Appendix 1: Map of Tanzania showing location study villages

Appendix 6.3.2
R7569: Promotion of farmer-acceptable and disease-resistant Phaseolus beans in the Southern Highlands of Tanzania

Activity 6.3: Survey to assess impact of promotion and dissemination activities
Draft questionnaire

A Background information

A1 Respondent number
A2 Village
A3 Gender of respondent

B Exposure, awareness, knowledge gained

B1 Have you seen a poster on Uyole 94 beans?
If "yes": (a) where did you see it? _____
(b) what does it say? _____
(c) what new ideas did you get from it, if any?
_____
(d) is it useful to you? yes _ no _
(e) have you got a copy in your house?
(if "yes") (f) where / from whom did you get it?

B2 Have you seen a poster on Uyole 96 beans?
If "yes": (a) where did you see it? _____
(b) what does it say? _____
(c) what new ideas did you get from it, if any?
_____
(d) is it useful to you? yes _ no _
(e) have you got a copy in your house?
(if "yes") (f) where / from whom did you get it?

B3 Have you seen a poster on Uyole 98 beans?
If "yes": (a) where did you see it? _____
(b) what does it say? _____
(c) what new ideas did you get from it, if any?
_____
(d) is it useful to you? yes _ no _
(e) have you got a copy in your house?
(if "yes") (f) where / from whom did you get it?

B4 Have you seen a poster on upcoming varieties of beans?
If "yes": (a) where did you see it? _____
(b) what does it say? _____
(c) what new ideas did you get from it, if any?
_____
(d) is it useful to you? yes _ no _
(e) have you got a copy in your house?
(if "yes") (f) where / from whom did you get it?

B5 Have you seen a poster on pests in beans?

If "yes": (a) where did you see it? _____
(b) what does it say? _____
(c) what new ideas did you get from it, if any?
_____
(d) is it useful to you? yes _ no _
(e) have you got a copy in your house?
(if "yes") (f) where / from whom did you get it?

B6 Have you seen a leaflet on bean husbandry?
If "yes": (a) where did you see it? _____
(b) what does it say? _____
(c) what new ideas did you get from it, if any?
_____
(d) is it useful to you? yes _ no _
(e) have you got a copy in your house?
(if "yes") (f) where / from whom did you get it?

B7 Have you seen a leaflet on producing good bean seed?
If "yes": (a) where did you see it? _____
(b) what does it say? _____
(c) what new ideas did you get from it, if any?
_____
(d) is it useful to you? yes _ no _
(e) have you got a copy in your house?
(if "yes") (f) where / from whom did you get it?

B8 Have you seen a leaflet on pest management in beans?
If "yes": (a) where did you see it? _____
(b) what does it say? _____
(c) what new ideas did you get from it, if any?
_____
(d) is it useful to you? yes _ no _
(e) have you got a copy in your house?
(if "yes") (f) where / from whom did you get it?

B9 Have you had in the last three years, or do you have now, an on-farm trial or a demonstration plot of beans on your farm?

B10 Have you attended a field day or demonstration on beans in the last three years?
If "yes": (a) where did you attend?
(b) who organised the field day or demonstration?
(c) what new information did you get from it?
(d) was it useful to you?

B11 Have you heard any item on the radio about new varieties of beans?
If "yes": (a) what new information did you get from it?
(b) was it useful to you?

C Practice

C1 In the most recent planting season, did you plant:
(a) Uyole 94 yes __ no __ Why / Why not? _____
(b) Uyole 96 yes __ no __ Why / Why not? _____

(c) Uyole 98 yes __ no __ Why / Why not? _____

If "yes" to (a), (b), or (c):

(d) where did you get the seed from?

(e) how did you get the seed? purchase __ gift __ exchange __

C2 Which bean pests do you experience in your farm? _____

C3 What action do you take, if any, to avoid or deal with these pests? _____

C4 Have you used (extracts from) any local plants to control pests? yes __ no __

If "yes": (a) what have you used? _____

(b) where did the idea / information come from? _____

C5 In the most recent planting season, have you made any changes to the way you plant or grow or manage beans?

If "yes": (a) what change(s)? _____

(b) why have you changed? _____

(c) where did the idea for this change come from? _____

D Future intentions

D1 Do you intend to plant any of Uyole 94, 96 or 98 next season?

If "yes": (a) why? _____

If "no": (b) why not? _____

D2 Do you intend to make any changes in the way you grow/manage your beans, in the next season?

If "yes": (a) what change(s)? _____

(b) why do you want to change? _____

(c) where did the idea for this change come from? _____

D3 Do you intend to make any changes to the way you deal with bean pests?

If "yes": (a) what change(s)? _____

(b) why do you want to change? _____

(c) where did the idea for this change come from? _____

E Overall assessment of promotion materials and activities

E1 Researchers have been using the following methods to provide new information about beans. Please say which of these methods you have found to be useful, and which you find less useful. *For each method, give a score from 1 to 5, where 1 = not very useful, and 5 = very useful.*

Method	score
posters	
leaflets	
Radio	
On-farm trials and demonstrations	
Field days at research station	
Nanenane shows	

E2 What impact, if any, have these methods had on you, as a grower of beans?

_____

E3 How do you prefer to get new information about beans, including information about new varieties?

Appendix 1.1, Activity 1.1

Increasing Farmer Access to Phaseolus Bean Germplasm in the Southern Highlands of Tanzania - Stakeholder Workshop and Seed Fair 7 – 10 August 2002

PROGRAMME

Sunday 6th August	Farmers and other participants arrive pm
Monday 7th August	Preparations for Seed Fair Farmers and others who have brought seed organize their presentations facilitated by Uyole staff (Including different seed types labelled with name and source)
Tuesday 8th August	**Bean Seed Fair** incorporated into the *NaneNane* Agricultural Show at Mbeya Showground. Farmers (23) who participated in '*In situ*' project to present/discuss the beans grown in their village/ community (12) for information, sale or exchange Others present their beans for information, sale or exchange.
Wednesday 9th August	**Workshop**
Morning	Introductions Aims of the workshop etc (30 minutes)
	Overview of bean breeding in East Africa - Dr M Pyndje, ARI-Selian (15minutes)
	Experiences of bean breeding in S. Highlands - Dr C. Madata Head Bean Prog, Uyole ARI (20-30 minutes)
	Experiences of participatory bean breeding -Dr Susan Nchimba-Msolla Sokoine Univeristy of Agriculture (15 m)
	In situ conservation of plant genetic resources - Dr Mirandu National Plant Genetic Resource Centre, Arusha (15m)
	BREAK
	'Functional Diversity' study findings - Dr Dawn Teverson Natural Resources Institute, UK (20-30m)
	In situ study findings -Dr S. Bisanda, ARI-Uyole (30m)
	Opportunity for representatives of different stakeholder groups to respond to the findings; particularly farmers. (30 m)
	Groups: to discuss the findings and suggest implications (for policy, for promotion, for extension, for marketing, for further research ...). Report back to a plenary session for further discussion (30 m)
	LUNCH
Afternoon	Seed policy and legislation - T Z Maingu, TOSCA (15m)
	Dissemination and uptake of new bean varieties in E. Africa – Prof. Chris Garforth, Reading University, UK (20m)
	Experiences on marketing bean seed- Tanseed representative, Mbeya (15m)
	BREAK
	Presentation of the new "promotion" project – basic concept and outline of proposed activities (subject to changes negotiated with

	stakeholders). DMT, followed by questions/answers/discussion in plenary. (60 m)
	Promotion and communication issues – introduced by CG, with findings from the desk study re. Dissemination and uptake of new bean varieties in East Africa (An interactive session: groups to identify communication processes, constraints, opportunities, followed by relevant findings from the desk study).(60 m)
Thursday 10th August	
Morning	Plenary discussion, on people's reflections on the promotion project concerns, suggestions.
	Two groups: one to plan the seed multiplication activities, one to plan the communication / promotion timetable (including design, methods, questions for the field study for Activities 2.1 and 3.1)
Afternoon	Presentation of two groups proposals; plenary discussion; negotiate agreement on what happens next and who is responsible.

MINUTES OF A WORKSHOP FOR STAKEHOLDRS TO DISCUSS AND PLAN STRATEGIES ON HOW TO INCREASE FARMERS'ACCESS TO *PHASEOLUS* BEAN GERMPLASM IN THE SOUTHERN HIGHLANDS ZONE HELD AT UYOLE TRAINING INSTITUTE MBEYA FROM 7 - 9 AUGUST 2000.

Bisanda S Z, *et al,* ARI-Uyole 2001

1.0 PARTICIPANTS;

A list is as shown in Appendix 1 of this report.

2.0 OPENING SPEECH;

The workshop was opened by Dr.M. Msabaha (the Zonal Director of Research and Development) who welcomed guests to the workshop and introduced the guest of honour, Mr. Kitangalala who represented Regional Administrative Secretary. Mr. Kitangalala gave an opening speech which highlighted the importance of the Southern Highlands as bean producer and the technologies (new bean varieties) recommended by Uyole. He urged the workshop to discuss and make fruitful deliberations on how to increase farmers access to the improved technologies in order to reverse the low productivity trend and improve household food security and financial incomes.

After extending his gratitude to the organizers for an important and timely workshop he declared it officially opened.

3.0 SESSION I

(Chairperson Dr. G.S. Madata)

3.1 OBJECTIVES OF THE WORKSHOP

These were presented by Mr. Richard Lamboll from the Natural Resources Institute in the UK.

3.1.1 Main Objective

To involve key stakeholders in planning activities for the new Department for International Development (DFIP) crop protection Project.

3.1.2 Specific Objectives

- To exchange information among stakeholders
- To present findings from the in-situ conservation project
- To plan next steps for farmer centred bean research and development.

3.2 OVER-VIEW OF BEAN BREEDING IN EAST AFRICA (Paper presentations).

3.2.1 Participatory Plant Breeding (PPB) in Eastern and Central Africa Bean Research Network (ECABREN) By Dr. Pyndji, ECABREN Coordinator stationed at ARI-Selian Arusha.

Highlights;

The paper highlighted on the historical necessity of participatory plant breeding and the methodology so far used in Ethiopia and Tanzanian (Selian) bean breeding programmes. Participating farmers are mostly women whom Dr. Pyndji stressed that in East and Central Africa they are the main producers although nowadays men are coming up for commercial production. Dr Pyndji enphasised on the need for participatory breeding which is a way to ward wider technology up take.

3:2:1:1 Discussion

1. From a farmer (Lulanzi Village, Iringa region) He appreciated their involvement as stakeholders in bean research and in this workshop. He further queried on the following;

a) The long cooking time for some of the small seeded bean varieties

b) Whether the yellowing of bean leaves he noted on his farm was due to soil problems.

c) What to do with frost in some parts of Dabaga area.

Response:- Dr. C. S. Madata a bean breeder for the southern hihglands zone answered this question on behalf of or Pyndji said that long cooking time could be due to the type of variety or long storage time.

- Dr. S. Msolla - Nchimbi from the Sokoine Univesity of Agriculturel added that they are making crosses with short cooking varieties to solve the problem of cooking time.

- Concerning frost it was suggested that time of planting in frost prone areas should be revisited and/or early maturing varieties planted.

- On the yellowing problem the secretariat suggested that it could be attributed
  to either nutrient deficiencies, bean stem maggot attack or haloblight disease.

- A farmer from Sumbawanga aired that traditionally elder women added hot water instead of cold water to the boiling beans to inhance cooking. Another farmer objected the idea of preparing hot water aside considering the time involved and the current fuel crisis.

- Dr. C.S. Madata advised farmers to grow variety Uyole 98 which cooks fast.

II. Another farmer from Sumbawanga was concerned that the new high yielding bean varieties distributed to farmers have no ready market.

Responses;

Dr. Pyndji responded that his experience in Nothern Tanzania is that, scientists have little to do with marketing problem. However, through collaboration with NGOs like FAIDA in the North they managed to market all their beans.

III; Another farmer from Kasu village in Nkansi district

Shared his experience that some improved varieties have multiple problems. For example, rust, poor market and cooking time like T3; bad seed colour in Kabanima and long Kablanketi (Jesca) they can only be marketed in mixtures.

Response:

According to Dr. Madata, C.S,all those problems and shortcomings have been addressed in programme for the newly developed varieties. She encouraged farmers to test them and give back the feedback to researchers.

3.2.2 Bean Research and Technology Transfer in the Northern Zone - Tanzania
By P. Ndakidemi, ARI - Selian, Arusha.

Highlights;

The report highlighted major activities conducted by the northern zone bean research programme in the mid altitude areas of Tanzania. The objectives, strategies and approaches, achievements, current research and development activities technology transfer activities and experiences and future areas of collaboration were narrated.

Five bean varieties have been released, namely, Lyamungu 85, Lyamungu 90, Selian 94, JESCA and Selian 97.

Agronomic packages and IPM technologies for the control of bean stem maggot (BSM) and foliage beetles have also been recommended.

Current activities include breeding for multiple constraints resistance, natural resources management and evaluation of bean lines for tolerance to low P,N, and drought using participatory approaches.

On technology transfer farmer, groups were used to produce bean seeds of improved varieties which are disseminated through rural shops, where12.5 tons were sold at anattractive price. Extension agents and private sector were considered quite effective in technology transfer.

3:2:2:1 **DISCUSSION**

Comment
A participant from Laela Agricultural Centre - (NGO) was impressed with collaboration that exist between research and women groups in terms of bean seed production and marketing in the Nothern zone of Tanzania. However, he wanted an explanation on food security if all seed produced was sold.

Response;

Each participating household kept one bag of bean for food.

Question I:

Why was there a weak cooperation between researchers and NGOs in the northern zone?

Answer:
NGO's had little commitment in the project because of differences in objectives and interests.

Question II:
Another participant wated to know about efforts made by the research programme to make sure that the bean crop will not be grabbed by men once it becomes an important crop.

Answer:

It was advised that the issue of bean being a women's crop be discouraged. Rather it should be for both men and women in all aspects. The idea was supported by a farmer from Kilolo village (Iringa) that both women and men are involved in bean production.

Question III

Since the market for improved bean varieties in the Southern Highlands is currently a problem can researchers assist farmers in seeking markets in the Northern Tanzania and neighbouring countries.

Response:

A possibility is there with good communication. However, national marketing policies and laid down regulations should be considered when exporting beans.

3:2:3 Participatory Bean Breeding and Technology Transfer (Experience at SUA Bean Breeding Programme)
By Dr. S. Msolla - Nchimbi - Sokoine University of Agriculture.

Highlights

Reasons were given for adding a farmer participatory component to the Bean CRSP which were to enhance efficiency and accuracy, control and equity include farmers conditions and farmers knowledge in the selection of good and acceptable varieties.

Currently, farmers who are collaborating with SUA are involved in early generation (F3) selection unlike in the past where farmers were invited for selection in later generations(F6) this resulted in the loss of valuable traits of beans which could have been of interest to farmers.

Lessons learned were also highlighted. The presenter concluded that by working more closely, farmers and researchers hope to device a better blend of both formal and informal approaches that are more useful for smallholder farmers and their high risk conditions.

3:2;3:1 **Discussion**

Question 1:

Were the responses of men and women in bean selection separated? The answer was yes and there was no significant difference.

3:2:4

Experiences of Bean Breeding in the Southern Highlands of Tanzania
Br. Dr. C.S. Madata - ARI - Uyole, Mbeya.

Highlights;

Bean production its importance together with the past, present and future activities of the bean improvement programme at ARI to solve encumbent constraints and increase productivity were discussed. The achievements made which mainly stressed on the seven improved varieties so far released - T_3, Kabanima, Uyole 84, Uyole 90, Uyole 94, Uyole 96, Uyole 98 were also given. All these varieties are currently in the farmers'fields.

It was also pointed out that research trends since the 1970s and over the last decade to date are demand driven and that collaborative approaches with farmers and other stakeholders through on-farm trials and seed production have eased farmers' access to the improved technologies.

3:2:4:1 **Discussion**

Question I:

Can you give the disease reaction and yield of the Kablanketi x Uyole 84 progenies?

Answer:

The progenies were not too bad on diseases although some lines are still susceptible. Compared to Uyole 84. Some lines were also early maturing and higher yielding than the local Kablanketi.

Question II;

Can the presenter give us a swahili translation of the transparencies since we can't understand english?

Answer;

The transparencies were meant for those who could not understand Swahili where as the presentation was made in Swahili for the rest.

Comment;

One farmer appreciated the invitation of both women and men in this workshop because all got first hand information, otherwise if only women attended it could have been difficult for them to pass the message to those left at home.

Question III;

A farmer from Kantawa village - (Sumbawanga) wanted to know some solutions to insect problems (aphids and pod borers) observed in the field.

Answer;
There are many insecticides in the market that can control both aphids and pod borers. What is important is for the farmers is to buy genuine products and apply as recommended.

Question IV;

We also have not acquired some of the new varieties in Kantawa except T_3 and long Kablanketi.

Answer;

Funds have been a limitation . Most of our research activities have been concentrated in Laela division. Activities will be expanded to as far as Nkasi upon receipt of funds in future.

4.0 SESSION II

(Chairperson Mr. Lema)

4:1 Collaboration of Laela Agricultural Centre with ARI - Uyole
By Mr. Ndanshau, Manager, Laela Agricultural Centre, Sumbawanga.

Highlights;

The paper highlighted on the history of the centre, objectives and activities carried out at Laela on bean technology tansfer in, collaboration with ARI - Uyole.

Experiences and challanges were also presented. Use of improved bean varieties at Laela Agricultural centre has increased bean yield from 487.5 to 1800 kg/ha between 1996/97 - 2000 (269% increase).

4:1:1 **Discussion**

Comments

One member, from Northern Tanzania shared their experience concerning the problem of marketing raised in the paper. He encouraged farmers to seek external markets from, neighbouring countries for some of the bean varieties which have high demand. He said that in Northern Tanzania farmers are getting profit of about one million shilling by selling beans to neighbouring countries.

Another participant thanked the Nothern speaker for encouraging farmers but cautioned on government policy on external trade.

4:2 Findings of the Functional Diversity Project
By Dr. D. M.Teverson, Natural Resources Institute, United Kingdom.

Highlights;

The functional Diversity Project analised in detail 3 farmers bean mixtures from the southern highlands to study the relationship between diversity, disease resistance and yield stability. Mixture components were screened for resistance to five major diseases namely ALS, anthracnose, halo blight, common bacterial blight (CBB) and BCMV. According to Dr. Teverson, one mixture component from Tukuyu, 5084.2 (small Masusu) was found to be resistant to all races of halo blight. This was later crossed with Canadian Wonder to improve seed size. Another promissing component 5660/6 was crossed with Canadian Wonder to improve palatabilty. The F_6 generation of the later and F_5 of former crosses together with two materials from ARI Uyole (Uyole 98 & 96) and two from SARI, Arusha (G8866 and improved Kablanketi) will be tested in the promotion and uptake Pathways Project which has started in the southern highlands zone.

4.3 Dynamic conservation, enhancement and utilization of agrobiodiversity *in-situ*: phaseolus vulgaris beans in the southern highlands of Tanzania.
By S. Dr. Bisanda; ARI - Uyole, Mbeya.

Highlights

The project aimed at producing a generic methodology for the *in-situ* conservation of agrobiodiversity of self pollinated crops from an understanding of the dynamic interactions of farmers selected bean mixture components.

The paper delt in detail on three themes
1) Understanding why and how farmers bean seed mixtures are maintained.
2) Understanding key factors which influence farmers' decisions
3) Find ways for continued farmer selection to conserve local germplasm.

Discussions

Question/comments:

One participant was impressed by involving farmers into this project and by your suggestion to involve them in seed production. But then when it comes to seed production the government policy through TOSCA is very bureaucratic. How do you handle the certification issue to enable universal acceptance of the farmers seeds?

Response:

The chairman postponed the question to be discussed later by TOSCA during their presentations. (TOSCA is the Tanzania Official Seed Certification Agency).

4.4 Ministry of agriculture seed unit presentation
By Mrs T.Z. Maingu, Tanzania Official Seed Certification Agency, Morogoro.

Highlights:

The paper touched on government policy on formal and informal seed sector programmes in the country. Participants were informed that it has been liberalized to time up with current changes in the seed sector. The formal seed system is for big scale farmers e.g. TANSEED, and the seeds produced are to be sold all over the country. The informal seed system is for small scale farmers and the seeds produced are allowed to be sold within the village or in specific area. It was stressed that for seed certification one need to go for those varieties that can be characterized.

4.5 Role of TOSCA in the commercialization of new varieties.
By Mrs T.Z. Maingu, TOSCA, Morogoro

Highlights;

Participants were informed that TOSCA is the only organ in the country which certifies seed of officially realesed varieties for commercial purposes. Certification procedures were highlighted. In the informal sector small scale farmers are allowed to produce quality declared seed (QDS) inspected by TOSCA and trained VEOs. However certification for mixtures was deemed difficult due to differences in uniformity.

Discussion

Question 1;

Can you explain where registered farmer groups can obtain initial seed for seed production?

Answer 2;

Initial seed should come from breeders in various research institutes.

Question 2;

Will TOSCA come to me (farmer) directly to certify the produced seed?

Answer;

First the producer and his field have to be known to TOSCA. Nevertherless TOSCA or representatives will inspect the field prior to appropriate plant growth stage.

4.6 Promotion and Uptake of Beans

By Dr. Chris, University of Reading. UK.

Highlights.

The paper covered literature review, on farmers seed uptake path ways in the formal and informal seed sectors. Farmers communication systems, factors influencing up-take of new varieties and options for stimulating uptake were also discussed.

Discussion

Comment: 1

TOSCA representative official informed the participants that contribution of Formal seed sector to seed uptake path ways has currently droped from 10% to 4% emphasing the importance of informal seed up take pathways. Another comment was that free or highly subsidized seed make farmers unable to fee the production cost.

Comment II:

Drama could be used for information dissemination in informal seed uptake systems. This has been successfully used in Northern Tanzania for beans and in Uganda for agroforestry activities.

4.7 Presentation of the New Promotion Project

Dr. D.M. Teverson, Natural Resources Institute, UK.

Title: Participatory Selection and Promotion of Disease Resistant Bean Seeds.

Highlights:

This project has been relayed from the functional diversity project with emphasis on disease resistance.

