

Retail sale of tree seed in small bags may turn out to be a very efficient way for the co-operatives to provide small-scale users with good quality plant material, and through that to reach the aim of creating a more diversified market. This requires that genetic considerations are made in order for the right material to reach the customers, and that guidelines on the bags on how to germinate the seed and grow the plant are sufficiently clear,

Naturally, there are challenges to be met concerning the right choice of packing material and design. Moreover, there are certain aspects about quality insurance to be clarified, and considerations to be made concerning how to convey directions for use of the seed to small-scale users who are often illiterate. There is also a need to identify the most suitable channels of distributing the seed.

If good quality and effective distribution is to be ensured, it therefore requires

some investment at the beginning to make sure that a proper design and good guidelines for handling and distribution of seed are elaborated. These are areas where TISC and Danida/DFSC can contribute with expertise and resources to support the co-operatives in the initial phases.

4. Two phases of the project

The proposed project has two phases. Phase 1 is a phase of compiling and producing knowledge about seed and distribution and includes the implementation of a pilot project designing and producing samples of small bags and distributing them on a commercial basis. Phase 2 aims at establishing the prospects for the financial viability and social and bio-diversity impact of commercial distribution of tree seed in small bags based on the experiences from phase 1.

4.1 Phase 1

The first step to be taken in phase 1 is to select a number of tree species (10-15). Emphasis will be put on selected fodder species, tree species with small seed, and seed that are viable. Moreover, selection criteria will include the relevance of the species to small-scale farmers, forest user groups and other tree seed users, as well as the physiological suitability of the seed for distribution in small bags. The selection will be made by the two co-operatives and TISC at a meeting to be held in Kathmandu. DFSC will participate in the meeting. The selection will be made on the basis of existing knowledge including the results from the investigations of farmers' preferences, which have already been carried out by TISC (e.g. Lillesø, Dhakal, Jha and Aryal, 2000). The capacity of the seed co-operatives to meet an increased demand for the selected species in the future will also be taken into consideration.

The second step to be taken is to compile existing information about how to handle and germinate tree seed of the selected species. Much work has already been done by TISC on this aspect (e.g. TISC, 2000). Moreover, the most suitable methods of packing the seed considering physiological aspects will be investigated.

The third step is to examine and come up with recommendations as to what are the most cost-effective methods of packing and distributing tree seed. In this connection, the following questions will be addressed: Should packing be done by the co-operatives themselves, or is it more cost-effective to leave it to others? What are the most effective channels for sustainable commercial distribution of tree seed in small bags? Whom should co-operatives include in improving the effective supply of packaged seeds (e.g. agro-vet shops, FECOFUN, government organisations, or yet other types of organisations)? TISC in collaboration with DFSC and a local marketing expert will implement this part of the project drawing on the experience and opinions of the seed co-operatives and on the marketing and network study (Nicholson, 2002).

The fourth step is to select the knowledge and information produced during step 1 to 3 to be printed on the bags. This information must be transformed into guidelines and symbols, which can be understood (even) by illiterate tree plant-

ers. The fourth step involves close co-operation between seed researchers, extension experts from NARMSAP's training components, the designer of the bags, and the co-operatives. The fifth step is for a professional designer with knowledge about local preferences to carry out the design of the bags.

To ensure that the guidelines and symbols cannot be misunderstood and to ensure that small-scale planters approve of the design, a small test-survey will be initiated to get feedback from small-scale tree planters and to observe their practice. A seed expert from TISC in collaboration with DFSC will carry out this survey, which is the sixth step of phase 1.

When the small bags have found their final form, the pilot project will be initiated for the co-operatives to sell tree seed in small bags. This is the seventh and final step of phase 1. The seed will be produced by the co-operatives; a number of small bags will be produced, packed with seed, and distributed by or through the co-operatives on a commercial basis according to the recommendations resulting from the previous steps.