Two Crop Protection Programmes developed materials 5060/6xCW (F6 resistant to ALS, purple and large seeded) and 5084/2 x CW (F5 resistant to all races of haloblight, anthracnose various colours) will be tested and promoted in the new project together with two materials from ARI - Uyole (Uyole 98 high yielding, medium seed size and “good”colour and Uyole 96 early and large seeded). Furthermore, two materials from SARI-Arusha, G8866 (high yielding field disease resistant, yellow, large seeded) and improved Kablanketi/JESCA (Field disease resistant, purple speckled, large seed size). All these varieties will be compared to the already familiar varieties of the farmers.

Expected outputs were also presented in detail.

Discussion

Comments;

Local varieties should be labelled by their original names rather than code numbers to enable the farmers to understand what varieties they are talking about.

Question: 1
Are the varieties resistant to all diseases?

Answer:
Not at all, it is not easy to get varieties that can resist all diseases, in addition the varieties will be used in mixtures hence there will be complimenting effects.

Question: 2

Is the Kabanima referred to in the mixtures the real Kabanima? And where was it collected.

Answer:
It was collected from farmers who call it "Kabanima". The area from where it was collected could not be remembered although it was in the southern highlands.

Comment:
A farmerr wanted close cooperation between them and researchers to be able to solve any disease problems that come up.

Question: 3

Are you intending to push the varieties developed by research but susceptible to some diseases in specific areas?

Answer:
The discussions was reffered to plenary session.

4.8 The National Plant Genetic Resources (NPGR) Centre and conservation of beans **(***Phaseolus vulgaris***):**

By Dr. W.Y.F. Marandu, Tropical Pesticides Research Institute, Arusha.

Highlights

The paper briefed on the purpose, stakeholders, various functions and networkings of the centre. Activities that have been carried out so far in relation to beans involved germplasm collection missions in Rukwa, Mbeya, Mara, Kagera followed by seed multiplication, characterization, documentation and distribution.

Important observations highlighted were that:-

- Women are custodians of bean seeds and associated knowledge
- Younger women and men are less informed
- Mixtures of seeds are most common in Rukwa region and parts of Mbozi district in Mbeya region
- Mixtures are deliberately constituted by farmers.

The final conclusions drawn were:-

- Tanzanian farmers have a wide range of bean varieties.
- Erosion of indigenous knowledge on beans is taking place due to social change
- Mixtures used by farmers provide them with an opportunity to conserve more than would normally be possible if pure lines were planted.

Discussions

Question 1: Do you collect and preserve local landraces only or whatever seed is available with farmers regardless of where it came from and when?

Response: Any seed collected is given an identification number and will retain the number forever.

Question: 2

In rural areas we still would like and prefer to keep seed as mixtures rather than pure lines because it is difficult to loose them. Is this acceptable?

Response: It is good to adhere to your practice at village level. We are not discouraging you. As farmers you have the right to practice what is feasible in your condition.

Question 3:
If resources allow will you please consider conserving the local bean land races in the North, West and Central zones (especially in Kigoma, Morogoro, Moshi, Arusha areas) where a lot of diversity exists but the old varieties are in danger of being lost as many new varieties have been released.

Response:

The work is continuous until the whole country is covered. To speed up the process we are no longer concentrating on a single crop in our collection missions but many crops will be simultaneously collected. So it is a good opportunity that beans will be collected in each planned mission.

4:8 Group Discussions

4:8:1 Highlights;

Five groups were formed to discuss and present issues, constraints and opportunities arising from the expected outputs and the activities of the promotion project. The groups were divided as follows;

1. Farmers'Group: a) Women's group
   b) Men's group
2. NGO's
3. Researchers
4. Extensionists
5. Policy makers

4:8:2 Group Presentations:

4:8.2.1 Farmer group presentation.

a) Women group:

Issues: The group reminded researchers to consider agro-ecological diversity, differences in planting seasons, farming systems and drought when developing bean varieties for a particular area.

Constraints:
Aphids, BSM, flower bettles and pod borers were mentioned by the group as problems which occur during main growing season and dry season. High prices for the inputs (fertilizers and chemical insecticides), transport problem for the farm yard manure to the field site and high ratio of farmers to extension staff were also among the constraints to bean production in the villages.

Opportunities:
Farmer have traditional knowledge on bean production to cope with production constraints. These include crop rotation, intercropping, varietal mixtures identification of suitable land for beans and timely planting.

b. Men Group

Issues:

i) Research should develop bean varieties which are palatable, marketable, acceptable, drought resistant and adaptable to a wide range of ecological conditions.

ii) Farmers mentioned local seed path ways such as markets, seed exchange and borrowing among farmers, purchase from seed companies.

iii) The group reported weak linkages between farmers, extension agancies and research, lack of training and leaflets on agricultural technology.

iv) Seed multiplication should be done in the region or districts concerned with the project. On farm trials should involve as many farmers as possible.

v) It was recommended that the seed release committee should participate in all stages of seed production to enhance release of the improved seeds.

vi) The group proposed use of radio, news papers, extension leaflets meetings and seed agents for communication.

vii) The project prepare reports and distribute to different bean growing areas in East Africa.

Opportunities:

i) There is good co-operation between farmers and researchers. Some of the bean varieties are adapted to the local environment.

ii) There is a possibility of producing clean bean seeds in the valley bottoms using existing farmers groups.

iii) Farmers have interest in new technology. Researchers, V.E.Os and NGOs can cooperate with farmers in development issues.

iv) Communication media (radios etc.) are available in the villages.

Constraints.

i) Due to wide variations in weather conditions it is difficult to develop varieties which will cut across.

ii) Many seed companies do not produce bean seeds

iii) It might be difficult to differenciate between common seed and certified seed in the villages.

iv) Technical language used by scientists is difficult to understand.

v) Prices and timely delivery of seeds might not be convenient to farmers.

Discussion

Comment:

TOSCA representative highlited that in the informal seed sector, seed production fields will be inspected by extension staff trained by TOSCA in seed production and seeds produced will be sold locally in the respective village or district. In the formal seed sector, the seed production fields will be inspected by TOSCA and seeds produced will be sold any where in the country. It was further revealed that TOSCA's regulations have been relaxed to enable registered farmers and farmer groups to produce and sell seed to farmers in need.

Question:

Can farmers include their own varieties as one of the treatments in the on farm trials?

Answer: Yes, there is provision for the farmers practice treatment. This is common to any on-farm trial.

4.8:2:2 NGO's Group

Issues:

i) The group advised research to deal with major disease according to location/season as identified by farmers. There should be a network to avoid duplication.

ii) Recommended a field study to identify seed sources to farmers.

iii) Inventorise all institutions dealing with agricultural development and analyse their channels of dissemination of information.

iv) Identification of farmers to do seed production.

v) Farmer empowerment in the process of seed release.

vi) Training of promotional techniques to all concerned through trials, and demonstrations.

Opportunities.

i) Existence of experienced farmers and other institutions promoting agriculture in the project area.

ii) There are farmers who have been involved during the previous in-situ conservation project.

Constraints;

i) Large area to work with

ii) Lack of efficient communication system

iii) Uncertain weather conditions

iv) Insect pests and diseases are many in the southern highlands.

v) Difficult to maintain desired qualities in mixtures (seed colour, taste and marketability).

Discussion

Farmers were impressed by being considered in village seed production. It was also noted that weather uncertainties can cause genetic erosion to source of the bean varieties.

4.8:2:3 **Researchers group**

Issues:

1.(a) Researchers requested clarifications on the following areas which were unclear in the project .

- Why crosses were made with Canadian Wonder and not Kablanketi which is more widely accepted
- Whether the resistances reported on the varieties were field tested or under controlled conditions
- Whether the crosses were stable.
- What diseases were considered during resistance studies and what races of halo blight disease were tested.

b) The following procedure was suggested

- That crosses (CPP - developed materials and Dr. Mushi's) should be planted on station under open quarantine and for seed multiplication during mid Aug to Nov/Dec. planting, and that during February/March bean season the selected lines should be planted on station at Uyole and substations (Mbimba, etc)
- That should be participatory evaluation for diseases and agronomic traits on station and on farm.

2. The group suggested that UAC released varieties or other materials of interest should be used to test uptake and distribution pathways at the same time that the CPP materials are being evaluated on station.

Opportunities

The under mentioned resources were already available to enhance the work:-

- Human personnel, vehicle, initial seed; areas with three growing seasons for seed multiplication, irrigation facilities on station, and ARI-Uyole materials/seeds to test seed uptake and distribution pathways.

Constraints

a) Time frame for the project is short
b) Long distances involved considering overlapping planting seasons in different areas.
c) Overlaps with other work schedules
d) Lack of enough seed for selected varieties
e) Weather uncertainties.

Discussion

Question 1: What procedures were used to import the seed into the country?

Answer: Normal Government. procedures through the plant quarantine station at TPRI
Arusha.

Question 2: Why long Kablanketi (Jesca) variety was not seen in your (Uyole) seed types during the nane nane seed fair?

Answer: Jesca is a Selian released variety that was given to farmers in the previous project in exchange of farmer mixtures that were taken by research.

4.8:2:4 **Extension group**

Issues:

i) Variety acceptability criteria to include taste, marketability and cooking time.
ii) Seed distribution channels do not consider timeliness, type of distributors or provision of enough seeds.
iii) Agricultural information is not readily available to majority of farmers and extortionists.
iv) Varieties suitable for different conditions should be considered in dissemination.
v) Local seed approving committees should be formed.
vi) Efficient promotion and communication strategies should be devised to to disseminate the knowledge.
vii) Disseminators should have enough knowledge on the project.

Opportunities

As presented by previous groups, especially farmers and NGOs.

Constraints

- Lack of funds to purchase equipment media for agricultural information eg. radios, newspapers.
- Poor infrastructure hinder efficient communication in promoting new varieties.

4.8.2.5 Policy makers

Issues/Opportunities

- The group was in support of the project noting that the outputs were in line with the national agricultural research policy.

- They also complemented researchers and extension efforts in understanding seed uptake pathways and distribution channels to increase technology adoption among farmers.

Constraints

i) The life span of the project is short considering the planned activities.
- It was suggested that at least 3 years more might be needed to achieve all objectives.

ii) Possibility of genetic erosion for pure varieties included in mixtures caused by genetic drifts and plant competition.

iii) Monitoring and performance evaluation for varieties released in mixtures is difficult.

Discussion.

Question: Which materials are going to be considered for seed uptake pathways study?

Answer: All materials as covered under 4.7

4.9 **Group suggestions and plenary discussions emerging to planned activities**

In principle all groups concurred with the planned activities. Modifications and clarifications were called for in few activities.

Activity 4:1 and 5:2 (Seed production and certification)

- TOSCAs permission should be sought before commencement;
- In addition it was noted that the project phase is too short for the activities to be completed.

Response: Seed certification procedures were overlooked at the time of project write up.

Activity 6:1 Why this activity was left with the University of Reading and not include

other stake holders such as Uyole research institute?

Response: It was a matter of sharing responsibilities. The funds at Uyole could be

limiting. Nevertheless final plans for this activity need to be drawn so that if possible the project can be done in Tanzania and involve other stakeholders.

Question: Who is co-ordinating the activities?

Response: It is clear from the project write up who is responsible for what. The University of reading is answerable for activity 6:1. It is up to the University to see what stakeholders to include in this activity.

Activity 6:3 (Adoption studies)

It was suggested to do this activity three years after the lapse of the project as is normally recommended. However other funding sources will be sought since the current project will have bean concluded.

AOB: Farmers requested to be facilitated to be able to conduct their own meetings/workshops where they can explain to their colleagues what they have learned.

This was thought to be a good idea but it is limited by lack of funds.

4.10 CLOSSING SESSION (chairman RDR/SH)

4.9.1 The clossing session included

a) Brief comments from selected stakeholders representatives
b) General workshop recommendations based on group discussions.
c) Clossing remarks.

a) Brief Comments from various stakeholders.

- Farmer group:

All farmers were grateful for the invitation and thanked sponsors for providing funds for such a useful workshop.

- NGOs

They appreciated the intergration of all stake holders in the workshop and suggested that such arrangement should be extended to other research programmes.

- Extension:

They were also greatful for the workshop organizers and encouraged farmers to be aggresive in seeking advice from V.E.Os.

- T.P.R.I:

Unlike workshops attended previously he was impressed with the active participation of farmers in this workshop. He further urged the stake holders to work together in bean germplasm collection and conservation.

- Sokoine University of Agriculture (SUA)

She proposed that since seed policy issues are not well known and often change, leaflets should be prepared by the certifying agency and distributed. She called for equal partenership when involving other people in seed production.

- University of Reading:

Dr. Chris Garforth appreciated the effort put on the project and looked forward for the University of Reading to share its experiences and also learn from others. He agreed that all stake holders must cooperate to meet the project objectives.

- NRI

Dr. D.M. Teverson was grateful for the opportunity to be involved in the project, where so many farmers are involved - she looked forward to work together for the success of this project.

b) General Comments (Dr. C.S. Madata Bean breeder at Uyole)

She was greatful for the interactions from all stake holders and thanked then for their active participation. She further noted that a lot of new information was gathered and shared. The questions and comments made by farmers revealed their priority needs. She also commented that in the new project responsibilities for different stakeholders should be known so that contribution from each can be realised.

c) Clossing Remarks (Ruth Kamala)

On behalf of Director of Research and Development, Mrs Ruth Kamala congratulated the organizers, especially N.R.I. for facilitating the workshop, and all the participants. She summarised key issue from the workshop and acknowledged the big success of the workshop given the different stakeholders backgrounds. She urged the farmers to go back to collegues with the same enthusiasm showed in the workshop.

APPENDIX 1:LIST OF PARTICIPANTS

NAME	ORGANIZATION	ADDRESS
1. Dr. Dawn Teverson	Natural Resources Institute	Chatham, Kent, ME4 4TBUK
2. Dr. Richard Lamboll	Natural Resources Institute	Charham, Kent ME4 4TB UK
3. Dr. Chris Garforth		University of Reading, UK
4. R. Kamala	MOAC	Box 2066, DSM
5. N.M. Lema	MOAC	Box 2066, DSM
6. Dr. G.S. Madata	ARI - Uyole	Box 400 Mbeya
7. D.A. Kabungo	ARI - Uyole	Box 400 Mbeya
8. Nelei Nkatilo	Farmer	Kasu Sumbawanga
9. Conrad Mragala	Farmer	KantawaSumbawanga
10. Leonina Raza	Farmer	Kantawa Sumbawanga
11. Thomas Meli	Farmer	Matanga Sumbawanga
12. George Kipemba	Farmers	Matanga Sumbawanga
13. Anusiata Sasita	Farmer	Matanga Sumbawanga
14. Mwazele Mkumbwa	Farmer	Mbimba Mbozi, Mbeya
15. Ketelaga Mbindi	Farmer	Mbimba Mbozi, Mbeya
16. George Sanga	Farmer	Rungemba, Mafinga
17. M. Sanga	Farmer	Rungemba Mafinga
18. M. Mgumba	Farmer	Rungemba Mafinga
19. R.P. Luvanga	Kilimo/Iringa	Box 290 Iringa
20. M.F. Kombe	Kilimo/Njombe	Box 76 Njombe
21. L.A. Kibona	Kilimo/Ileje	Box 52 Ileje
22. Mkuchu (Mrs)	ARI - Uyole	Box 400 Mbeya
23. Sophia Msemwa	Kilimo	Box 253 Mbeya
24. Mrs. Mwalyego	ARI - Uyole	Box 400 Mbeya
25. Sevelina Langson	Farmer	Iyawala, Mbeya
26. Lenardi Shungu	Farmer	Iyawaya Mbeya
27. Edward Kayovyo	Farmer	Kantawa, Sumbawanga
28. Amkikiwe Kapange	Farmer	Mbebe, Ileje
29. Eneles Masebo	Farmer	Mbebe, Ileje
30. Nikumwitika Lwinga	Farmer	Mbebe, Ileje
31. Jolanda Kalikwenda	Farmer	Kasu Sumbwanga
32. Makulata Simwaka	Farmer	Kasu Sumbawanga
33. P.S. Assilia	Mbeya -Mabatini	Mbeya
34. P.A. Ndakidemi	ARI-Selian	Box 6024 Arusha
35. Dr. N.G. Lyimo	ARI – Uyole	Box 400 Mbeya
36. A.N. Mussei	ARI – Uyole	Box 400 Mbeya
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40. Lweswa Hew	DEO S'wanga	Box 232 S'wanga
41. P.M. Lanjau	DEO Mbozi	Box 94 Mbozi
42. Mshiha L.M.	DEO Nkasi	Box 15 Nkasi
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44. Dr. S. Nchimbi	SUA	Box 3005 Morogoro
45. T.Z. Maingu	TOSCA	Box 1056 Morogoro
46. F.F. Zumba	Farmer	MpusiBox 34 Sumbawanga
47. Claudiana E. Makula	Farmer	Kasu Sumbawanga
48. Rehema E. Kidumba	Farmer	Lyadebwe, Njombe
49. Talita Ndunye	Farmer	Lyadebwe, Njombe
50. Fides Benson	Farmer	Masebe Rungwe
51. Dr.C.S. Madata	ARI - Uyole	Box 400, Mbeya
52. Dr. M. Pindji	ARI - Selian	ECABREN-Arusha
53. G. Mgaya	VECO	Mbeya Office
54. C. Mbuma	Farmer	Lulanzi, Iringa
55. Mrs. Mbuma	Farmer	Lulanzi, Iringa
56. Mrs. B. Kidava	Farmer	Lulanzi Iringa
57. Mrs. Kivamba	Farmer	Lulanzi Iringa
58. E. Kivamba	Farmer	Lulanzi Iringa
59. K. Msungu	Farmer	Kilolo, Iringa
60. Mrs. Lazaro	Farmer	Kasu, Sumbawanga

Appendix 1.2 Pedigree of Kabanima x Canadian Wonder, the cross from which the project variety is developed and Horticulture Research International disease screening data.

Appendix 1.3.1

Table 1.3.1. Example of matrix ranking of farmers' bean types by seed type traits used during farmer surveys in March 2002.

Farmer Name: Mrs Nikumwitika Lwinga; Farmer No. 5; Mbebe Village in Mbeya region.										
	Bean mixture components, name, information and ranking.[1]									
Bean characteristics	***Kwaiti***	***Masusu***	***Namaini***	***Mwasipenjele***	***Unknown***	***Nambalala***	***Ndondo***	***Kablanketi***	***Kabanima***	***Kigoma***
Year obtained	Mid-1980	Mid-1980	Mid-1980	Mid-1980	Mid-1980	Mid-1980	Mid-1980	1990	1995	1993
Source of seed[2]	Undali	Undali	Ulambya	Undali	Undali	Mbozi	Undali	Mbozi	Mbozi	Mbeya
Taste	9	4	2	5	8	10	5	1	7	3
Sauce	8	1	6	4	9	9	4	3	7	2
Cooking time[3]	5	2	1	6	9	10	8	3	7	3
Keeps well after cooking[4]	10	4	9	6	7	3	5	2	7	1
Yield	2	3	9	5	7	1	5	10	7	4
Rain tolerance	2	6	9	4	7	5	1	10	7	3
Growth habit	climber	bush	bush	climber	bush	climber	climber	bush	bush	climber
Maturity time[5]	10	6	3	5	7	9	2	3	7	1
Marketability	10	4	3	5	7	9	5	1	7	1
Storability[6]	2	1	4	7	4	3	10	9	4	8
Overall ranking	**10**	**1**	**5**	**4**	**7**	**8**	**3**	**9**	**6**	**2**

[1] 1 = Best; 10 = Worst (all bean components are from one mixture and the names used are those identified by the farmer)
[2] These are names of local places where original seed was obtained by the household
[3] 1 = fast; 10 = slow. This is especially important in areas where firewood is scarse
[4] Beans are often cooked and kept overnight for use the next days
[5] 1 = early maturing; 10 = late maturing
[6] Susceptibility to storage pests

Appendix 2.1.1

Seed uptake pathways and distribution channels for beans in the Southern Highlands of Tanzania: a review of literature[1]

Kate Green and Chris Garforth, The University of Reading
August 2000

1. Introduction

'Uptake' refers to the application of information and technology by users, and 'pathways' refers to the routes or channels by which this information and/or technology 'reaches' the users (Garforth and Usher, 1996). Farmers' uptake pathways form part of their communication systems, and as such are influenced by the characteristics of these systems. This area is particularly worthy of research as it is commonly acknowledged that there are many weaknesses in the dissemination and adoption of new and improved technologies, including seeds, to smallholder farmers in Africa (Labo, 1988).

In this review current seed uptake pathways for farmers, in the formal and informal seed sectors, are described. The nature of farmers' communication systems is briefly discussed and attention then focuses on the many factors that influence farmers' uptake/adoption of new or improved varieties/technologies. Various suggestions have arisen in the literature as to how to stimulate the dissemination and uptake of new seed varieties by small-scale farmers and these are mentioned, to provide possible guidelines for future interventions in this area.

Although the focus of this particular research project is the uptake of new bean varieties in the Southern Highlands of Tanzania, due to the scarcity of literature on this specific area, the review focuses on experience primarily in Eastern Africa, but also draws on additional research findings from other geographical areas, and with other crop varieties.

2. Bean seed

Seed is a fundamental input to crop-based agriculture as it ensures grain production and provides new genetic material to the crop gene pool. This new material may maintain or increase local biodiversity, replacing other genetic material that has become disease prone for example. However, it may also have negative effects on biodiversity stability by replacing beneficial species, with potential knock-on effects for other components of the local ecosystem. These impacts on biodiversity and sustainability may not always be understood by local stakeholders. Seed is also important as its genetic make-up and quality determines the maximum potential for yield, and therefore the productivity of and return to other inputs (Jaffee and Srivastava, 1994).

[1] Literature review for CPP project R7569: "Participatory promotion of disease resistant and farmer acceptable *Phaseolus* beans in the Southern Highlands of Tanzania"

The common bean (*Phaseolus vulgaris)* is of fundamental nutritional and economic importance throughout rural and urban areas in Eastern Africa. Although beans are often thought of as a low status food ('the meat of the poor'), they provide a vital source of protein. They are also valued highly as all parts of the plant can be eaten - the grain can be dried or eaten fresh, the leaves are used as vegetables and the stalk is used to make soda ash. Beans are mainly produced as a subsistence crop, generally by women, but approximately 40% of production in sub-Saharan Africa is sold, and beans are valued as a cash crop due to their short maturity, and their ease of handling and storability (David et al, 2000). In some parts of Eastern Africa (e.g. Ethiopia) beans are also used as a supplementary animal fodder and as fuel (Mekbib, 1997).

3. Formal seed sector

The formal seed sector includes government, private and commercial seed companies, and in developing countries this sector has been heavily criticised for having poorly developed and inefficient systems of seed production (of existing varieties and multiplication of seed of new varieties) and distribution (Grisley and Shamambo, 1993).

Formal seed sector development varies across Africa. Some countries, such as Kenya and Zimbabwe, have developed effective and diversified seed industries, but most countries, including Tanzania, have experienced limited progress despite national and foreign investments and assistance (Lanteri and Quagliotti, 1997).

In Eastern Africa the formal seed industry plays only a limited role in the supply of seeds of self-pollinating crops, such as beans, due to several reasons - most notably the competition from farm-saved seed - which make the large-scale multiplication of this self-pollinating crop uneconomical (David, 1997) In addition to this, demand from farmers for 'clean' seed is low due to the lack of improved, widely adapted varieties released from the formal sector, the high price of this seed, and farmers' limited access to it due to inefficient delivery systems (David, 1994), and their preferences are often highly localised (David and Sperling, 1999). The incentive for the formal sector to participate in seed production is therefore low, except in areas of large-scale commercial farming, or for varieties where regular and frequent replacement of seed is needed, or where farmers are unable to save seed because of the demands on household income or food reserves (Cromwell et al, 1992).

The approach employed by national extension organisations to the dissemination of new or improved seed varieties typically follows several stages: 1) seed production at research stations/multiplication sites; 2) seed delivery to local area officials; 3) seed delivery to extension agents; and 4) farmer selection for free distribution of seeds or demonstrations (with seed normally being delivered once in each location). This approach is expensive, it is hampered by logistical and administrative difficulties, and it often fails to take into account farmers' own criteria or farming conditions (Tripp et al, 1997; David, 1997). To illustrate the weaknesses of the formal system it is interesting to note that in Ethiopia, only 10% of the 122 varieties of cereals, oil crops and vegetables so far released, have been adopted (Agrawal and Worede, 1996 in Mekbib, 1997) and over 13 years, seed sales by the Ethiopian Seed Enterprise averaged only 5% of the potential annual requirement (Agrawal and Mariam, 1995 in Seboka and Deressa, 2000). The national extension system has promoted the new

varieties available, but seeds of these have not been readily available to farmers due to inefficient multiplication and dissemination systems. In Tanzania, Tanseed, the national parastatal seed company, is plagued by inadequate storage facilities, which results in many seed stocks becoming not viable. The national seed quality control authority, TOSCA, is not able to effectively re-certify remaining stocks of seed, resulting in large amounts of unsold, deteriorated seed stocks (Lanteri and Quagliotti, 1997).

There are differences of opinion among professionals involved in the formal system about the nature of bottlenecks to the more effective and rapid uptake of new varieties. Shumba (1996), referring to the "non-availability of improved varieties" of sorghums and millets in marginal rainfall areas in Zimbabwe, reports that "although several varieties have been released, their diffusion to smallholder farmers has been limited". At a recent series of workshops in Bangladesh (DAE 1998), researchers and plant breeders suggested that inefficiencies in the public sector extension service were responsible for the fact that farmers were not yet adopting many of the 34 varieties of rice that had been developed and released in the country. Extension officers suggested the reason was more to do with inappropriateness of varietal characteristics to the needs and circumstances of farmers; while staff of the parastatal seed supply company felt it was simply a lack of awareness among farmers of the existence and advantages of the new varieties, which could be overcome by using the mass media for information and advisory campaigns. Others blamed the seed supply system itself, for not being able to deliver seed in appropriate quantities in time. However, despite such differences in opinions as to the causes, the overall conclusion is that the formal seed sector has not served resource poor farmers well, in terms both of access to quality seed and a range of varieties.

4. Informal seed sector

The informal seed sector comprises farm-saved seed, and exchanges with other farmers or through market structures. Seed dissemination through NGOs is also considered in this section.

4.1 Farm-saved seed

In many developing countries, farm-saved seed accounts for up to 80% of farmers' seed, with the exchange through other farmers and local markets making up most of the balance (Cromwell, in Tripp, 1997). For farmers, the advantages of using their own seed are that this is free, they are not dependent on others, they can control seed quantity and timing, they know the seed quality and can choose between varieties. The disadvantages are that they are restricted to available varieties and seed quality may be poor due to bad storage and/or diseases in the crop.

Although many farmers may be seed secure most of the time, they do use other seed sources to restock after a crisis or to obtain new genetic material.

4.2 Exchange with other farmers

Farmer-to-farmer exchange of planting material has always been considered an important mechanism for diffusion of new varieties.

Research conducted in Uganda (David et al, 1997) showed that the majority of farmers who harvested new test varieties shared seed with other farmers, mainly within the same village, but 59% of seed givers also sent gifts beyond the village. This was mostly done in order to spread an appreciated variety as well as to ensure its multiplication within the community (David et al, 1997). Research in India (Witcombe et al, 1999), where rice seed was disseminated mainly to friends and relatives in adjacent villages, also showed that the main reason for farmers spreading seed was to provide a seed pool in case of their own crop failing. In the Ugandan research, the main reason given for farmers not giving seed was the lack of sufficient seed, and it has also be shown that wealthier farmers were more likely to give more gifts of seed, and spread local varieties more widely (David, 1997). However, somewhat surprisingly, David et al (1996: in David, 1997) showed that the spread and quantity of seed shared was not greater for more appreciated cultivars.

Seed obtained from neighbouring farmers is considered to be of good quality, and to be locally adapted, but this exchange can create a sense of dependence, and receiving farmers have no control over the quantity of seed (which may be restricted by the limited amount the donor farmer has to spare), or the timing of seed delivery, and occasionally the seed given may be of poor quality.

Farmer-to-farmer seed exchange systems are based on traditional social networks and family relations, but Tripp (1995) cautions that seed exchange networks may be exclusive to particular ethnic or socio-economic groups. Farmers are selective about who they give seed to and it may be that only some farmers benefit. Often these are the wealthier ones as poor farmers may be seen as unequal and undesirable partners in indigenous seed networks (Sperling and Loevinsohn, 1993).

It is likely that the nature of farmer-to-farmer diffusion has changed over time, and now 'gifts' between farmers are likely to be smaller, and transactions are more likely to be on a commercial (rather than a gift) basis (David and Sperling, 1999). The importance of local networks of exchange and gift giving appear to be declining in many areas, and it is argued that local bean seed systems cannot sufficiently fulfil the needs of farmers under current production conditions (David, 1994). Therefore, relying on this system to disseminate new bean varieties would be likely to result in slow diffusion. (David, 1994)

4.3 Markets

Contrary to common belief, small-scale farmers do buy bean seed, and this ranks second in importance to farm-saved seed. Research has also shown that there is no relationship between farmers wealth and their willingness to buy seed (David, 1994), although poorer farmers are less seed secure and are more likely to have to buy seed each year (Witcombe et al, 1999; David, 1997). Poorer farmers buy seed to restock, due to the sale / consumption of their seed, and/or unfavourable climatic conditions, whilst wealthier farmers buy seed to restock after periodic crises or to improve their genetic stock (David and Sperling, 1999).

Research in Uganda and Rwanda has shown that farmers will eagerly buy seed of new, untested bean varieties at relatively high prices (David, 1997), and additional

research has shown that farmers are prepared to buy new varieties and risk growing them, irrespective of wealth category (David and Sperling, 1999).

Negative aspects of purchased seed include poor physical quality, poor genetic quality, distance to shops, and high seed cost. But its advantages include the availability of new genetic material (i.e. choice), easy access to seed when required and in the desired quantity, and the possibility to buy on credit.

4.4 NGOs

In some developing countries, NGOs represent a key set of actors both for disseminating information about and seed of new varieties and as collaborating partners for local and donor governments. NGOs either collaborate with research/government organisations to deliver seed to farmers (as in the first example below) or independently buy and sell/distribute seed directly to farmers (as in the second, ActionAid, example below).

In 1996, the Tanzanian National Bean Programme, in collaboration with CIAT, received an international grant to sell seed of 3 new varieties through a seed stockist programme set up by an international NGO. This programme provided small rural shopkeepers with training and credit guarantees to enable them to buy agricultural inputs from district-level supply agents. Shopkeepers in several regions received 1kg seed packets containing an information leaflet (in the local language) as well as a technical bulletin describing the different varieties to help them promote them. Seed was distributed over two seasons as an insurance against involuntary losses, and sale proceeds went into a revolving fund administered by the National Bean Programme (David, 1997).

ActionAid is involved in projects to diversify crop production and improve seed availability in Malawi. Planting material of improved varieties is grown in community-managed nurseries and this is then distributed to smallholder farmers for further multiplication and dissemination. ActionAid also provides seed on credit and training programmes. (Msimuko, 1997)

There is no evidence in the literature cited above as to the relative effectiveness of these methods of NGO operation.

5. Use of these sectors

The share of the formal sector in total seed supply is low compared to the informal sector (farm-saved seed, local markets, NGOs), and Cromwell (in Tripp, 1997) estimates that local or informal seed systems provide some 20 to 30 percent of the seed used by small scale farmers in developing countries, with farmer-saved seed accounting for 60 to 80 percent, and the formal (public and commercial) system providing only between 2 and 10 percent. The formal system may be important for providing a regulatory framework, but from the farmer’s point of view it is obviously not a major channel for distribution of seed. Lanteri and Quagliotti (1997) state that the comparatively large size of the informal sector reflects a lack of communication and co-operation between government organisations and seed-producing farmers in the informal sector.

Seed systems in developing countries are in a state of change. Whatever the present differences between crops and countries, it is clear that in the future there will need to be:

- more efforts to link the formal and informal or local systems, both for the introduction of new varieties and for providing high quality seed of established varieties
- more private sector involvement, both on a commercial basis for crops and contexts where firms can make an assured profit, and under contract to the state
- more NGO activity to promote local seed production and distribution; with perhaps a new focus on supporting the establishment of local entrepreneurs (Wiggins and Cromwell, 1995)

The table below summarises the main differences between the formal and the informal seed sectors.

Factor	**Formal seed sector**	**Informal seed sector**
Role of farmer	Seed receiver	Seed selector, producer, supplier and receiver
Nature of seed exchange	Purchased, on credit	Purchased, on credit, bartered, given
Access and dissemination	Via inefficient delivery systems; Focus on specific crops and areas that are more easily accessible	Use variety of channels to obtain seed as required; Diffusion among farmers is slow and may be biased against certain groups of farmers
Adaptability of seed	Often no inclusion of farmers' selection criteria in seed production process	Locally adapted

6. Farmers' communication systems

To make informed decisions farmers need: 1) a good varied supply of information and 2) the skills to manage and interpret this information (Norrish and Lawrence, ?). Farmers draw on a wide range of information sources, and attach varying degrees of importance to them. Face-to-face communication is often of paramount importance for farmers. As well as family and friends, local extension workers may be an important source of information for farmers. In one study villagers reported that extension agents were important as they "know more about agriculture than anyone else" (Munro, 1988). Farmers may also gain information from mass media (including radio and television) and printed material, although the latter is often criticised for not being readily accessible or useable by end users.

Research in Tanzania (Nathaniels and Mwijage, 2000) has shown that farmers are keen to learn new seed production and storage methods, but that they rely most heavily on their own experiments and the experience of other farmers, rather than the extension service. Other research in India (Tripp and Pal, 2000) has shown that when

choosing which seed to buy, farmers mostly rely on the advice of other farmers or seed merchants.

Access to information sources may vary between genders and socio-economic groups. It is therefore crucial to have an understanding of local communication systems if negative distributional effects are to be avoided. There may, for example, be important gender differences in the operation of local networks: Subedi and Garforth (1998) show that in the hills of Nepal, women farmers' communication patterns and sharing of information about new varieties and husbandry practices operate differently from those of men, a situation that is matched in other contexts. Case studies reviewed by Cromwell (in Tripp, 1997) suggest that when agencies (NGOs, for example) introduce local seed activities, "the relatively better-off and more powerful, with their extra resources and easier interaction with outsiders, were in most cases the first to benefit from the introduction of local-level seed activities". From research undertaken in Nepal, Sthaphit and Joshi (1996) also echo these concerns about the distributional or equity implications of informal systems, reporting that economically disadvantaged groups did not receive seed of the new varieties from "economically stronger" farmers.

For seed systems to function effectively there is a need for information to flow through the system. There need to be efficient, 2-way links between all actors in the seed distribution and communication system, and an appropriate mix of channels needs to be used to ensure the widespread dissemination of information among farmers. An initial analysis of existing communication systems is therefore essential, and it is suggested that such an analysis take account of the following (taken from Lawrence, 1995): the amount of information used by different farmers, the diversity of information sources they use, the relevance of each of these sources and the degree to which they satisfy the farmers' demand for information, the credibility of different information sources, the complementarity of information sources, linkages between information sources, access by users to different information sources, the direction of information flows, and the use of indigenous knowledge.

7. Factors affecting dissemination and adoption

Farmers are continuously making efforts to access and maintain their available pool of seed material, testing and evaluating new varieties and crop combinations.

In principle, farmers can try out and adopt seeds of new or modified varieties more readily than many innovations. They are inherently divisible, or "non-lumpy". The main factor affecting uptake is the relevance to end users, and this relevance is dependent on a set of specific contextual factors (Garforth and Usher, 1996). Farmers are influenced by the perceived compatibility of the new/improved variety with the existing farming system, the characteristics of the variety in relation to farmers' criteria, the availability of the seed within the systems used by farmers to access seed, and their access to information about the variety, and time.

In relation to compatibility, the less compatible the innovation, the less easy is it for farmers to integrate it into their system and the less likely is rapid uptake and diffusion. Incompatibility implies either that the use of the innovation will have to be

adapted to fit, or that other elements of the farming system will have to be adjusted in order to accommodate the innovation. Tripp (1995) cites the example of an improved variety of maize in Burundi which out-yielded local varieties but failed to be integrated within local farming systems because its late maturity conflicted with prevailing patterns of crop rotation. Other reasons for incompatibility may revolve around the demand for labour at peak seasons, or the timing of cultivation operations when draught animals are either not available, expensive, or weak.

In relation to the characteristics of a new variety, farmers apply a wide range of selection criteria to their planting material apart from yield and adaptability, including marketability, colour, taste, size, resistance to pests and diseases, storability, growth habit, ease of harvesting, maturity time etc. In most situations where a direct comparison has been possible between scientists' screening and selection criteria and those of farmers - particularly resource poor farmers - they have been shown to be quite different. McMullen (1987) summarises these under five heads:

- yield: scientists have emphasised maximum yield while small-scale farmers want an assured stable level of production under variable climatic conditions
- grain quality: scientists pay little attention to this, while resource poor farmers whose households consume most of their crop often have quite specific criteria regarding taste, cooking quality, appearance and storage characteristics. For example, small farmers in Southern Tanzania, Eastern Zambia and Malawi prefer the local hard white maize varieties to the high-yielding maize varieties, as the latter turn to unusable powder when pounded using traditional methods (Cromwell et al, 1992, in Lanteri and Quagliotti, 1996)
- plant structure: farmers may be particularly interested in straw and foliage production
- cropping practices: farmers may be particularly interested in the performance of new varieties in crop mixtures and complex rotations or relay cropping, as opposed to pure stands
- seed selection: small scale farmers tend to have specific criteria relating to appearance for the selection of seed for the next season

There are now many attempts to rectify the insufficient attention that was paid to farmers' criteria in the past, and various forms of farmer involvement in the research process - from on-farm farmer-managed trials, to participatory plant breeding and/or varietal selection - have been introduced in order to address this failure directly. However, Cromwell et al. (1992) note that conventional on-farm trials do not allow farmers' criteria to be heard until the selection of material to be tested has already been made by scientists. More recent moves toward participatory varietal selection, plant breeding and assessment are hoped to lead to selection and breeding programmes which will produce material that meets the diverse needs of a wider range of farmers (Joshi and Witcombe 1996).

These trends are also taking place in Tanzania, for although the formal seed sector was criticised in the past for paying little attention to indigenous systems of seed distribution and variety development, there are now signs that more consideration is being given to farmers' decision-making criteria, and there is a desire to promote the widespread testing of new materials with farmers to ensure sufficient demand and uptake (Nathaniels and Mwijage, 2000).

Farmers can only use information which makes sense to them, and although farmers are generally aware of the relationship between seed physical characteristics and germination, they seem less aware about the relationship between seed quality and plant health, attributing most bean diseases to soil conditions, insects and the weather (David, 1994). Following on from this, the concept of disease resistance, and its deliberate breeding into new varieties, may not be widely understood by farmers, and a cultivar which has been modified by inclusion of a specific genetic resistance but remains otherwise unchanged may not be seen as “new” by farmers. In this case uptake will only come as farmers replace seed in their normal way, or buy or exchange seed in the informal system as they see neighbours’ or relatives’ crops outperforming their own.

The dissemination of new/improved varieties and their subsequent adoption is also dependent on time, and Sperling and Loevinsohn (1993) reported from research in Rwanda, that new, untested bean varieties did not start to spread until they had been cultivated in farmers fields for at least 3 years. From their research in Nepal, Sthaphit and Joshi (1996) also found that farmers only exchanged or sold seed of a new variety outside their own village four years after its introduction. Due to the high dependence on farm-saved seed, the natural replacement of seed is a slow process for many farmers, and this considerably slows down the diffusion process.

The diffusion literature reminds us that “adoption” is not a once-for-all decision or action. With a divisible agricultural innovation, such as fertiliser or seed of a new variety, there is often a stage at which farmers try it out on a part of their holding. This allows them to evaluate it without risking a substantial part of their livelihood. Indeed, divisibility and “trialability” are characteristics usually associated in the literature with ease of adoption. Seeds are intrinsically divisible, unlike “lumpy” innovations such as new mechanical equipment, or some soil conservation measures. Even after the decision has been taken to adopt an innovation completely, its continued use may depend on the farmer’s experience with it: if this is positive, the adoption decision will be confirmed; if negative, the farmer may discontinue it. Again, a variety is relatively easy to discontinue: a decision to use it only commits the farmer for a single season. Also, of course, “complete adoption” does not necessarily mean that the variety takes over the whole of the area planted to that crop: the farmer will decide how much, and which, land to put down to the new variety, consistent with its characteristics and place within the farming system.

The continued use of new/improved varieties or seed also depends on the amount of seed 'lost' each season, and this accidental seed loss can substantially slow down the informal diffusion of a new variety. In the case of beans, seed loss can be caused by small bean plots, limited amounts of seed received, environmental pressures and poverty (Sperling and Loevinsohn, 1993). The amount of seed originally available to the farmer, and its multiplication rate and productivity, also influence their ability to retain seed (David et al, 1997). Some research has shown that wealthier farmers are better able to retain seed longer (Hoogendijk and David, 1997), whereas poorer farmers may need continuous access to a supply of improved varieties in order to ensure sustained adoption.

Dalrymple and Srivastava (1994) note several institutional and policy factors - in addition to the structure and performance of seed supply systems - which influence the transfer and adoption of modern plant varieties. These include the availability and cost of complementary inputs, government price policy and credit programmes, research and extension services and other channels for provision of information about new varieties, and seed distribution and transportation.

The adoption by farmers of new crop varieties therefore depends on a multitude of factors, including the compatibility of the new variety within the existing farming systems, the characteristics of the new variety in relation to farmers' criteria, the farmers' information systems, prevailing institutional and policy factors and time.

8. Options discussed in the literature for stimulating seed uptake

Several authors make suggestions for ways in which the dissemination and adoption of new and improved varieties can be improved:

- Sperling et al. (1996) describe efforts to design distribution systems for new varieties of beans in the Great Lakes region of Africa, based on farmers' current practice of growing small quantities of several varieties and of exchanging seed amongst themselves to meet their needs for different uses of beans, spread risk and try out material from other areas. The widespread distribution of small "test packets" of seed proved particularly successful.
- Sthaphit and Joshi (1996) suggest that community based organisations and NGOs should be used to speed up the diffusion that, left to the local system alone, would be relatively slow.
- Many authors, including Sperling et al. (1996), support the idea of using more than one channel for distributing seed of new varieties as different farmers use different sources within the formal and informal systems. Research conducted by David et al (1997) confirmed the appropriateness of using market and non-market (rural health clinics, women's groups, on-farm trials and NGOs) channels to disseminate seed in as many locations as possible, with each channel having its own advantages and disadvantages that need to be assessed within the local context.
- Edwards and Farrington (1993) stress that the involvement of end users of research from an early stage is a critical factor both in ensuring appropriateness of outputs and in early uptake and promotion. It is also important that research projects consider their dissemination and communication strategies from the outset, and ensure that this is active and demand-led, rather than passive and supply-driven (Norrish et al, 1999a). Key stages identified from their research include: the identification of stakeholders and end users, the definition of communication objectives and indicators of their achievement, the assessment of users' needs, analysis of the communication context, the development and piloting of communication materials, and continuous monitoring of the materials and the overall communication strategy (Norrish et al, 199b).
- Seboka and Deressa (2000) suggests organising farmers into co-operatives/ community seed banks that could then act as contract growers. Fujisaka (1999) also suggests initiating farmer seed enterprises as a strategy to sustainably disseminate and promote new crop varieties.

- Witcombe et al (1999) advocate the establishment of local, community seed pools; Lanteri and Quagliotti (1997) state that efforts should be taken to create linkages between the informal and the formal seed sectors, so that the informal sectors can obtain, multiply and distribute seeds produced in the formal sector; and David (1997) suggests that if seed is limited, this can be distributed to 'key distributors' for multiplication and subsequent diffusion.
- David (1997) also recommends that free bean seed distribution should be avoided, except in cases of emergency. Farmers value seed more when they have to purchase it; free seed undermines commercial seed production activities; and free seed can raise farmers' expectations and lead to dependence. It is also advised that seed should be packaged in small quantities, and seed packets should be clearly labelled in the local language, providing some basic information about the variety; and that it may be necessary to repeat seed distribution over several seasons to ensure continued adoption.
- Nathaniels and Mwijage (2000) suggest the use of seed fairs - to bring together different organisations and individuals involved in the production and dissemination of new seeds.
- Where seed has been modified by the inclusion of a specific genetic resistance, Garforth and Warren (1998) suggest that its dissemination should be supported by an informational campaign, informing farmers of the 'invisible' benefits of the new variety.