4.2 Phase 2

In phase 2, a study will be initiated to establish the financial viability and the social and bio-diversity impact of commercial distribution of tree seed in small bags. TISC will be responsible for implementing this study in collaboration with DFSC.

5. Partners and mode of operation

TISC will be responsible for facilitating and implementing the research and development project and for writing up reports on the two phases. The two tree seed co-operatives in Kaski and Kabhre will be fully involved in the project's two phases, including decision making, field implementation, and monitoring. DFSC will provide professional/technical assistance as described above and take part in report writing.

The project will, as far as possible, build on the experience of the training components of NARMSAP within the field of elaborating extension material. Moreover, it will be necessary to draw on the experience of other relevant organisations and enterprises such as agro-vets, other types of seed co-operatives, etc.

6. Time schedule

The project is planned to run for 1 year. Phase 1 will be carried out in the first, second and third quarter of 2003. Phase 2 will be carried out during the last quarter of 2003.

7. Outputs and activities

Outputs and activities are listed in the budget, which is attached as *annex 2*.

8. Budget

Revised budget (27 May 2003) for the research and development project on commercial distribution of tree seed in small bags

Outputs and activities	Costs		
	TISC NRS	DFSC DKK	Total
PHASE 1			
Output 1. Species selected			
• Meeting in Kathmandu (2 day WS)	80.000		
Output 2. Knowledge of seed handling methods (germination and storage) compiled and, if necessary, developed.			
• Salaries, TISC			
• Procurement of seed for trials	5.000		
• Various materials for testing, etc.	5.000		
Output 3. Knowledge about distribution channels procured and most cost-effective packing procedure determined.			
• Salaries, local marketing expert	100.000		
• Costs of involving the seed co-operatives	15.000		
• Local transportation, daily subsistence allowances, etc.	15.000		
• Meeting(s) between co-operatives, TISC and seed dealers/outlets	40.000		
Output 4. Seed bags including user guidelines designed, and test-survey (feed-back and observation) carried out			
• Costs of involving the seed co-operatives	15.000		
• Salaries, designer with knowledge about local preferences	50.000		
• Local transport, daily subsistence allowances, etc.	15.000		
• Visit from DFSC: travel costs for six weeks, to cover output 1-5		60.000	
• Salaries, DFSC (5 weeks), incl. optional visit in Dec./Jan.		90.000	
Output 5. Printing, packing and selling tree seed in small bags			
• Alufolie bags and stickers (2 sizes)	140.000		
• Packing costs, including printing of information on bags	20.000		
• Local transportation	20.000		
• Information sheets and advertisement	55.000		
PHASE 2			
Output 6. Survey of the financial viability, social and biodiversity impact, and replicability of commercial distribution of tree seed in small bags			
• Costs of having co-operatives and other seed sellers (e.g. agro-vets) filling in a small form when selling seed to a customer	25.000		
• Local transport, daily allowances, etc.	20.000		
• Visit from DFSC (travel costs for three weeks)		30.000	
• Salaries, DFSC (5 weeks + 20% overheads)		60.000	
Total	630.000	240.000	

Costs for seed 95,000 Rp. to be covered by TISC's ordinary budget.