7. Conclusion

It is apparent that access to quality bean seed is often problematic to small-scale farmers, due to the lack of appropriate channels for disseminating new cultivars. There is, therefore, a strong need to develop a seed dissemination strategy that builds on existing channels of diffusion and information exchange. Although at present much of the emphasis is on informal systems of communication and dissemination, there is increasing interest and experimentation in bringing the formal and informal systems together by, for example, making available the products of formal research to farmers in ways which facilitate their diffusion and multiplication within local informal seed distribution systems. Integrated approaches such as these show potential for stimulating the supply and adoption of new seeds to small-scale farmers throughout much of the developing world.

Any strategy for achieving appropriate uptake must fulfil some basic conditions: the new varieties must be relevant or appropriate to one or more specific categories of target beneficiary; information about the new seeds must be widely available to the farmers to whom they are thought to be relevant, and these farmers must be convinced that the new seed is going to make a difference either to productivity or, in some other way, to the well-being or livelihood of the farm household; and farmers must have access to the new planting material in appropriate quantities, and at the required time (Tripp, 1995).

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Appendix 3.1.2

Role of local government structures in communication and information flow in respect of *Phaseolus* beans in the Southern Highlands of Tanzania

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1.0 Introduction

Release and dissemination of new bean varieties by Uyole Agricultural Research Institute (ARI-Uyole) in the Southern Highlands zone started in the 1980s when the first variety 'Kabanima' was introduced in Mbeya, Mbozi, Ileje, Chunya, Iringa, Mufindi Njombe, Makete, Sumbawanga, Nkasi and Songea (Mussei, Madata and Mbogolo, 2002). Thereafter a number of new varieties were released: they include

- Uyole 84, 90, 94,96 and 98
- YC-2
- Ilomba.

It is more than 20 years now, but researchers do find adoption rate to be slow and difficult due to low access to the improved varieties and information (Mussei *et al* 2002). On the other hand, farmers tend to have different views as regards to their preference and other actors' influence on the adoption rate as this report will try to explain and the way forward.

Amid this situation, information promotion as a project was brought into the Bean Improvement Programme (BIP). It was felt that enhancement of improved bean varieties adoption and acceptance to a large extent depends on an effective information mechanism. This demanded a practical communication process.

Since communication is a social process, it operates within social structures, both formal and informal, and their processes. This requires involvement of all stakeholders in designing and usage of the communication mechanism that can be decided upon by all parties. For communication to be interactive and participative, linkage among all stakeholders is of paramount. This creates some complexities as to the identification, inclusion and participation of all stakeholders for the breeding and ultimately the release and adoption of bean varieties. Farmers, the primary stakeholders, live in communities which are open to internal and external environments that have influence on their lives as well as to decision making on innovation as whether to adopt or refuse, accept or deny, go subsistence or commercial and the like. Figure 1 demonstrates the environment in which farmers live. It is a complex situation that needs to be appreciated by anyone introducing an innovation directed to farmers.

Researchers have in many cases ignored consideration of socio-economic aspects on their targeted recipients of innovation as was the case of the Green Revolution in South Asia (Lipton, 1989, Shiva, 1991 and Perkins, 1997). The Green Revolution Technology was intended to increase yields for cereals like maize, wheat and rice so

as to fight hunger and poverty of the poor, but in the end hunger and poverty persisted as the poor never benefited from the technology, although yields increased (ibid). Likewise BIP would like to see farmers' yields increase and the generation of food security and income so that they can meet their basic needs. This would depend on how different factors that have influence on the programme are harmonised. The first and foremost step is accommodating the socio-economic aspects that have effects and influence on the programme as this report will later suggest. This requires resources if it is to be clearly understood, accepted and implemented by all stakeholders in the programme.

ARI-Uyole has been applying several approaches in bean variety dissemination including on-farm trials and use of research groups, demonstrations, seed distribution and collaboration with community based organisations (CBOs). The problem is the uncertainty of the level of adoption and acceptance of the new varieties. Former studies on this matter suggested that information problems might be hindering the slow rates of adoption and acceptance (Asseid, 2002). This study builds on the former findings by exploring, through a participatory survey, the local structures and processes that surround bean production, use and marketing within villages in the Southern Highlands.

1.2 Objectives of the study

An assignment on participatory promotion of disease resistant and farmer acceptable *Phaseolus* beans in the Southern Highlands of Tanzania was commissioned to explore three issues:

i. What role do local government structures and processes play in the exchange of information relating to agriculture, and in particular information about new varieties of beans and about bean markets and prices?
ii. Are there differences, between communities where bean production is primarily for household consumption and those where beans are grown deliberately for sale, in access to, and channels for accessing, information on agriculture (and beans in particular)?
iii. In relation to (i) and (ii) above, what differences are there between men and women who are involved in bean growing, use and marketing?

The study commenced on 2nd July, 2002 and ended on 30th July 2002 in Tanzania. Ms Martha Luleka an MA student in Social Development and Sustainable Livelihoods took up the assignment as it coincided with her dissertation topic;

> '*Improved Access to information in local governance, a strategy in making Village Councils work for rural development: The case of Tanzania'*

Execution of the assignment not only was an input to the project in terms of meeting stakeholders and sharing with them the effective information channels for bean production, marketing and consumption but also an opportunity for the student to put into practice theories learned during her course in a rural setting.

Another equally important aspect of the study was to consolidate findings from past research on the issue of information promotion on acceptance and adoption of new

varieties of beans. The study was seeking to analyse information processes within the communities on bean production, use and marketing.

1.3 Study area and people met

The study took place in Mbeya and Iringa regions as shown in Table1 below.

Table 1: Places and number of men and women farmers who participated in the study

District	Ward	Village	Number of people met
Njombe - Iringa	Wanging'ombe	Lyadebwe	50 (19 women & 31 men)
Mbarali – Mbeya		Mahongole	5 all men
Mbarali - Mbeya	Igusi	Azimio, Mahango and Simike	108 (54 women & 54 men)
Mbeya Rural	Iwindi	All villages' chairpersons and sub-village chairpersons and Village Executive Officers (VEOs)	46 (1Woman & 45 Men)

The numbers of people met in Table 1 include bean farmers and non bean farmers, but the majority are engaged in farming that includes bean production, mixed with other crops. Apart from these the following were individually met:

- District Executive Directors for Mbeya Rural and Mbarali were met including the District Planning Officer and Council Chairman and his deputy for Mbeya Rural district.
- Two Ward Executive Officers (WEOs) and all Village Executive Officers (VEOs) from all villages visited
- Two beans farmers in Iwindi village and one in Lyadebwe village
- Bean Traders at Mbalizi, Soko Matola, Soweto and Uyole markets totalling to 14 mostly being women traders as the breakdown appear below:
  i. Mbalizi – 5 women traders
  ii. Soweto – 3 women traders
  iii. Soko Matola – 2 women traders and 2 men traders
  iv. Uyole - 2 women traders
- Traders at three village (weekly) open markets at Mahongo Inyala and Chimala totalling 8 traders, most of whom were women:
  i. Mahango – 1man trader
  ii. Chimala – 3 women traders and 2 men traders
  iii. Inyala – 2 women traders.
- Four Research Assistants (Dr. C. Madata's supporting staff)

1.4 Process

i. Initial Briefing

Briefing started in Zanzibar whereby Dr. Bakari Asseid gave the project background and his experience in the former research which he did and suggested the villages to be visited. These were Mahongole and Mayale. Then I moved to Mbeya where Dr. Catherine Madata, head of the bean breeding programme at ARI Uyole, gave the project background and its current status. She then delegated her involvement into the study to Mr. Kisanga for the selection of the villages to be visited. The selection made

was Mahongole and Iwindi. Selection of these two villages was based on the criterion in the Terms of Reference for the study that one had to be in a predominantly subsistence area and the other where beans were produced on a more commercial basis. So Mahongole was subsistence and Iwindi was a commercial bean production village.

ii. Field work

After all the logistical arrangements, fieldwork started on the 10th of July 2002. Schedule for the said villages did not work as it was later found out these villages were yet to be supplied with the improved bean varieties. Our physical cancellation of the schedule to these villages, however, revealed that Iwindi got the seeds in 1997. The itinerary had to be changed and new villages were picked, these were Lyadebwe in Njombe district in Iringa region, Azimio, Mahango and Simike in Mbarali District in Mbeya region.

But all the same we went to Mahongole to officially apologise and to Iwindi to cancel the 4 days stay, but in this village (Iwindi) I was lucky to find a ward meeting involving village chairpersons, sub-village chairpersons and Village Executive Officers, taking place in which I was invited to participate. This was very fruitful because it provided room to discuss how matters relating to development are communicated, their problems and how they address them through the district council structures. This will be further expanded in the findings under local government structures.

After this we proceeded with the fieldwork up to the end of the study, making it possible to meet the number of people appearing in Table 1 above.

2.0 Methodology

During the fieldwork survey, Participatory Rural Appraisal (PRA) was deployed to generate qualitative outcomes through information, dialogue and discussions by both men and women. The tools used were:

a. Venn Diagrams to assess social institutional linkages
b. Preference ranking to assess preferences by use of scores in focus group discussions for women and men separately.
c. Key informants discussions to benefit from their experience and influence in their respective areas
d. Seasonal calendars to observe their timeline activities in a year
e. Visits to individual farmers to talk about and see their bean production
f. Identification and selection of the best channels for information sharing in the village
g. Observation and discussions at the markets on how beans marketing is carried out by traders
h. Role play and Facilitated Self Assessment (FSA) for Uyole Research Assistants to act out the roles of a farmer/ researcher relationship when introducing new variety for the first time and self assess the programme.

The findings revealed in this report are the outcomes through the use of Participatory tools listed (a - h) above and later analysed. Findings on preference ranking which resulted into beans variety preference was based on scores ranging from 0 to 5 (see Annex A). The higher the scores the more positive people are to the variety. It worked the same with the effectiveness of information channels. Exploratory Data Analysis (EDA) was later used resulting in tables and charts to facilitate an insight of the trend of the data collected during the participatory research in the two locations. (These are referred to below as two villages: Azimio, Mahango and Simike are counted as one village as they were jointly surveyed; the other village is Lyadebwe.)

2.1 Limitations

Although the Terms of Reference required picking a village that produces beans for household consumption and a village that produces for commercial purposes, the study ended up with villages which only produce under subsistence conditions. It was Iwindi which was said to be commercially producing beans, but it was later found out not to be in the list of villages ARI is involved in promoting improved varieties, although the Extension Officer in that village claimed to have had the improved varieties in 1997.

3.0 Findings

3.1 Introduction

Picking a typical farmer in the village and trying to bring about changes by introducing an innovation means adding one more variable among many that surround her/him. These are the variables influencing her/his decision making in accepting and adopting the innovation or not. This is where development actors including breeders have to appreciate the socio-economic aspects that are involved when introducing innovation in order to facilitate a smooth and successful change. In all villages visited it was vividly demonstrated that farmers are surrounded with many factors and actors with whom they interact on day to day basis. These range from weather, poverty, lack of credit facilities, researchers, extension officers, traders, local leaders, local government structures and many different institutions, etc. Figure 1 below visualises these.

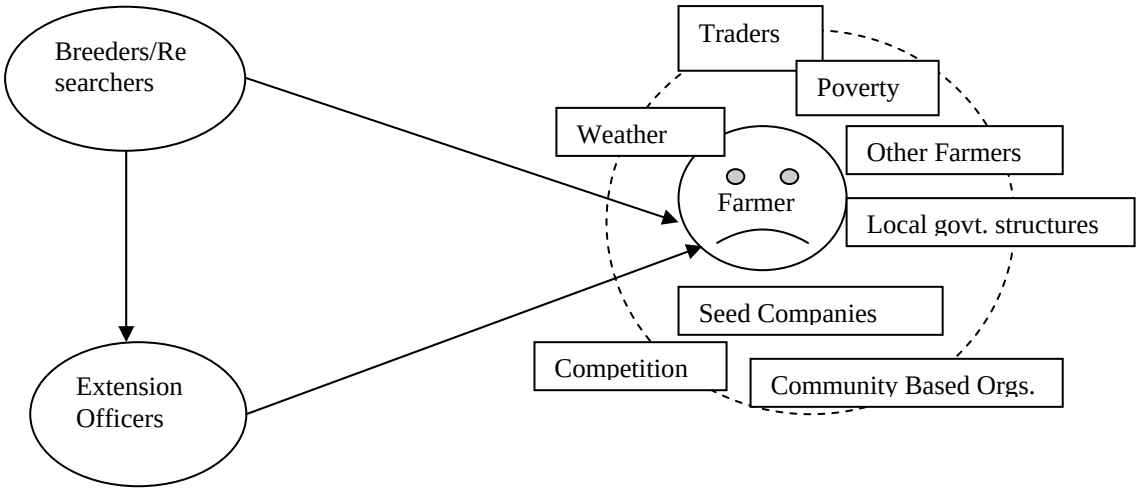


Figure 1: Farmer environment with different factors and actors
Source: Designed according to what was observed during the study

The approaches used by ARI-Uyole in disseminating bean varieties have targeted the farmer (see Annex C) and at times through the extension officers in different villages. Figure 1 demonstrates a one way communication system between research and farmers and this is what Melkote and Steeves (2001: 126) call the 'diffusion model' which incorporates inadequate feedback from the farmers. This was confirmed during a facilitated self assessment exercise done with supporting staff of the bean project at ARI-Uyole after they had done the role play. Having identified the rest of the stakeholders like the traders, consumers and policymakers, they found out there was a gap that created communication breakdown between different actors. They even wondered how it can be possible to identify promotion channels without knowing and involving the other stakeholders. It would therefore require involvement and commitment of all stakeholders in the growing, use and marketing of the beans through effective communication and support systems.

Success or failure of adoption of the new varieties depends on the farmers' decision that is in many ways influenced by different factors like weather, competition and poverty, and equally on actors with whom farmers have to interact. But before any farmer comes to accept or reject the new varieties s/he considers a number of issues:

- Early adoption means early risk taking;
- Motivation and incentives for taking up the risk;
- Other people's opinion in regard to the innovation;
- Assurance if things go wrong; and
- The capacity and ability for the cost involved.

It is therefore important that the above factors and actors appearing in Figure 1 are taken into consideration during the introduction of any innovation to a farmer in a village. Choosing Kabanima or Kablanketi as a variety depends by and large on these

bulleted points and these are influenced by factors and actors appearing in Figure 1 above. The findings in this study will try to address the following aspects:

i. How the local governance structures are in support of agriculture and particularly bean production and marketing;
ii. Communication channels people use under the local governance structures;
iii. Farmers beans preference for production, use and marketing and Sources of information gender-wise; and
iv. The way forward.

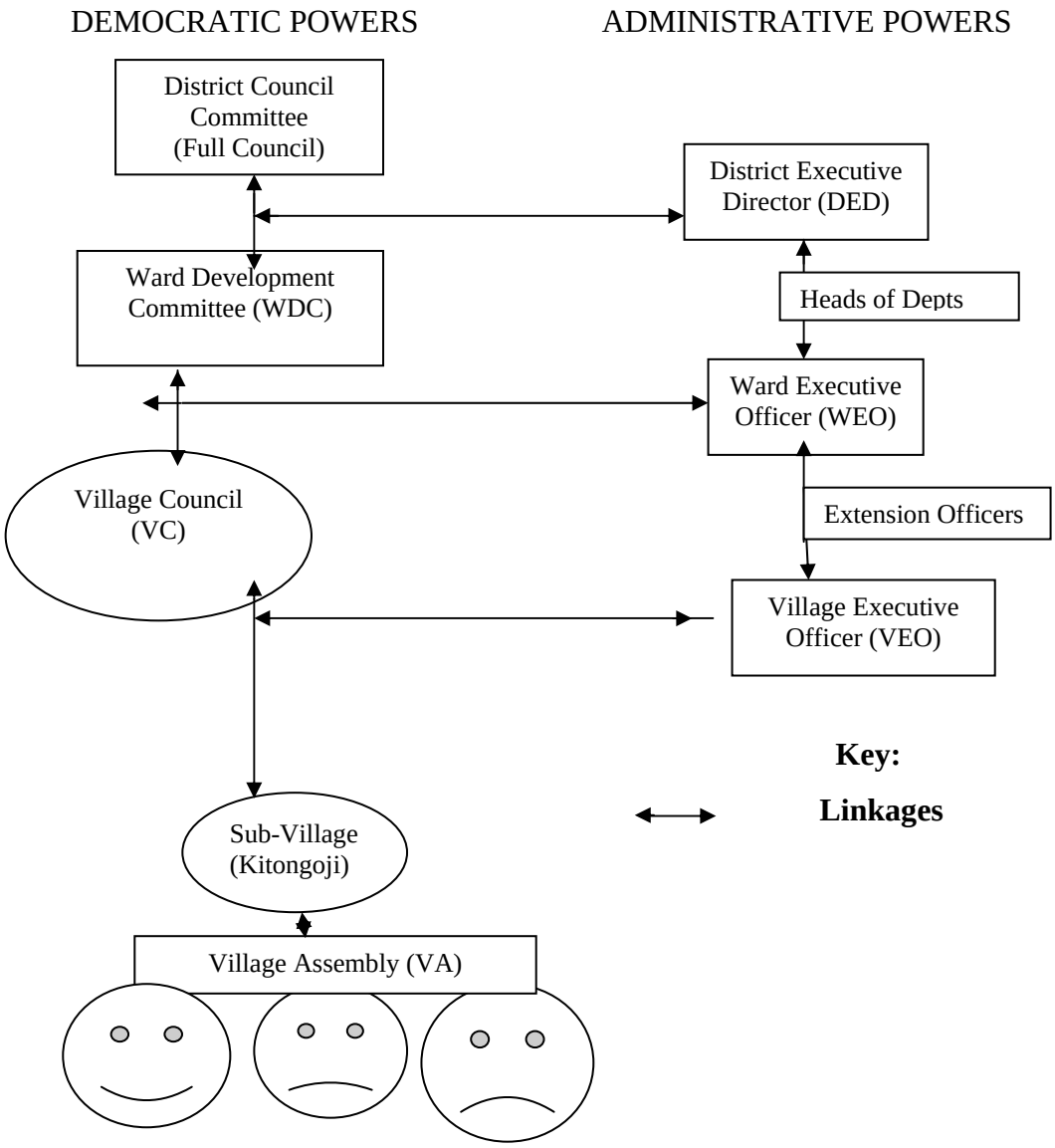
3.2 Local governance structures and beans promotion

3.2.1 Linkages

Each village is part of the local government structures and processes and therefore its residents are also connected to these structures and processes, such as decision making, participation, income generation and others. That is why, before any intervenor is allowed to meet people in a village, he or she has to go through the village chairperson and the Village executive officer. It is a formality that is always observed by many actors as these are the leaders within the Village Council, the governing body of the people and managers of the resources of each village. ARI-Uyole used Village Councils (VCs) during their early mobilisation and formation of trial and research groups. But thereafter, linkage was mainly through the extension officers and these groups, so the VCs were not much involved any more. This was observed during the meetings with villagers in both villages. Whenever there was a point to be made on the improved varieties, group members were pointed by other villagers to react first before anyone else. This showed an emergence of a cluster of people with special knowledge and responsibilities within the same society, while in actual fact the intention behind the formation of these groups was to spread the bean innovation to all farmers.

The local government structures are shown in Figure 2 below. This shows how the elected Council members and the local administration interact, which therefore means that meeting farmers it is in a way interacting with the local government set up: farmers and other people in the villages elect the democratic leadership, and some beans farmers are also village leaders. In Lyadebwe village, for example, some members of research groups are also Village Council members.

Figure 2: Organisational Structure and Power Centres of a District Council in Tanzania



These structures bring about the connection between different levels of local governance and the village residents who are mainly farmers. Since this is the set up that is in principle operational, it carries both potentialities and shortcomings in bean promotion. It could be an opportunity for the BIP to capitalise on it as we will later explore when looking at the structures in Figure 2 below. It would therefore be of importance to visualise the local government structures and their linkages in order to locate how information flows downwards and upwards between the high level and lower levels. Directives, policies, circulars, political campaigns dominate, though all follow the hierarchical set up to the lowest level which is the village. So if any of the structures is disconnected it has a negative impact on information flow to the rest of the structures. Each of the structures has roles or functions to perform (see Annex B for details of functions at each level).

3.2.2 Local governance and beans promotion

As said earlier, ARI-Uyole formed groups (Research Groups) in the villages which were the focal points for both researchers and extension officers. The Village Councils (VCs) in all villages visited were informed and involved in formulation of groups created by ARI-Uyole. After that ARI-Uyole worked closely with these groups and the Extension officers. The VCs were no longer involved in the progress or development of the new varieties. During this study, it became apparent that the formation of these groups meant another layer of leadership within the villages because these groups had chairpersons and secretaries without defined relationships with the local structures at village levels. While this would not cause problems if the extension and ARI-Uyole were available all the times to support bean promotion in the villages, ARI-Uyole staff only occasionally visit the villages. The Extension Officers also have other responsibilities from their department: bean promotion is just part of their day to day activities. So this signals a potential communication breakdown happening from time to time between farmers and ARI-Uyole and the extension officers on bean promotion and also within the villages. Its implication is loss of motivation for continuity and follow up and commitment by farmers to the new varieties.

Looking at the structures above, the villagers are at the bottom line, and one can imagine the process it takes to access information that comes from the top levels. The meeting convened by the Ward Executive Officer (WEO) in Iwindi Ward for Village and sub-village chairpersons, Village Executive Officers (VEOs) lamented on how villages are denied crucial information on their district council's affairs like the district council budget and development reports. As said earlier we found this meeting taking place while going to cancel the schedule for this village. It was meant to give directives on the National Census which was about to take place, emphasising on village collection of development levy and building of village and sub-village offices, which some did not have. Since we were given time to ask a few questions, we asked an open ended one: 'How do you see the future of your villages getting away from poverty?' Although agriculture was mentioned as the major activity that will facilitate poverty reduction, they did not see how that can be done because:

- Their cash crops like coffee and pyrethrum have no markets since the introduction of liberalisation of trade;
- No farm credit facilities;
- Cannot adhere to extension advice like on fertiliser and pesticides as all need money; and
- No reliable traders for their cash crops.

Beans, maize, sweet potatoes and livestock were said to be enabling farmers to meet their basic needs. Their district council has not found any better solutions for them.

When beans were mentioned and we asked for the varieties that are grown, it was said to be mainly Kablanketi. In this village farmers harvested much more than in other villages we visited. One lady who was the only woman (a sub-village chairperson) in this meeting said she harvests from eight bags and above when the weather is good, some farmers produce more. On whether they had seen the improved varieties, that is when the Iwindi village extension officer remembered to have had the seeds in 1997

and the lady was one of the research group members. At this point many village leaders appeared to be uninformed of the seeds and therefore after the meeting we were able to visit two farmers who were in the research group but no longer had the improved seeds.

What was learnt in this meeting is that the local governance structures at the higher level were not strongly linked to the lower levels especially on agricultural marketing.

3.2.3 General information flow in local governance

This was well explained through group discussion and voting on what was the most effective means of information flow to the villagers on matters concerning their economic, social and political welfare.

Villagers in villages visited during the village meetings identified means or channels like meetings, Village Councils, Sub-village Chairpersons, radio, newspapers and other channels. Figure 3 shows the pattern that emerged after they voted by individually ticking against the channel they regarded as the most effective (both men and women participated).

The sub-village chairpersons ranked highly as an effective information channels, followed by village assembly (village meeting) and radio. Below is an analysis of each source which scored according to their effectiveness:

3.2.3.1 Sub-village chairpersons

These represent about 50 households each and therefore are closely attached to the people within their part of the village. They pass over information from house to house or by use of a drum that signals there is an important issue and an urgent one. Be it agricultural or livestock directives from the district Council or from the Ward, sub-village chairpersons are the ones to deliver the message to the lowest level of the village where people are. Both men and women in all villages gave more scores to the sub-chairperson than any other source. Even success in meeting the audiences in each village during this study relied on the sub-village chairpersons. Poor meeting attendance during this study for Azimio, Mahango and Simike on the first day was resolved by sub-village chairpersons who made it possible to get a big number of people, increasing participation from 11 men on the first day to 108 both men and women the second day.

3.2.3.2 Village Assemblies

These are statutory meetings scheduled to take place on a quarterly basis or at least twice a year, but recently there had been more frequent because of development activities taking place in these villages, like building a health centre, schools, wells and roads. As these demand participation in terms of cost sharing, then meetings are considered by the VCs as the best way of informing the villagers and involving them in decision making.

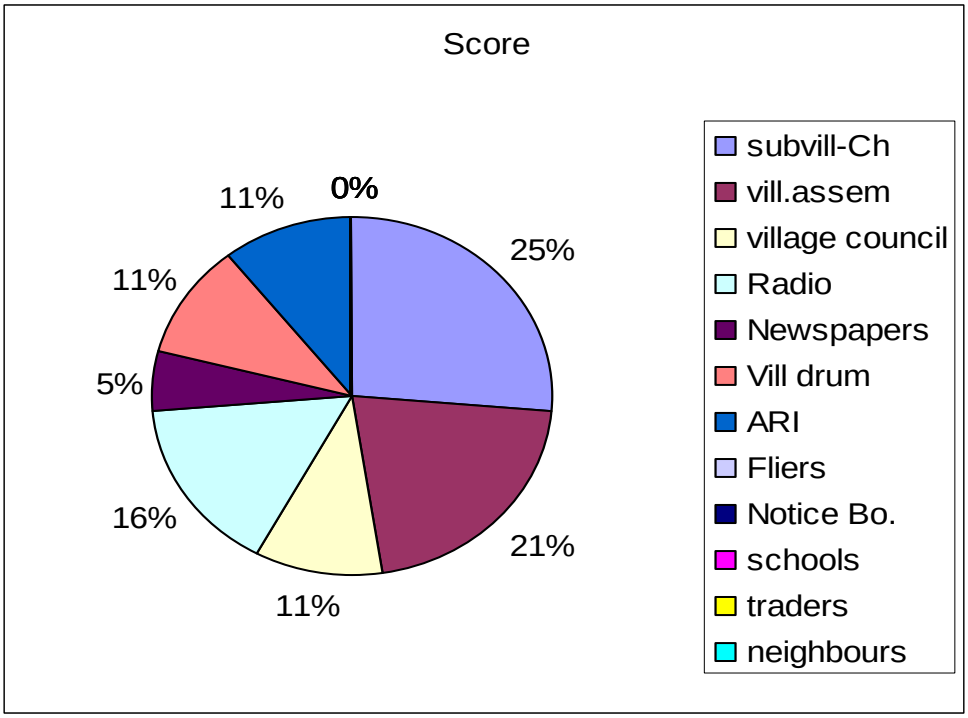


Figure 3: Information Channels and their effectiveness

3.2.3.3 Radio

In both villages people are devoted much to 'Radio Free Africa', that entertains more than the other radio stations like Radio Tanzania. However, youths are the ones who are particularly attached to this station because of its entertaining programmes. Most of the programmes are urban oriented such as music and advertisements. It was picked as a source of information because a number of people have radios and walk with them in the villages particularly the male youths.

3.2.3.4 Village Council

The VC is the governing body of the village and holds its meetings on a monthly basis. It is the body that arranges for meetings to take place and also mobilises and safeguards the resources for the entire village. Of the VC members, 25% are women. All sub-village chairpersons are members of the VCs, therefore if what is decided needs to be communicated to the villagers it will be taken by the sub village chairpersons to their respective sub-villages known as 'kitongoji'. This is how villagers are made to know what transpires within and outside their villages including what is directed from the district council headquarters.

On the other hand among the functions of the VCs is promotion of agricultural activities (see Annex B). In support of the VCs' involvement in promotion of agricultural activities both villages when they drew their seasonal calendars included mobilisation of people to commit their time to agricultural activities in the months of November and December. Although it referred to general agricultural activities, VCs and the Sub-village chairpersons have the duty to see that people prepare their farms

on time and that they cultivate, plant, weed and harvest on time. The VC in Lyadebwe village clearly pointed out that if they were continually involved by ARI as facilitators of the improved varieties they would use Sub-village Chairpersons to be making a close follow-up to make sure that people know them and try adopting according to the demands of consumers and traders. Probably the number of people in trial and research groups involved would not have decreased. At Lyadebwe they started with 20 people in the group and now there are only 6 remaining. Others have dropped out and even ARI-Uyole appeared to be uninformed of the decrease in the number of group members.

The VCs of all study villages are however not strongly connected or linked to their district councils; this was found out from the Venn diagrams that were drawn by the participants. The leaders at the district level were not close to the villages like the District Executive Directors (DED), the District councillors' for the constituencies covering the study villages and the Heads of Departments within the District Administration. Only the Member of Parliament serving Lyadebwe village was praised for visiting and listening to people's needs of this village. The implication of such a situation is that information flows from top structure to bottom structure without room for dialogue or feed back and vice versa. This was said to be the way things work by the Ward meeting convened by the Ward Executive Officer (WEO) in Iwindi ward which all village and sub-village chairpersons were attending. It was good to note one thing in this meeting: there was some print material from a certain NGO which was read to the participants on how to control worms in human beings and how to preserve cereals by use of local materials. Participants had the opportunity to ask questions and contribute money for photocopy costs for more copies so that they reach as many people as possible in their villages.

3.2.3.5 Village Drums

Villages use this channel during emergencies like death announcement, village meetings and the like, but it is not frequently used. When it is used, however, it reaches a big number of people. The drums were used in Azimio, Mahango and Simike the sub-village chairpersons to encourage attendance of both men and women for the survey meetings. It worked very well.

3.2.3.5 Newspapers

These have to be bought from town. They are brought to the village mostly by teachers, extension officers, and other literate villagers, when they visit nearby towns.

3.2.3.6 ARI-Uyole, Fliers, Notice boards, traders and schools

All these got zero preference as no one chose them. Reasons given were:

- ARI-Uyole only occasionally visits villages
- Fliers are good only for those who can read
- Notice Boards, posters are destroyed by the first or second person who reads the information
- Traders are only useful if farmers have something to sell, but if there is nothing to sell they also have nothing to offer

- Schools are not effective: as one participant said, 'if our children finish class seven without knowing how to read and write, will they be able to carry correct information for their parents?'

3.2.4 Concluding remarks

To a large extent the local government structures have been inactive in beans production, use and marketing though they look potentially important at village and sub-village levels. As an opportunity for bean promotion it would be ideal to use them. For example the VCs and the sub-village chairpersons are key structures that coordinate all development activities in the villages and they are the key information channel from different actors to villagers. Meetings like the village assemblies spread information to a big number of village residents, men, women and youth. Through such gatherings bean promotion can be accessed and shared among villagers. ARI-Uyole would use bodies like the VCs and the sub-village chairpersons in the villages to implement, monitor and even evaluate progress of the BIP programme.

3.3 Criteria for Beans Variety choice and information channels

The survey took the initiative to study what makes farmers choose a particular variety. In both villages criteria used to choose bean varieties were as they appear in Table 2 below.

Table 2: Criteria for choosing a bean variety

VILLAGE/CRITERIA	MEN	WOMEN
Lyadebwe Village		
▪ Taste/ Palatability	√	√
▪ Cooking	√	√
▪ Market	√	√
▪ Drought tolerance		√
▪ Diseases	√	√
▪ Yields	√	√
▪ Maturity	√	√
▪ Liked	√	
Azimio, Mahango and Simike Villages		
▪ Cooking		√
▪ Market	√	√
▪ Taste	√	√
▪ Selling		√
▪ Price	√	√
▪ Diseases	√	√
▪ Maturity	√	

For both men and women there is not much difference except for cooking which was not an important criterion to men in Azimio, Mahango and Simike because men generally do not cook. Also drought and time to maturity were the criteria that differed between men and women. Market was a criterion that carried more weight than other criteria, followed by taste. The question of yields was not very much

considered as an important aspect especially in the three villages, where it was not even included among the criteria used to do the preference ranking.

Basically, improved bean varieties are intended to increase yields. The fact that this criterion is missing in Azimio, Mahango and Simike for both men and women implies that the purpose of the research has not clearly crossed over to the target groups – or that a varietal improvement programme based on yield as a sole or main criterion may be missing the mark as far as farmers are concerned. Here the breeder/researcher and the farmer are not talking the same language; there is weak connection, probably caused by use of the diffusion model that is a one way communication system that maintains farmers as receivers of an innovation with little or no inputs into the research. A participatory approach of involving farmers from the design of the research programme and its intended outcomes through to the implementation processes would make farmers understand the purpose or goal of the research. At this point it is important to say that when farmers and researchers are properly connected, it can simplify the research process and make it possible for participatory monitoring and evaluation to take place. It would facilitate ownership of the programme by the targeted beneficiaries.

By use of the criteria appearing in Table 2 above each village did preference ranking to identify the most preferred bean varieties in their areas. The results are shown in Annex A and are discussed in the following sections.

3.3.1 Lyadebwe

In this village preference ranking was done by men and women separately. Similarly, each group ranked the sources through which they get information on each bean variety and their effectiveness. It was interesting to note that marketability and taste were the most dominant factor that influenced their decision to choose a particular bean variety (Annex A). Figure 4 shows their preferences.

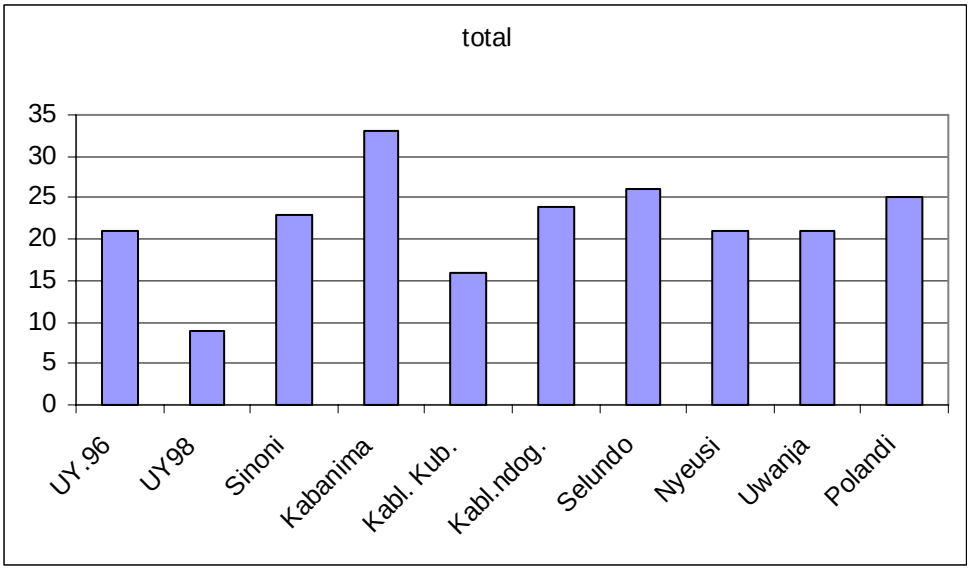


Figure 4: Women's bean variety preference scores – Lyadebwe
Source: Annex A

From the chart above, Kabanima (improved variety) ranked highest of all followed by Selundo and Kablanketi. These bean varieties are commonly produced in this village but to a subsistence level. Women said that a person with high yields can harvest up to two sacks (about 200 kilograms). Most of them claimed to harvest only a few tins of 20 kilograms each. Kabanima is now fetching a good price, the same as Kablanketi kubwa which is about Tanzanian Shillings 3,000 per 20 kilogram tin. It is only now that it is spreading to many farmers. Kablanketi ndogo still ranks the highest in price as it fetches about Tshs 3,500 per tin.

When they were asked how they share the information on the criteria mentioned above in Table 2, three sources were mentioned: traders, neighbours and ARI. Figure 5 below shows how they ranked the effective channels of information for each of the varieties. Traders appear to feature more prominently with respect to local varieties than the new varieties (improved varieties) with the exception of Kabanima which is an improved variety. On the other hand neighbours have an influence in each variety because there is a lot of beans exchange and selling within the village.

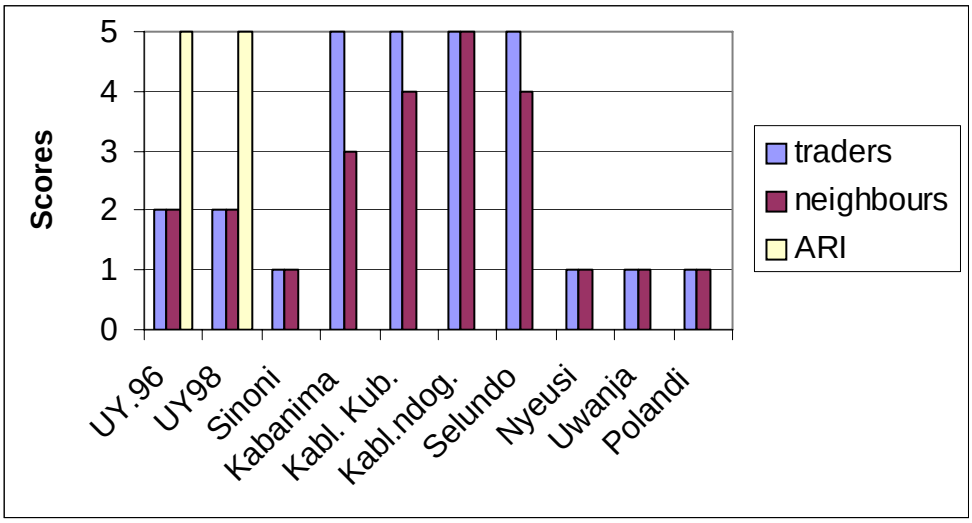


Figure 5: Ranking of channels of information for bean varieties by women in Lyadebwe village

The Figure above tells a connection between traders and neighbours, this shows that whenever a farmer gets information regards beans growing and marketing, shares with fellow farmers accordingly. But ARI-Uyole appear to be working independently of all other sources or channels of information. While it scores high for Uyole 96 and 98, other channels were ranked low and are relatively inactive for those varieties, so exchange of information remains essentially between ARI and research groups and farmers in the process of adopting the improved varieties. Currently the traders are vigorously promoting Kabanima as it is needed in Dar Es Salaam city, according to traders from Chimala market.

There is a difference between women's preferences and those of men as shown in Figure 6 below. For men, Sewolo and Kablanketi ranked high. Kabanima was said to be produced by few farmers and is not yet popular with all farmers though it is tasty and fetches a good price.

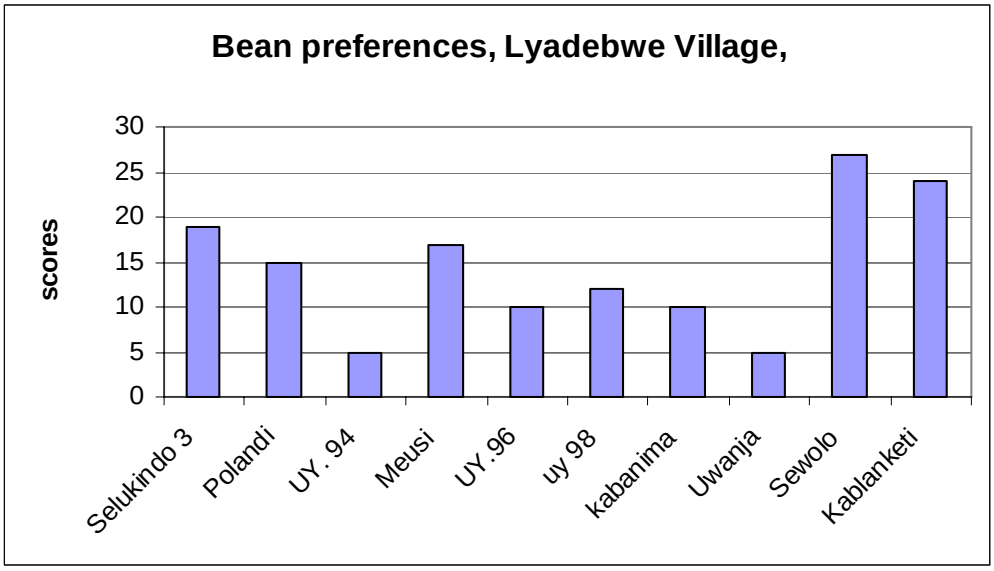


Figure 6: **Men beans variety preference in Lyadebwe Village**

On the channels of information they had farmers instead of neighbours. But the trend is still the same such that farmers closely work with traders. Men also appreciated the role of ARI-Uyole on the improved varieties like Uyole 94, 96 and 98. No doubt about this because men farmers have more chance of meeting the research and extension people than women. That is why farmers appear to be closely working together with ARI-Uyole in the case of men's chart below (Figure 7).

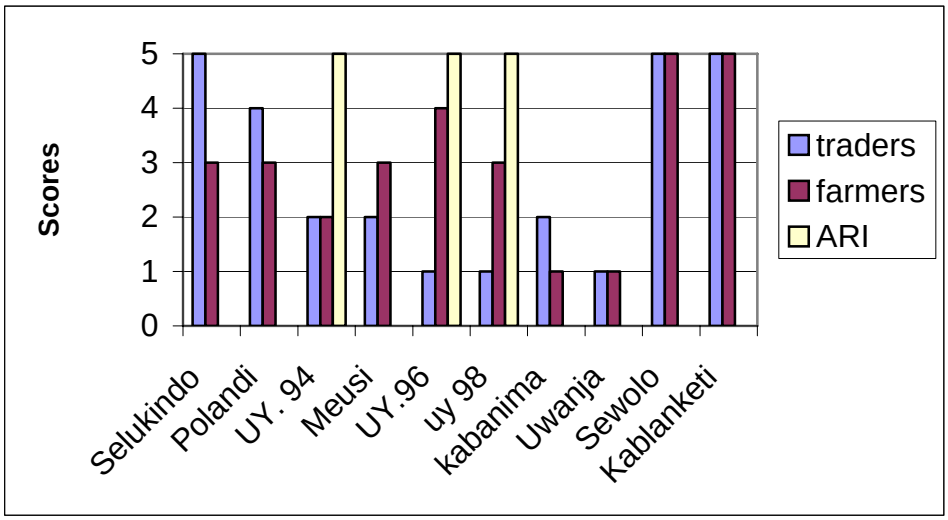


Figure 7: **Ranking of sources of information on varieties by men in Lyadebwe village**

It is good to note that where the variety has scored high in preference then farmers and traders score high as information sources. In many cases traders have shown a great influence on the preference as it appears in figure 7.

3.3.2 Azimio, Mahango and Simike Villages

The survey combined these three villages because they are served by one Extension Officer, who suggested having them all participate in the survey. In these villages the new varieties are Uyole 94, 96 and 98. But farmers do cultivate their traditional varieties like Kablanketi and Mwasipenjele. The results of their preference ranking, which men and women did separately, are shown in Figure 8.

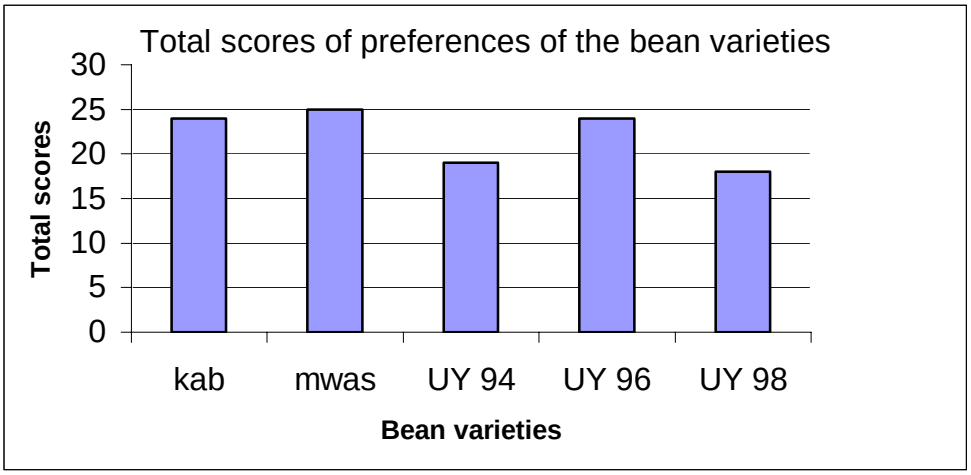


Figure 8: Women's bean variety preference scores in Azimio, Mahango and Simike villages

Improved bean varieties are preferred alongside other traditional varieties in these villages as shown in Figure 8. Adoption and acceptance of the improved varieties are on the increase as indicated elsewhere in Table 3 of this report. Uyole 96 is the most liked variety due to its market and this is clear from Figure 9 below. Even traders have been ranked high as with the more traditional varieties as an effective channel or source of information. Consumers were identified as another source of information. These are people or institutions who buy for consumption purposes. They have a great influence on the information received by the villagers especially on the price, taste and cooking of the bean variety. Women recognise them because they interact with them frequently in the villages. Traders meet consumers at the markets especially the big buyers like institutions such as prisons and schools.