Annex 2a. Directions for elaborating seed extension leaflets

1. There will be two types of seed leaflets. One type is guidelines to be included in the small bags for five different species. They will be printed on thin paper to take up as little space and weight as possible.
2. The other type is larger size guidelines that can be distributed to any interested seed user or tree planter by TISC, RSCs, co-operatives, dealers, DFOs, Fecofun etc. Leaflets are being prepared for the small bag species, but seed extension leaflets can easily be elaborated for additional species.
3. Only one design is needed for both of the two types of leaflets, one to be printed in full size normal paper, the other in small size and thin paper. If space is not sufficient, the amount of info to be printed in the small leaflets may be reduced.
4. The seed leaflets are targeted towards Nepali farmers, nursery owners and laymen. Therefore the leaflets should be in Nepali, and sentences should be simple, short and clear. Technical terms must be avoided.
5. Measures (weight, length, depth, months, etc.) should be stated in ways that can be understood and applied even by illiterate poor farmers. E.g. one pinch or one teaspoon instead of (or together with) 1 g. etc.
6. The guidelines should always refer to remedies that are accessible for any poor farmer without extra costs (e.g. instead of seed tray, use “any tray or a seedbed on the ground). When making any recommendation, keep the situation of poor farmers in mind – thus a poor farmer with very little land may not have a choice of where to make a seed bed or to build a fence.
7. Provide only the most necessary information. If there is too much information, it will be difficult for people to comprehend
8. In the end the large extension seed leaflets may be gathered in a file or small booklet. Other types of extension seed leaflets may be developed to cover other aspects of seed, for instance, collection and storage.

Annex 2b. Example of guidelines for nursing seed of Kalo Siris (English version)

1. **Uses:** Same
2. **Planting zone:** Terai, inner terai and mid hills 1200 m altitude, it will grow in low quality soil, it need a lot of sunlight
3. **Time of seed collection:** Mongsir to Magh (November to February)
4. **Time of seed sowing:** Magh-Falgun (February-March) in nursery

5. Techniques of plant production:

Fig: Composition of soil (25 percent sand; 25 percent compost; 50 percent soil)

- a. Mix the soil
- b. Add the mixed soil to a polythene pot or in any other pot
- c. Remember to make a hole in the lower part of polythene pot for drainage of water
- d. Soak the seed in cold water 48 hours before sowing
- e. Make a half inch deep hole in the soil and add two seed to every hole. Cover with soil.
- f. Water regularly
- g. Germination will start after one-two weeks

6. Techniques of transplanting:

- a. If two seedlings germinate in the same pot: wait until the seedlings have four leaves. Then transplant one of them to another polythene pot following this procedure:
- b. Water the new polythene pot.
- c. Transplanting time is normally in the evening or cloudy day to protect from bright sunlight
- d. Technique: How to pick up the plant. Take a flat wooden stick, hold the plant carefully, and dig under the root.
- e. Use a small wooden stick to make a hole in the soil of the new pot. The hole should correspond to the length of the root.
- f. When the plant is added to the new pot, cover the root with loose soil. Be careful not to damage the root, and that the pot stands up.
- g. Keep the transplanted seedlings in shade until they have four or five leaves.
- h. After four leaves, remove shade gradually
- i. Irrigation time is evening and morning
- j. Make environment good: gradually increase space between polythene pots for light
- k. Let us go to weeding the surrounding area of nursery
- l. Regularly transfer polythene bags from one place to another to make sure roots not go into the ground

7. How to plant

- a. Normally when plants reach the height of one feet, it can be planted
- b. Spacing of plant in field: 12 feet between each plant. Size of hole: one feet depth one foot length and one foot wide
- c. Transport polythene bag from nursery to planting site, and carefully remove the polythene bag with a razer blade.
- d. Carefully plant the seedling. Keep it vertical.
- e. Cover the roots with loose soil and push the soil slowly with hand or leg

8. Protection

Regular protection from grazing, fire and frost

Other information:

Addresses/telephone numbers for NAFSCOL. Technical help: Local DFO; Regional RESO; TISC

Annex 3. Dealer Survey Questionnaire (English version)

Please fill in one sheet per buyer.

1. Date (day/month/year)			
2. Buyer's personal name and address			
3. Buyer's occupation			
4. If relevant: Name and address of the organisation on behalf of which the seed bags are purchased			
3. How many bags did the buyer purchase?			
	Number of small bags	Number of large bags	
Raikhaniyu			
Nimaro			
Simal			
Kalo siris			
Tanki			
4. Comments, if any			
Thank you			

The purpose of this survey is to find out whether there is a market for tree seed in small bags, and to know who are the potential buyers. There will be a follow-up on the survey later this year. *) The sheet will be translated into Nepali

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