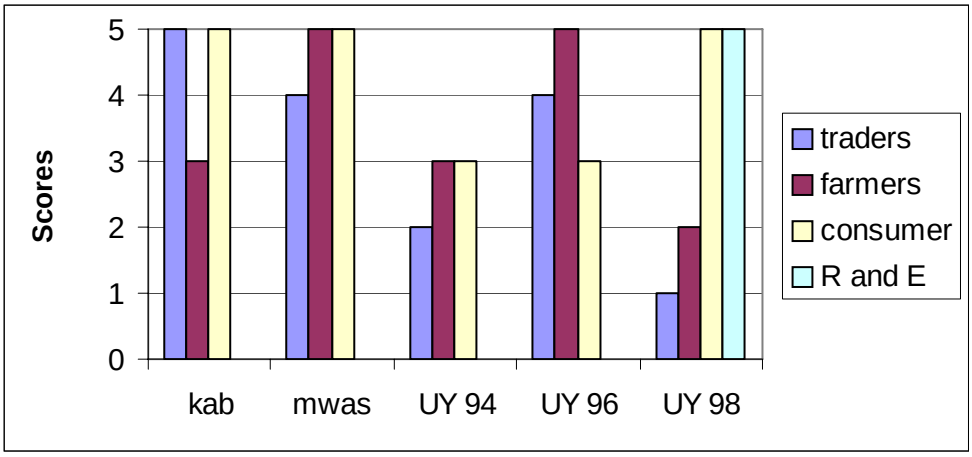


Figure 9: Ranking of sources of information on bean varieties by women in Azimio, Mahango and Simike villages

In Figure 9 traders too feature strongly as sources of information alongside farmers and consumers, as the three relate in terms of information sharing. The farmers choose a variety when there is assurance of a market as they said. The market for beans means there are people who can consume the product. Traders can only buy for selling if there are consumers to buy the beans. Research and extension (R and E) institutions could only be linked with Uyole 98, because it was recently introduced and women could still remember it, but did not link them to the other improved varieties. Women rarely associate themselves with researchers and extension officers, rather it is their husbands and sons: the chart for men shows appreciation for the role played by Research and Extension (Figure 11).

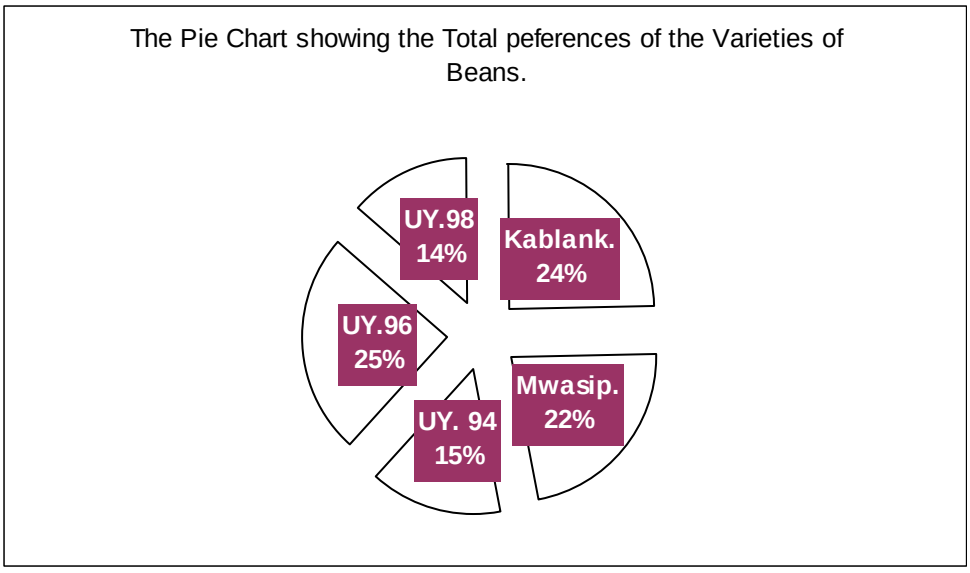


Figure 10: Men beans preferences in Azimio, Mahango and Simike villages

In the above pie chart (Figure 10), Uyole 96 and Kablanketi ranked high in men's preference, like among the women. The reasons given were market and taste. When it came as to how information is shared, the farmers and traders were the key sources (Figure 11). But also ARI and the extension officers were appreciated as sources of information. As mentioned earlier, men have more access to researchers and

extension officers, which is why they recognise their role in the promotion of beans more than women.

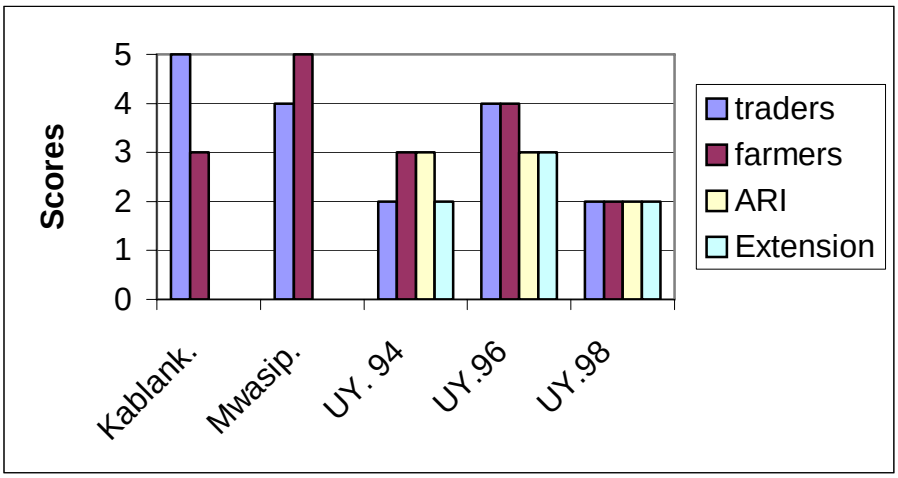


Figure 11: **Ranking of sources of information on bean varieties by men in Azimio, Mahango and Simike villages**

3.4 Analysis of sources of information

In all villages surveyed, the sources of information to farmers have been mainly the traders, farmers, consumers, neighbours, Extension Officers and ARI-Uyole. Participants in this survey identified them and recognised the role of these sources in influencing their decision in growing the different varieties, improved and non improved.

3.4.1 Traders

These are found in weekly open markets like the one visited during the survey in Mahango, Inyala and Chimala. Traders are also found in towns like Mbeya and Makambako and trading centres, for those visited during the survey are from Mbalizi, Soko Matola, Uyole and Soweto. Most of the traders found in these markets are women with a few men. Most of the beans they were selling are the traditional varieties and when we showed them the improved varieties being promoted by ARI-Uyole they recognised them but said currently the market is not regularly good for the improved varieties and the quantity does not meet the needs of the customers. However they are now seeing Kabanima and Uyole 96 which is traditionally called 'Mekundu' picking up and selling fast when brought to the market. In both market places, traders confirmed about the market for Uyole 96 as picking up especially between October and December during the month of 'Ramadhan' when Muslims fast.

On asking as to who are their customers, the traders said that they sell beans to big consumers like schools, prisons and industries and neighbouring countries like Zambia, Malawi and Congo. Equally they sell to anyone who is in need of beans including the farmers themselves who depend on these markets when it comes to the planting season. They said farmers do come in the months of May and October to January to look for bean seeds. So at one time farmers become consumers. One observation which was made is that traders know exactly where each variety is grown or would grow well. This is due to the fact that the traders were at the same time both

producers and farmers; but also their interaction with farmers widens their knowledge on bean production and marketing. This signalled a key role they play in influencing a farmer on the choice of bean seeds.

On further probing on the prices and marketability of the beans, traders said each type of beans has a consumer, which is why they buy whatever comes from the villages. As for big orders like schools, prisons and neighbouring countries, they do go themselves to the villages and mobilise the type that is needed and bring it to the market. So how beans reach the markets depends on either the traders going to buy from the producers directly by sending what they call 'collectors' or agents or the producers bring them to the traders in towns. Both men and women are involved in this process though in each market visited women traders were more numerous than men traders.

Many farmers mix their beans varieties and one would think that this might create market problems; however traders said for them it is not a problem as there is always a buyer for mixtures. For example farmers like buying mixed beans for seeds and later either sort them out at home or plant the mixture as it is. It is cheaper for farmers to buy mixed seeds than a selection because they can get a number of varieties in one kilogramme instead of several kilogrammes that are sorted. And also farmers like the mixed seeds because it minimises the risk of losing all seeds in case of a bad year (weather).

It was interesting to see how traders were able to mention places for each variety when mentioned. It appears traders do have more information and knowledge of the different varieties and hence have influence on farmers' seed preference as far as bean production is concerned.

3.4.2 Farmers

These are the producers of different crops in the villages so sometimes they are the consumers as well. Their recognition came about because they do share information with fellow farmers concerning the criteria stated in Table 2 above. They do influence one another due to their experience, success, failure and future intentions. The exchange of beans seeds starts from the time of beans harvest because at this time farmers would have seen the growth and yield of the variety as it appears on the farm. Bean seed buying happens during the planting seasons between farmers and farmers. But there is an increasing trend now for most farmers to buy their seed beans from the traders shortly before the planting seasons.

It was something strange that even some of those who are in trial groups consume all the harvest and then go to buy from the traders each season. This implies that ARI-Uyole has to provide new seeds each time a trial process is started. This indicates lack of commitment of the farmers to the on going research activity. They have not owned the intention of the BIP.

3.4.3 Consumers

These are those who buy for consumption purposes. There are the big consumers like the prisons, schools and industries, also the ordinary consumers who buy for home

use. Their preference too has influence on the traders and the farmers. This is the market of the product and they are therefore an important set of actors in bean production. That is why participants from the study villages picked them as one of the sources of information for they are the ones who buy beans according to their needs. For example Kablanketi and Uyole 96 have good market in Dar Es Salaam and big quantities of beans are bought and transported there. Likewise Kabanima is commonly bought by prisons and schools. Demand and supply of beans is largely influenced by the quantity the consumers need and hence the price. But the question is whether consumers and researchers do share information or need to share information. Because they shape the market trends, they are key stakeholders in the programme.

3.4.4 ARI-Uyole and Extension

This is the Uyole Agricultural Research Institute that breeds the varieties. It is a source of information particularly on the improved beans like Uyole 94, 96, and 98; and Kabanima. Through groups they established in these villages they spread the innovation first among group members who are expected to be change agents for the rest of the villagers. In Lyadebwe the number of the group members has decreased from 20 to 6 members only, out of a village of 367 households. In Azimio, Mahango and Simike the situation is different: the number of those adopting is picking up according to data provided by the village Extension Officer (Table 3).

Table 3: Adoption and acceptance of improved bean varieties in Azimio, Mahango and Simike villages

Village	Number of adults		Total	No. of households	Number of farmers started	Current number of farmers
	Men	women				
Azimio	418	463	881	518	20	103
Mahango	270	285	555	375	25	100
Simike	283	391	391	325	30	115
TOTAL	**971**	**1,139**	**1,827**	**1,218**	**75**	**318**

The most liked bean varieties in these three villages are Uyole 96 and Uyole 98, their preference is based on the criteria given above in this report.

3.5 Concluding remarks

All channels of information identified by villagers on beans are contributing towards the promotion of different varieties, both improved and traditional ones. But all these channels are not coordinated, rather they work independently. As the assessment was done gender-wise, differences emerged in the way men and women access information. Although beans seem to be marketed by women more than men as it was found during visits to markets, men seem to have more access to the new varieties than women.

The gender aspect of the analysis has highlighted how research information is accessed by women and men. The difference caused by unequal opportunity for women to interact with research and extension organisations is an aspect that calls for reformulation of the dissemination approach currently in use.

Traders appear to play a great role in supply of seeds, and they do sell traditional seeds to the farmers including those who have been supplied with the improved varieties as they consume or sell everything before the new growing season comes in.

It is interesting that the research groups were never mentioned as sources of information at any point. They do not appear to have taken the role of change agents yet, at least in the perception of their fellow villagers.

4.0 Conclusions and way forward

The study has tried to look at the way bean variety promotion is carried out and has seen a lot of efforts and resources being invested in the programme. Even from observation at ARI-Uyole where seeds are bred, you could see the enthusiasm of both the breeder and the support staff including the seed sorters (labourers). This is highly applauded.

Reacting on the gaps that surround the programme as Annex C demonstrates, there is need to take stock of all stakeholders and coordinate them or involve them in the programme. Although we are not advocating improved seeds to be distributed by traders for reasons such as adherence to the conditions of storage, mixing with other traditional varieties and profit maximisation, we would recommend them to be informed of the importance and characteristics of improved varieties. This is because their influence seems to out pass other information channels especially during farming seasons when farmers go to buy seeds. Traders will also benefit from improved varieties by reducing the hustle of collecting little by little from many individual farmers.

On the other hand, local government structures have not been mentioned as sources of information on beans varieties and marketing, which suggests that there is a communication gap between the farmers, ARI-Uyole and the local government structures.

The sources or channels identified by farmers are not connected, like traders and ARI-Uyole, consumers and ARI-Uyole and also ARI-Uyole and the VCs at village level. At the district level there too seems to be scant information about BIP as it took time to explain and make respondents understand the purpose of the programme and the importance of information promotion. But it is understood that policy formulation is done at this level and one would normally expect it to have influence on the programme. Beans are getting to be a crop that brings back income to the farmers. If the district council institutes road blocks for the traders when they go to purchase beans and imposes unnecessary crop levies, it would frustrate the whole programme. Interventions succeed when there is cooperation and information sharing. So it is worthwhile to incorporate district leaders as stakeholders in the programme.

Above all the big challenge ahead is to connect the different sources of information who are also the stakeholders of the programme in order to facilitate effective information flow to the farmers and particularly women.

Based on the Terms of Reference and study conclusions above the way forward suggested is:

1. Local government structures have been involved but at a low level. There seems to be some potential for their taking a greater role and we would therefore suggest that ARI-Uyole could to involve the structures more directly and make them responsible for the programme by using the VCs and sub-village chairpersons as their focal points. These structures have shown to be effective in reaching both women and men effectively;

2. Although the study did not visit a village which produces beans for commercial purposes except for the few hours discussion with Iwindi local government leaders and two farmers, the trend of information flow as it was found in the villages with subsistence production portrays a trend that may be applicable to commercial production and marketing. What would be the difference is the time and options of markets, as farmers with big quantities quickly hunt for markets as they have the capacity to do so. The study therefore recommends that dissemination of improved seeds be taken to commercial production villages, which could play a catalytic role of influencing more farmers who are subsistence-based producers to speed up adoption.

3. The study shows clearly that there are gender inequalities as far as access to research information is concerned. Women are linked much more with traders and farmers than with ARI-Uyole and extension officers, which denies them direct access to the technical innovations that come with the programme. It is suggested that both research and extension officers, most of whom are men, become more conscious of the inherent gender bias in their work and make increased efforts to contact more women in relation to the development and promotion of bean varieties and technology.

4. From the point of view of the support staff at ARI-Uyole as Annex C suggests, ARI-Uyole can start now thinking of the Social Marketing approach as this gives room for producers also to be part of the research.

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ANNEX A

PREFERENCE RANKING FOR LYADEBWE AND (AZIMIO, MAHANGO, SIMIKE) VILLAGES

Beans preference– women (Lyadebwe Village)

Criteria Variety	Taste	Cooking	Market	Drought Tolerance	Disease	Yield	Maturity	Total
Uyole 96	5	5	1	-	3	3	4	21
Uyole 98	2	1	1	-	3	1	1	9
Sinoni	5	5	1	-	5	3	4	23
Kabanima	4	5	5	5	4	5	5	33
Kablanket Kubra	2	2	5	1	2	2	2	16
Kablanket ndogo	5	4	5	1	2	2	5	24
Selundo	5	5	5	3	2	4	2	26
Nyeusi	4	1	1	5	4	5	1	21
Mekundu	3	1	5	1	2	4	4	20
Uwanja	5	4	1	-	3	4	4	21
Polandi semukiledu	3	3	1	5	5	5	3	25

Note: weight is given between 0-5 (5 as the highest score-best and 1 is poor)

Beans preference– men (Lyadebwe Village)

Varieties Criteria	Selundo	Polandi	Kasuka nywele/ Uy. 94	Meusi	Uyole 96	Uyole 98	Kabanima	Uwanja	sewolo	Kablanket
Palatability	3	1	-	1	-	2	1	-	5	4
Yield	1	4	1	5	1	1	3	1	1	2
Market	3	1	-	1	2	1	2	-	5	4
Cooking	4	1	-	1	1	2	-	-	5	3
Disease	2	4	1	5	-	2	-	-	3	2
Liked	3	1	1	1	2	1	1	1	5	4
Maturity	3	3	3	3	4	3	3	3	3	5
Total	19	15	5	17	10	12	10	5	27	24

Beans preference– Women (Azimio, Mahango and Simike Villages)

Type/Criteria	cooking	Market	taste	disease	selling	price	Total
Kablanketi	5	5	3	3	3	5	24
Mwasipenjele	5	5	2	4	5	4	25
Kasuka Nywele (Uyole 94)	5	2	1	3	5	3	19
Msafiri (Uyole 96)	4	5	5	4	3	3	24
Njano (Uyole 98)	5	1	4	2	5	1	18

Beans preference– men (Azimio, Mahango and Simike Villages)

Type/Criteria	**maturity**	**Market**	**taste**	**diseases**	**price**	**Total**
Kablanketi	4	5	3	3	5	20
Mwasipenjele	3	5	2	4	4	18
Kasuka Nywele (Uyole 94)	3	2	1	3	3	12
Msafiri (Uyole 96)	3	5	5	4	3	20
Njano (Uyole 98)	3	1	4	2	1	11

ANNEX B
Structures and Functions of District Local Government

Structures	Member composition	Functions
1. Democratic		
District Council Committee	Elected Council chairperson, Member of Parliament in that district, councillors, elected Women councillors through special seats*, DED and heads of departments	-promoting social welfare and the economic well – being of the society -development, mobilisation and application of productive forces to the war on poverty, disease and ignorance -make bye-laws -make and levy rates -adopt estimates of revenue and expenditure of the council -impose fees and charges -delegate powers to standing committees
Ward Development Committee	Councillor from the constituent, Villager chairpersons in the ward, WEO, VEOs and Ward extension staff	-promoting and establishing of economic activities in the ward -supervision and co-ordination of projects and programmes -planning and co-ordination of activities undertaken by residents of the ward -formulation and submission to the VCs or to the District Councils of proposals for making bye-laws in relation to the affairs of the ward -monitoring revenue collection -initiating and promoting participatory development -promotion of gender issues
Village Council	Elected village chairperson & Sub-village chairpersons, women special seats* representatives, village extension staff and VEO	-planning and co-ordinating development activities, -rendering assistance and advice to the villagers engaged in agriculture, forestry, horticultural, industrial or any other activity, -encourage village residents to undertake and participate in communal enterprises. -Propose bye-laws, but must be adopted by the village assembly
Village assembly (VA)	All villagers (men, women and youths)	-supreme authority on all matters of general policy making in relation to the affairs of the village -electing and removal of the VC
2. Administration		
District Development Director	With heads of departments	-discharge of managerial and administrative duties within the powers conferred -secretary to the District Council meetings
Ward Executive Officer (WEO)	With extension officers	-co-ordinating between the VEO and DED -secretary to WDC -monitor revenue collection in the ward
Village Executive Officer (VEO)	With extension officers	-discharge day to day activities as directed by WEO and VC -Collect revenues for the district council -secretary to the VC meetings

Source: compiled from the Local Government Laws, Revised, 2000 and Papers from the Local Government Reforms.

* The special seats for women are allocated to political parties according to the number of seats they have won in election. It is normally 25% of all seats.

ANNEX C

FACILITATED SELF ASSESSMENT FOR THE RESEARCH SUPPORTING STAFF FOR BIP

Four participants attended the Facilitated Self Assessment session, which started with a role play where participants were divided into two pairs. Then they were asked to demonstrate how they would introduce the improved varieties to the farmers. The aim was to look at the criteria farmers look for before accepting a variety. The following were the reaction of the farmer in each pair as appearing below:

PAIR 1

FARMER	RESEARCHER
Yield potential	-Greetings -Introduction -Purpose of the visit -New improved varieties mention and show them to the farmer -Asked criteria farmers use to accept seeds -Ask the planting season -Promise to supply seeds at the right time -Request for plot and labour -Promise to supply chemicals to start with
Market	
Cookability	
Seed size	
Seed colon	
Maturity time	

PAIR 2

FARMER	RESEARCHER
Market	-Introduction and visit purpose -Ask farmer what makes him choose a variety -Talk of farming patterns -Two seasons: 1st Ridges intercropping 2nd Monocropping -Ask about native varieties - Price will depend on demand and supply
Yield potential	
Disease resistance	

Since market is a criterion that featured prominently in the villages that the study took place and it has featured in the researchers too, then it is an important aspect that needs further follow up. But what is the approach that is used by ARI? Below is the approach and its strengths and weaknesses:

PROMOTION APPROACH IN USE IS 'ADOPTION'

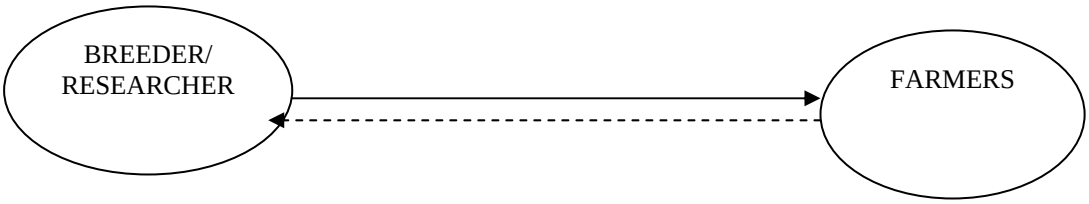
STRENGTH	WEAKNESS
Some improved varieties have been accepted like Uyole 84, kabanima Uyole 98 and 96	No control or knowledge of marketability of improved var.
Row planting method accepted	Resource constraints
PRAs cover about 40 participants in every village	Slow adoption /diffusion rate due to traditions

From the above approach, another approach 'the social marketing approach' which comes from Melkote and Steeves (2001) was discussed and the stages of implementing both approaches are shown for comparison below:

A COMPARISON OF STEPS INVOLVED IN THE TWO APROACHES

ADOPTION	SOCIAL MARKETING
Awareness	Audience segmentation
Acceptance	Stakeholders analysis
Evaluation/assessment	Market research
Adoption/exit	Seed breeding
	Incentives: trials, demonstration and training
	Facilitation

Participants said for what they have been doing using the ‘adoption approach’ their goal was achieved, no doubt about that, except for the gaps that are now identified as appearing below:



1. A strong working relationship is between the breeder/researchers and the farmers, Participatory Rural Appraisal (PRAs) were deployed to identify needs. The major purpose is to help farmers grow improved bean seeds with high yields.

2. In Sumbawanga where farmers are now realizing high yields on soya beans , they are encountering a marketing problem of where to sell it, and they cannot consume it all at household level. So the market element is being asked by those farmers and ARI currently has no solution for that.

3. When asked to list who are actors in bean production and marketing, these were identified:

    - Breeder;
    - Producers;
    - Traders; and
    - Consumers like schools, hospitals, industries, etc;

4. ARI is currently not working with other actors except the farmers (producers), however there are gaps with this approach.
    - Not aware of marketing system surrounding bean production
    - It is difficult to decide on the promotion materials/channels without involving other actors
    - Although ARI started with PRAs, but they have not been able to follow through to consider what happens after yields increase, thus missing the end results and impact.

Appendix 3.2.1

Participatory promotion of disease resistant and farmer acceptable *Phaseolus* beans in the Southern Highlands of Tanzania

Proceedings of a meeting to discuss promotion strategy for project R7569, held at ARI-Uyole, 8-9 November 2001. Chris Garforth and Nick Hayden

Overview

The meeting was arranged by ARI-Uyole as part of Activity 3.2 in the project logframe. The objective for the meeting was to develop a strategy for the effective promotion of bean varieties. Early in the planning for the meeting, it was recognised that it would be appropriate to promote things other than varieties, to contribute to the overall project purpose - for example processes and knowledge which would enhance producers' (and others') ability to make effective use of information about bean varieties. The planned outputs for the meeting were agreed, following the stakeholder workshop in August 2000 and in subsequent correspondence between the project partners, as:

(a) an agreed initial set of farmer evaluated varieties for promotion

(b) an agreed set of seed uptake pathways

(c) a communication and promotion strategy, including the use of appropriate media and information outlets and channels

(d) agreement by stakeholders on their roles in implementing the strategy.

At the end of two days, these outputs had substantially been produced. Varieties were identified; seed uptake pathways were specified; elements of a communication and promotion strategy were agreed; and, in general terms, organisations and disciplines who should be involved in implementing the activities within the strategy were identified. These elements included activities which were already part of the work programmes of key stakeholders and partners. It was agreed that the final specification of the strategy - particularly those elements that were new or additional to ongoing work programmes - would be developed by a small group at ARI-Uyole, in the light of priorities agreed at the meeting, resource availability and existing commitments of the various partners. Participants in the meeting are listed in Annex 1.

Programme

Day 1: Thursday 8 November. Chair: Dr G Madata

Session 1	Introduction, background and objectives
Session 2	Presentations on recent research and promotion channels
	Field research on farmers' information sources relating to beans - B Asseid
	Update on beans research and development in Southern Highlands - C Madata
	Overview and case study of promotion and communication media - T Wheeler
Session 3	Group discussion and plenary on current and recent promotion activities

Day 2: Friday 9 November. Chair: Dr G Madata

Session 4	Review of Day 1 and objectives for Day 2
Session 5	Group discussion and plenary to identify what should be promoted
Session 6	Group discussion to identify channels
Session 7	Experience of leaflet production and use in beans IPM project - D Kabungo

Session 8 Group presentations and plenary discussion on content, channels and priorities for promotion strategy

Thursday 8 November

Session 1: Introduction, background and objectives

The chairman, Dr G Madata, welcomed the participants. Later, the Zonal Director, Dr M Msabaha added his welcome, pointing out that ARI-Uyole sees the promotion strategy for this research project as a pilot for the promotion of other research outputs. There is therefore considerable interest in the outcome of the meeting.

The participants introduced themselves. C Garforth then outlined the background to the meeting. The research project, on "Participatory promotion of disease-resistant and farmer acceptable *Phaseolus* beans in the Southern Highlands of Tanzania", is funded by DFID's Crop Protection Programme (CPP). The research partners are ARI-Uyole, Natural Resources Institute (UK) and The University of Reading (UK). The project has two interrelated components: (a) the further development of disease-resistant beans, which builds on material developed through earlier projects, and (b) the "widespread promotion" of varieties. The promotion component has two objectives: to encourage the adoption of appropriate varieties by farmers, and to learn lessons about how new ideas and material can be effectively promoted in the context of the Southern Highlands. To achieve these two objectives, the project needs to:

(a) design a strategy for promotion

(b) implement the activities within the strategy

(c) assess the effects, strengths and weaknesses of the promotion strategy - through monitoring and a survey towards the end of the project (March 2003).

A promotion strategy involves providing information, ideas and materials for specific audiences, through methods and channels and places which will maximise the likelihood that they will pay attention to it, evaluate it and act on it in ways which are beneficial to them. A key audience here comprises bean producers. To plan a promotion strategy, we need to know:

- where producers get information about beans and about new bean varieties
- where producers look for, or expect to find, information
- when and why producers introduce new beans to their farming system
- what characteristics are important to producers when assessing the potential of new bean varieties
- differences in information access between men and women, and between richer and poorer farmers
- what new opportunities there are for communication between producers and other stakeholders in the bean research, development and marketing system

The project partners have carried out three research activities to provide information on these points:

(i) a literature review on seed uptake pathways was presented to a project stakeholders' workshop in August 2000

(ii) qualitative research, using PRA methods, into bean producers' access to and use of information was completed in March 2001

(iii) a survey of a sample of 149 bean producers in seven villages was completed in July 2001.

The findings from these activities complement those from earlier studies, including the work by Dr S Bisanda and colleagues in the *in situ* conservation project. The main findings from (ii) and (iii) will be presented at this meeting, by Dr Bakari Asseid.

Against this background, the objectives of this meeting are to:

(1) review available information on farmers' sources and uses of information about beans, and on their seed uptake pathways

(2) design a promotion strategy, including identifying audiences, content, communication channels, and activities.

Session 2: Presentations on recent research and promotion channels

(1) Field research on farmers' information sources relating to beans

Dr Bakari Asseid, The University of Reading

Dr Asseid reported findings from the two pieces of field research conducted for this project earlier in 2001. The main purpose of the research was to explore farmers' sources of bean seed, including new varieties, and their sources of information about beans. In practice, it proved difficult to keep a clear distinction between these: transactions involving beans and bean seed (exchange, gift, sale, for example) almost always involve the giving and receiving of information.

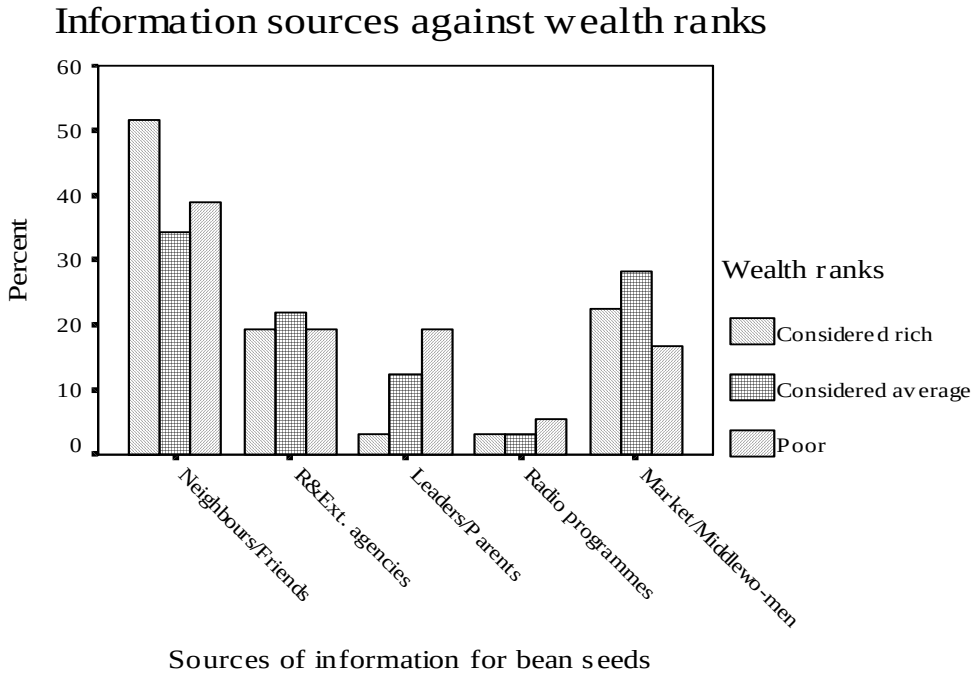
Linkages and interactions differ between villages and are complex. The seven villages selected for the study represent a range of agro-ecological zones and socio-economic conditions (Box 1). The complexities and details of interactions will be spelled out in the final report of the field work. For the present meeting, Dr Asseid focused on the general findings of the studies. Quantitative data in the figures below are from the survey of 149 bean producers.

Box 1 Description of the study villages

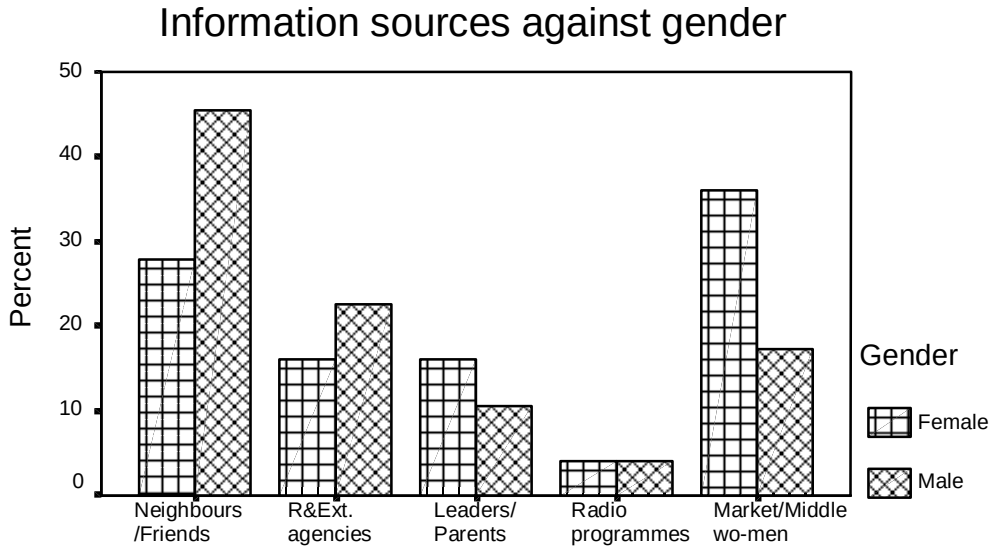
Villages	Agro-ecological zones[1]	Social-economical level[2]
Kifanya	Agro-ecological zone – 5g: The area is generally flat with undulating, dissected to rolling plains with altitudes between 1000m. and 1700m. Soils are red clays with dark to brown top soils with low to medium fertility. The average annual rainfall is about 1300mm with the temperature ranging 10 – 19^{0}C. Crops grown include maize, sorghum, coffee, bean, bamboo, sunflowers and potatoes.	▪ There are many houses with iron sheets. ▪ There are houses for hiring/ shops/kiosks/transport ▪ Keep big number of livestock & sale to other areas ▪ Most people have regular job/self employed ▪ Have some renowned witch doctors ▪ Most people have small families/ matured and employed children ▪ Most people have good access to farming resources ▪ Religiously active villagers
Mayale	Agro-ecological zone – 3d: The area is undulating to rolling plateaus with elevation between 1200 and 2000m. The soils are red to yellow clays with occasional sandy topsoil, generally of poor to moderate fertility. The average annual rainfall is about 900mm and the temperature range is between 15 - 26^{0}C. The growing season is between November and April. The most common crops grown are maize, sunflower, groundnuts and beans.	
Ujindile	Agro-ecological zone –1c: The area is mountainous and hilly with valleys and plateaus ranging between 1800 – 2200m composed of heavy texture soils of wet red clay with top sands and rocks. The rainfall range between 1000 – 1500mm annually, and the temperature range between 12 – 26^{0}C. The growing season elapse between November and April. The most common crops are maize, sunflower, beans, potatoes, wheat, fruits and forestry.	▪ Remotely located and owning forest is a tradition. A communal village with its own tractor & bus ▪ There are few churches/shops around ▪ The village has improved houses, good office & dispensary ▪ It has shortage of good fertile land.
Mdandu	Agro-ecological zone – 3c: The area is undulating to rolling with an altitude ranging between 1500 – 1800m. The average annual precipitation is between 900 – 1200mm, and the temperature ranges between 15 - 26^{0}C. Farming activities concentrated between November and April. The most common crops are maize, sunflowers, beans, potatoes, wheat and fruits.	▪ Difficult to access during rainy season ▪ Poor soil fertility and few livestock ▪ High level of illiteracy ▪ High alcoholism ▪ High birth and death rate of children ▪ There is no trading ▪ Poor village transportation system

[1] Agro-ecological zones were adopted from Messei et al. (1999).
[2] These social-economical factors were derived from the wealth ranking exercise before the sample survey.

Igongolo	Agro-ecological zone – 3b: This part of the southern highlands is characterised by undulating to rolling landscape of 1600 – 1800m of yellow and red clay soils. The average annual rainfall is about 900mm and the temperature rage between 15 - 26^{0}C. The main crops of the area are maize, beans, sunflower and forestry.	▪ High number of divorcee ▪ Limited crop diversity ▪ Large number immigrants who depend of hiring-out labour.
Mahongole	Agro-ecological zone – 9a: This village is located on Usangu plains at 750 - 1500m characterised with dark grey clay soils. The rainfall is ranging between 400 – 600mm annually. The farming season is between December – March and the most important crops are rice, banana, oil palm, cocoa, fruits, cassava, maize and groundnut.	
Mpembano	Agro-ecological zone – 4g: The is in the undulating plain of Laela with elevation of 1200 – 1700m characterised of shallow, dark brown sandy loan soils. The rainfall range between 800 – 950mm annually. The growing season is between November and April and the most common crops are fingermillets, beans, maize, sunflower, groundnuts, vegetables and sugarcane.	

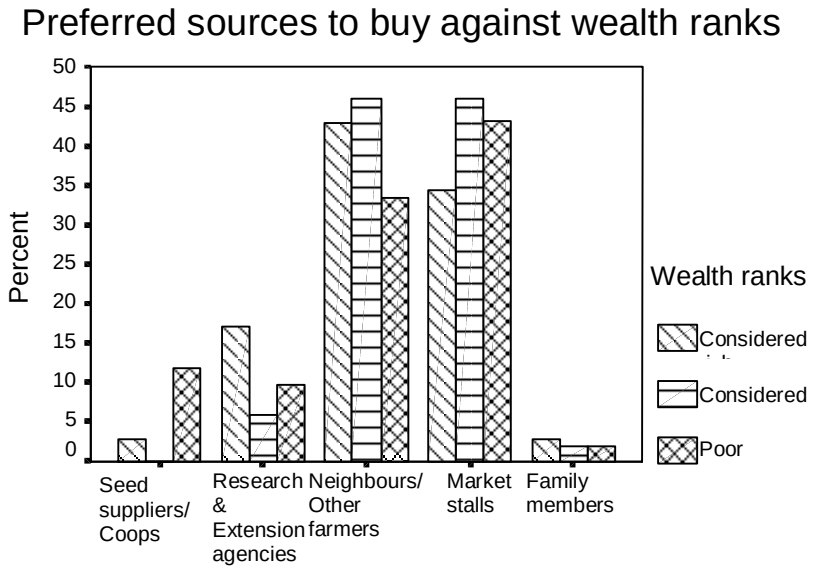


The two main sources of information on bean seeds are other farmers (neighbours, friends) and people involved in the marketing of beans. Other farmers are particularly important information sources for male producers, and market "actors" for women producers. Radio was mentioned by only a small proportion of farmers as a main source of information. Research and extension agencies are mentioned by around 1 in 5 of respondents (slightly more for men than for women).

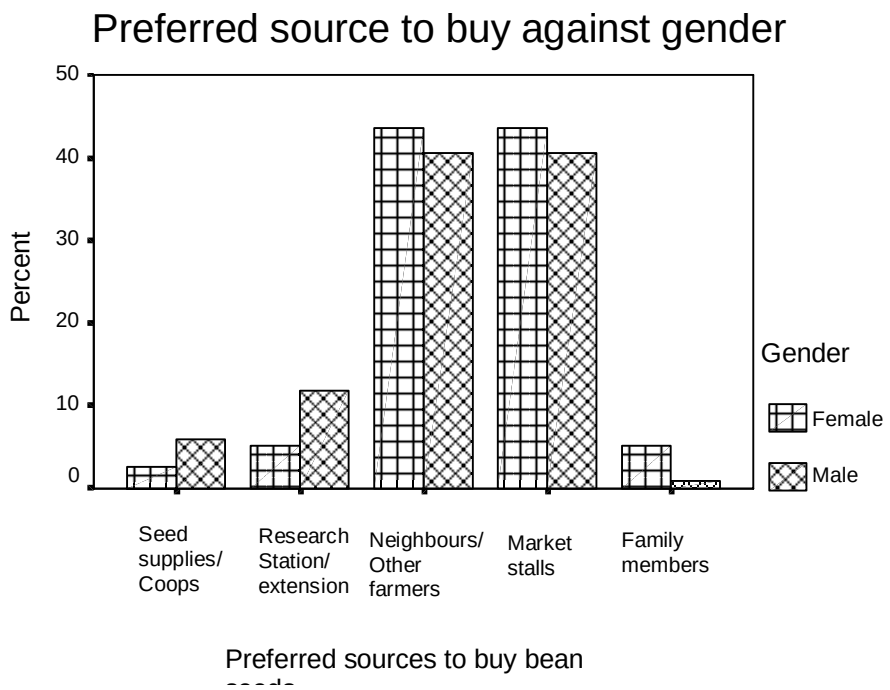


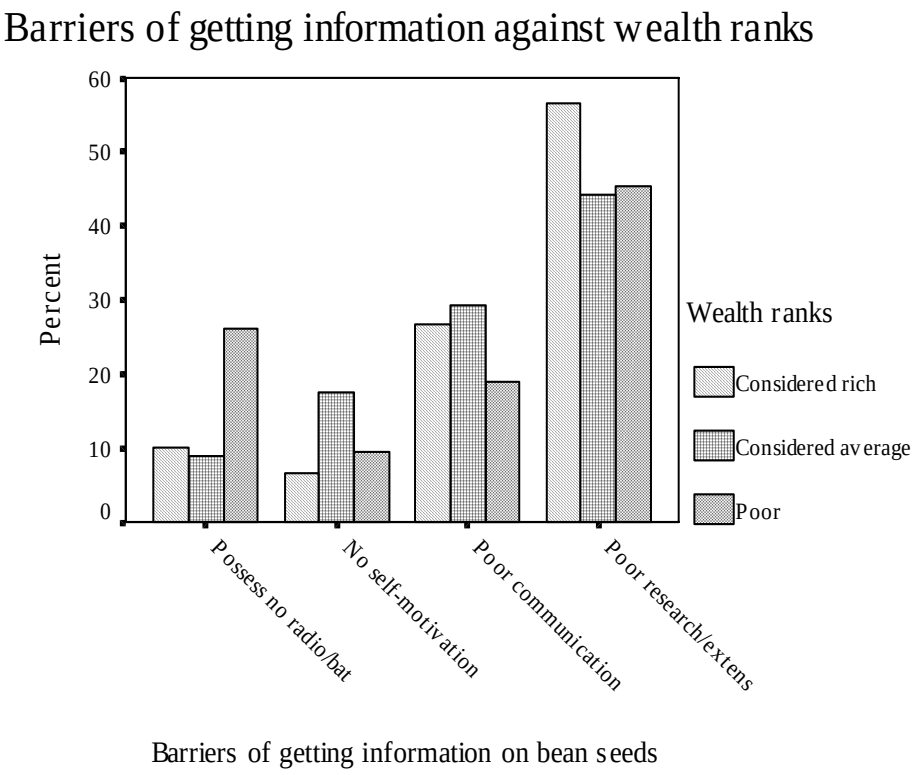
Sources of information for bean seeds

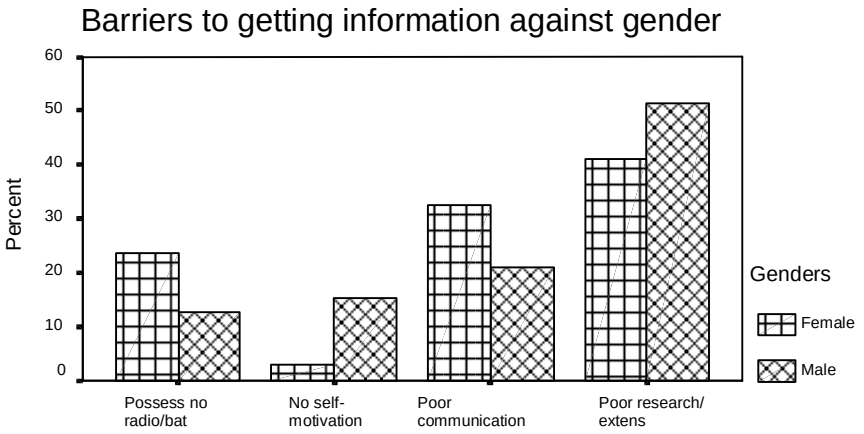
When it comes to buying bean seed, market actors and other farmers are again the principal preferred sources. The market is more important for poorer than for richer producers. Men are slightly more likely to regard research and extension agencies as a preferred source; otherwise there is little difference between men and women producers.



Preferred sources to buy bean seed

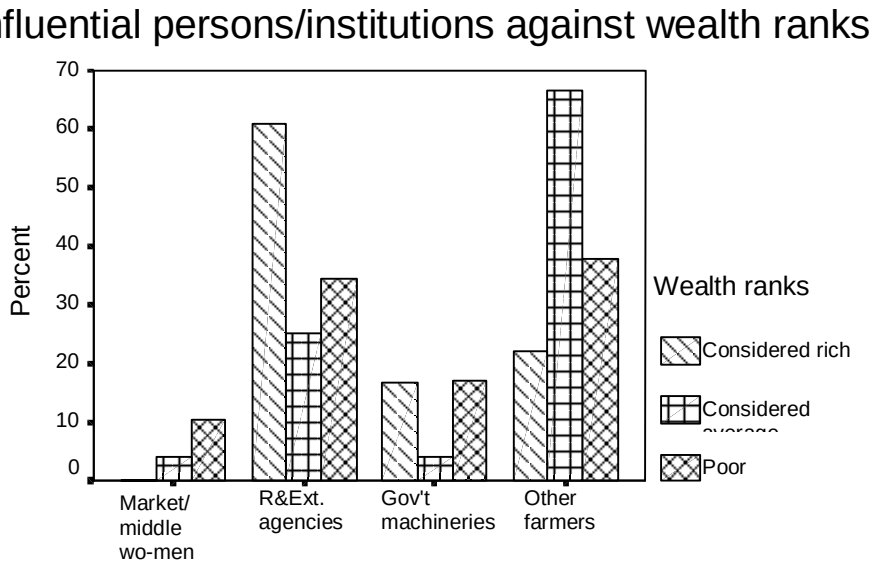

Preferred source to buy against gender
Percent
50
40
30
20
10
0
Gender
Female
Male
Seed supplies/ Coops
Research Station/ extension
Neighbours/ Other farmers
Market stalls
Family members
Preferred sources to buy bean


Barriers of getting information against wealth ranks
Percent
60
50
40
30
20
10
0
Wealth ranks
Considered rich
Considered average
Poor
Possess no radio/bat
No self-motivation
Poor communication
Poor research/extens
Barriers of getting information on bean seeds

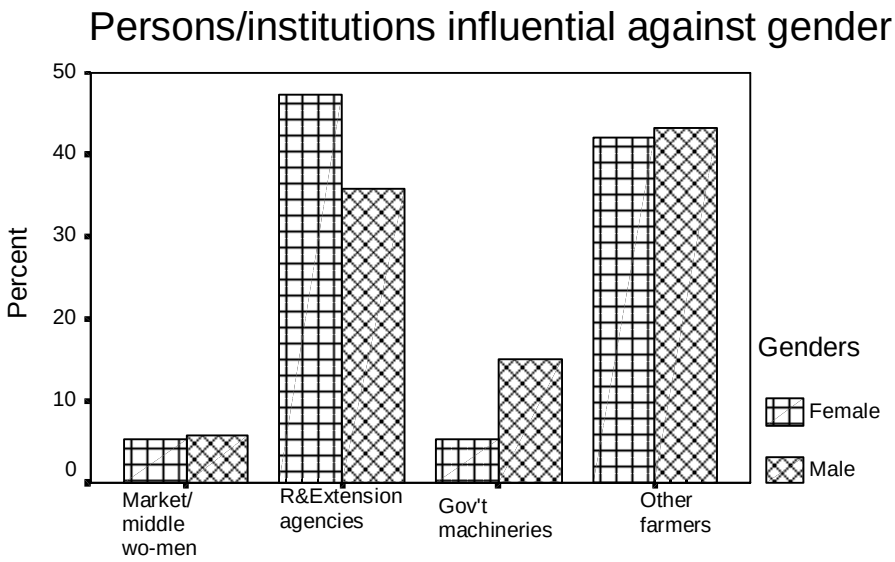


Barriers to getting information on bean seeds

Respondents' perceptions of research and extension agencies are interesting. "Poor research and extension" is seen as a major barrier to getting information about bean seed and varieties. At the same time, research and extension are seen as credible sources of information about new varieties. This gives a strong platform on which to build a promotion strategy - improving the availability of credible, trusted information from research and extension. Poor communication infrastructure (roads, and possibly telephones?) was another important barrier. Poor producers are less likely than others not to have a radio (or to have a radio but no batteries).

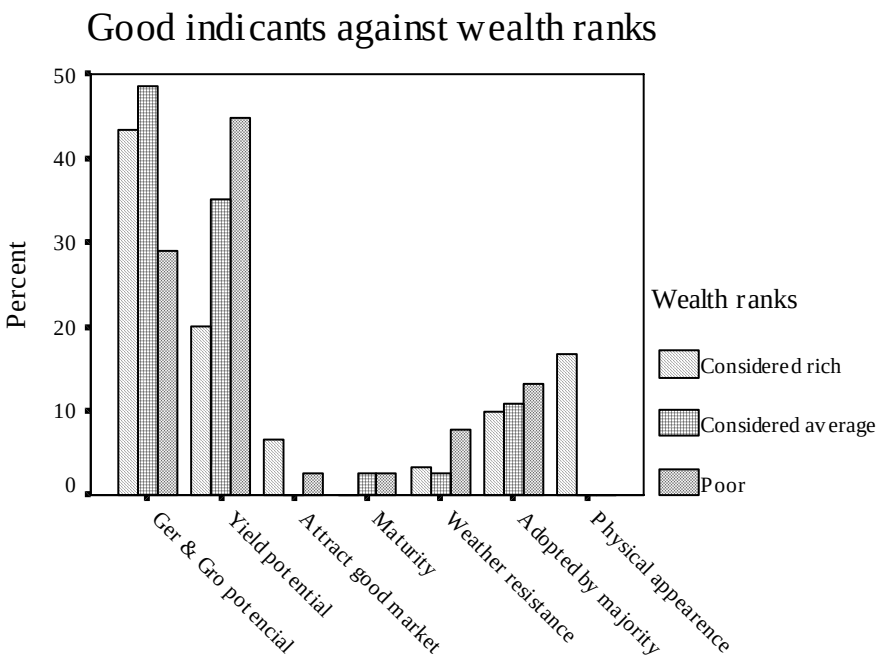


Person/institution influential on the view held towards bean seeds



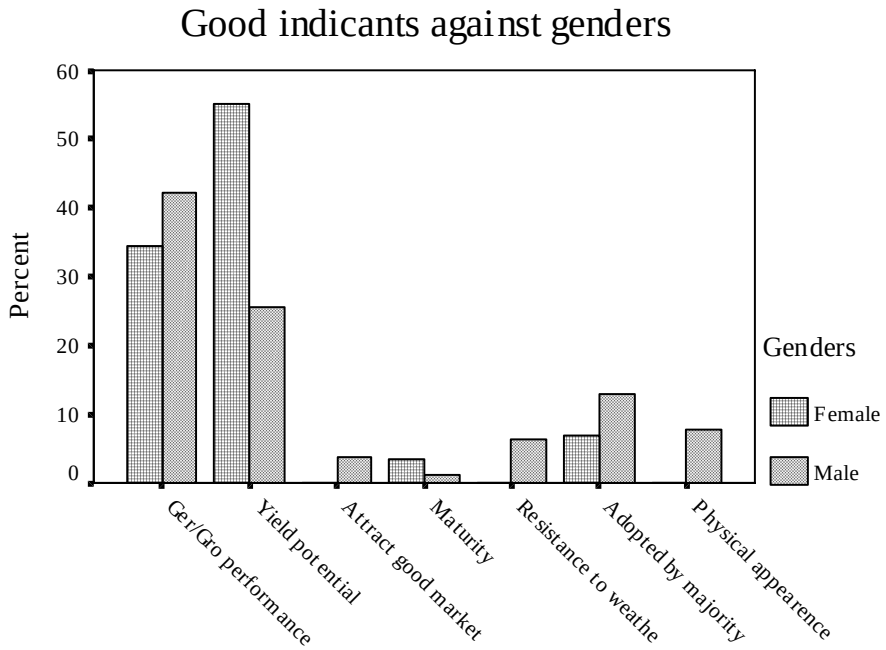
Persons/institutions influential on the view held towards bean seeds

Alongside research and extension agencies, other farmers were seen as particularly influential on respondents' views about new bean seeds. For poor producers, these two sources covered around 75% of responses.



Good indicant of bean seeds

When asked what they regarded as good indicators of the quality of a new variety of bean, most respondents' mentioned germination and growth potential, or yield potential (particularly the poorer producers, and women producers). None mentioned disease resistance and only a few mentioned resistance to poor weather (which may be a proxy for disease).



The following points were raised in discussion on Dr Asseid's presentation:

- the seven villages selected for the study are in the mainly subsistence production areas. In villages in areas where beans are becoming more of a commercial crop, the picture may be different
- the low number mentioning radio as an information source is surprising, in the light of data from elsewhere in the region where radio is a primary source of information on a wide range of topics including agriculture. This may be partly because the question in the survey asked only about the primary source of information; but may also reflect the lack of local content on radio
- a farmer participant observed that farmers will sometimes take a variety from researchers - and then give it their own name; so that the "official" name of the variety or line may not be given in response to a question about varieties which a farmer is growing
- the lack of reference to disease resistance as a characteristic of bean varieties confirms other research in the area. Producers do not talk about disease in beans; they may say "the rain has spoiled my beans"
- can we bring together the current prominence of the market as a source of information and of bean seeds, and the credibility of research and extension agencies - for example, by using markets as a forum for distributing information about new varieties?
- there is a demand from farmers for print material about bean varieties and production practices
- different bean varieties are grown - and new varieties are suitable - for different markets; local, national, food vendors, external market (e.g. Malawi); a problem for producers is that the external market is particularly unstable and unpredictable

- the District Extension Officer from Iringa described the functioning of bean seed producer groups, established under the HIMA project
- bean producers are not the only potential target groups for promotion activities: others include traders or market actors at various levels (from local, to national, to international), consumers, and extension agencies in the public and NGO sectors
- where beans are produced for the external market, it is necessary to promote quality of the product
- potential channels for promotion include schools; promotion of a deeper understanding among producers about bean diseases, for example, could be channelled through schools: both as a route, via school students, to bean producing households, and to empower young people - who will be the bean producers of the future - through knowledge

(2) Update on beans research and development in Southern Highlands

Dr Catharine Madata, ARI-Uyole

1. Breeding
   - yield is the primary consideration
   - main biological problems constraining yield in the Southern Highlands are:
     - disease: reduces yield. Major diseases are anthracnose, angular leaf spot, rust, haloblight (which is increasing: contributing reasons are that some varieties are becoming susceptible, and production is moving into areas not traditionally used for producing beans) and BCMV (mosaic virus: because of irrigation and the high population of aphids)
     - insect pests - including bean stem maggot (IPM project is looking at varieties which have resistance / tolerance), pod borer, and stem borer
   - breeding for whom? for consumers, who include the producers themselves, and various markets. Requirements and preferences vary: for example, consumers in DRC prefer yellow types. From consumer preference point of view, beans can be classified in different ways, for example:
     - seed types: large v. medium; colour (yellow, orange, purple [e.g. kablanketi], red); sugar types (preferred in countries in southern Africa)
     - culinary quality - e.g. shelf life after cooking; palatability of the leaves
   - markets include local markets, distant markets within Tanzania, and regional markets outside Tanzania. For the latter, small white beans have a market for canning
   - main non-biological constraints are drought and soil characteristics. Breeding programme is developing drought tolerant material, and material which has tolerance to high acidity, low P and low N
   - seed multiplication is an issue for released varieties - the need to produce basic and breeder seed.
2. Promotion
   - main means of promotion so far are on-farm trials/testing (OFT), informal seed multiplication, and dissemination of bean production technology. This is done in several ways - farmers come to ARI, scientists pass on production technology during OFTs and field days, through extension and NGOs, at Nanenane shows.
3. Materials for promotion
   - these fall into two broad categories: released varieties, and promising lines which are at various stages of OFT. The latter include the "NRI" or "CPP" lines: 32 lines screened down to 8, which are currently being increased on station to produce clean

seed (which, subject to further testing by the official agencies (TOSCA? or TPRI?), will go on-farm in the February-March planting season). The NRI/CPP lines are dark red kidney type, small to medium size: they will be tested initially in low-lying dry areas.

4. Other work going on at ARI-Uyole
    - agronomy (time of planting; soil fertility management)
    - technology transfer
    - plant protection: diseases; entomology
    - IPM: this is looking at a strategies which combine tolerance, time of planting, field management (including earthing up), soil fertility management, botanicals; and is involved in technology transfer
5. Released varieties
    - Kabanima: good resistance; poor shelf life; has been crossed with local variety "Masusu" to produce YC-2, UAC 160
    - Uyole 84: excellent leaves; high yield; drought tolerant; tolerant to bean stem maggot, and to diseases; ongoing work is improving it by crossing with Kablanketi
    - Njano: high yield, but susceptible to rust and aphid attack; is being crossed with Kablanketi, and with Sinon
    - Uyole 94: palatable; but it is not widely known among producers
    - Uyole 96
    - Uyole 98: yellow; cooks fast
6. Promising lines
    - Kabu population
    - Masusu population
    - YC 2 population
    - Uyole 84 X Kablanketi
    - Wanja (A197) - this is a CIAT accession, already released elsewhere in southern Africa and may be released in Tanzania
    - CAL 113, 143

Discussion on Dr Madata's presentation raised the following points:

- breeders face a challenge: they are seeking to develop varieties which will better withstand the disease (and other) pressures of the environments in which they are grown; yet if producers do not explicitly recognise disease as a problem, it is difficult for them to appreciate the full benefits of the new varieties
- research always has to be a mixture of demand-driven and supply-driven processes: scientists respond to needs and problems articulated by farmers; but must also use their own expertise and knowledge to identify promising lines of research
- reference was made to the sharing of information and materials within SABREN (Southern Africa Bean Regional Network) and ECABREN (East and Central Africa Bean Regional Network): the former is more relevant to work in the Southern Highlands, the latter more relevant to work in the north of Tanzania
- varieties vary in time to maturity:
    - early maturing: Uyole 94, Uyole 96, Uyole 98 (cf. Kablanketi)
    - medium maturing: Kabanima (cf. Masusu), Uyole 90

  - late maturing: Uyole 84

- Uyole 84 is a climber. Some farmers are now growing it only for their leaves, which now have a high demand in the market
- seed certification: it was suggested that varieties that farmers like during OFT are likely to be taken up through informal seed multiplication and dissemination; is it necessary to go through formal TOSCA procedures? is it possible that one is struggling to release varieties that farmers do not want, while those that they do want have already been taken up informally? Participants discussed the importance of testing under various conditions, and over specified periods of time, to minimise the risk of widely promoting planting material which turns out to have unforeseen negative consequences. It is also possible to speed up the process by collecting on-farm data and on-station data simultaneously rather than sequentially.

(3) Overview and case study of promotion and communication media

Ms Tisha Wheeler, The MEDIAE Trust (an educational NGO based in Nairobi and the UK)

1. What media can be used for promotion? Participants' suggestions included:

radio	television	video
drama	choir	stories
newspapers	posters	leaflets/brochures
newsletters	telephone	speeches
interaction	public meetings	

   Of these, five were suggested as suited for reaching bean producers: radio, field days, newspapers, posters and leaflets: i.e. a combination of mass media (radio), face-to-face interaction (field days) and print media.

   Ms Wheeler then went on to explore the potential of radio, print and mobile vans; and illustrated their combined potential through a case study of the *Tembea na Majira* programme in Kenya.

2. Radio
   - can reach the largest audience
   - it is immediate, reaching directly into people's homes
   - authoritative: it is widely regarded as credible and has a lot of influence on what people talk about, and what they think about issues
   - has wide coverage: from rich to poor; from ordinary citizens to top politicians
   - builds an audience over time (e.g. in Kenya, listenership to a rural radio "soap" went up from 42% of the potential audience to 88% in six months)
   - in Kenya, radio is the primary source of agricultural information: 99% of the population have access; research confirms that farmers' knowledge, attitudes and practices (KAP) can change through radio broadcasting
   - quality, relevance and format are critical to the effectiveness of radio: poor programming is counter-productive (e.g. a single person delivering a lecture over the radio about an agricultural practice, or giving the latest research results in technical language, do not work).
   - FM radio stations (Kenya, Uganda) create choice for listeners and therefore stimulate competition to provide entertaining, relevant programming in order to attract audiences
3. Print
   - durable

- can be used for reference (unlike radio - which is good for creating awareness but not for learning of detailed information for later use)
- penetrating
- prompts discussion
- represents the project or organisation
- can be used for training
- quality and relevance are important. Characteristics of an effective leaflet or poster are:
  - they contain one idea only
  - simple language and few words
  - logical structure
  - attractive to look at
  - prompts action: shows what you can do
  - widely distributed: excellent leaflets which sit on an office shelf do not communicate with farmers
- local production ensures local relevance and language
- participatory workshops to design print material - with scientists, extension personnel, farmers - are an efficient way to produce and test a lot of material in a short time, while building capacity for design of future materials. (At this point, it was commented that Ministry of Agriculture and Food Security policy on leaflets is that they should be designed jointly by scientist, extension workers and farmers; also that there are plans to bring the Zonal Communication Centre (the Media Centre in Mbeya) under the management of the Zonal Director of Research)

4. Mobile Vans
   - are used by the commercial sector to promote consumer products
   - offer a combination of: large numbers of people gathered at, for example, a market which is a good place to meet traders as well as consumers; a stage; music; contests and prizes
   - reach farmers and traders
   - bring information to the point of purchase
   - are entertaining: again, quality of the content and activity are important
   - make contact: interaction, direct feedback, questions from the audience which can be answered on the spot or fed back to research or other specialists for a later answer
   - an effective mobile van:
     - makes repeat visits
     - builds information pathways: e.g. the local extension worker, or local NGOs, can follow up van visits
     - taps the commercial sector
     - brings high proportion of women in the audience
   - (participants pointed out that there are four mobile vans belonging to the extension/research set up in the Southern Highlands; and that commercial mobile vans are used in Tanzania for promoting products like soap powders and beer: they use drama troupes to attract audiences)
5. Tembea na Majira: a multi-media case study from Kenya

This is an example of how communication channels can be more powerful when used in combination; and of the potential for bringing commercial sector resources into promotion and development communication. Using several media brings a bigger total audience; and the different media complement and reinforce each other. There are four main elements in the programme.

Radio soap and magazine
Broadcast on KBC Swahili. Soap broadcast on Thursday primetime for 15 minutes and repeated on Sunday primetime. The magazine is broadcast after the soap on Sunday. Has a weekly listenership of 8 million throughout Kenya.

Tembea Na Majira features social and development issues; livestock and milk marketing, child abuse, good governance, education and parents' involvement in schools.

Mobile Vans
Operate in peri-Urban markets throughout three regions in Kenya; Rift, Central and Western. Three van crews visit up to 160 markets and 200,000 market goers every six week cycle. Feature drama and interactive games, contests and entertainment linked to the social and development issues on Tembea Na Majira, focus on one issue each cycle.

Print Material
70,000 leaflets are distributed through mobile vans each six weeks. (560,000 per year) Distribution through schools carried out two to three times per year with an increased distribution of up to 250,000. Feature information on social and development issues on Tembea Na Majira linked to the vans and focusing on one issue each cycle.

Research
Qualitative media listenership research and measurement of changed knowledge, attitude and practice on key Tembea Na Majira issues and commercial consumer information. Conducted annually with1,600 persons interviewed throughout Kenya. Research serves two important functions: first, it shows commercial and donor sponsors whether the programme is delivering the audience they want and the changes in KAP which are expected; second, it provides feedback which is used to improve the programme for future cycles. Research is independent, to ensure credibility.

Session 3: Group discussion and plenary on current and recent promotion activities

In the afternoon session, participants divided into two groups: research scientists in one group, and extension, NGO and farmer representatives in the other group. They addressed the following three questions:

(a) what messages, varieties and practices has your organisation promoted, in relation to beans?

(b) what channels and methods have been used in this promotion?

(c) what are the strengths and weaknesses of these channels and methods?

Group 1 (Extension, NGO, farmer)

(a) What has been promoted?

Three experiences were described: the work of Ileje Rural Development Trust Fund (IRDTF); the extension programme of Mbeya Regional Extension Office; and the programme of Iringa District Extension Office.

IRDTF: exposes bean producers to technology developed by ARIs. This includes varieties provided by ARI-Uyole and ARI-Selian; and production technologies. They work in partnership with ARI-Uyole - for example helping establish OFTs with farmer groups, and participating in demonstrations. Some of these are arranged by ARI-Uyole, others by IRDTF and farmer groups. They also multiply seed on land owned by IRDTF: this is seed of varieties

which farmers have identified, through scoring at the end of the season, as promising. At the local Nanenane show they have prepared a display showing packets of seed of different varieties with information on the performance of the variety. At twice-yearly meetings of farmers' groups, they show varieties and technologies. (There are also Trust Funds working in Mbosi and Isangati Districts, as well as Ileje.)

Mbeya Regional Extension Office: manage some OFTs on behalf of ARI-Uyole, through the facilitation of Ward extension staff. They also arrange field days. They have received leaflets from ARI-Uyole and from the Media Centre (ZCC) on soils, diseases, pests, agrochemicals, agronomy - planting time and spacing.

Iringa District Extension Office: have received support from HIMA project, now from DANIDA via the Agricultural Sector Project. They have a bean seed production programme: villagers select a farmer to produce seeds. He or she receives training; TOSCA provides training on clean seed production; extension staff give training on agronomy and supervise throughout the process. Farmers come to evaluate and select varieties. In the second year, two farmers are selected to produce seed from the preferred varieties. Farmers Field Day is held at the seed producers' field.

(b) What methods and channels have been used?

- Nanenane shows
- demonstrations
- training
- field visits
- leaflets and booklets
- radio (the former Southern Highlands (IFAD) project had a weekly broadcast; Radio Tanzania (national) now sometimes mentions new varieties when reporting meetings of researchers)
- cross visits
- group discussions
- video - used in Iringa to show the idea of seed multiplication in new villages; the video was made by the staff on the mobile van; and then shown in new villages on the van
- paraprofessionals (farmer volunteers)
- a farmer representative said that buyers and traders of beans also promote varieties, encouraging farmers to grow varieties for which there is a strong market demand

(c) Strengths and weaknesses?

Strengths	Weaknesses
– farmers' enthusiasm; they want to learn, and are searching for new ideas and information – farmers are willing to share costs, give land for demonstrations – farmers' visits to ARI-Uyole are very effective for interaction and learning	– no leaflets to give out and spread the information widely – farmers lack a reference source which they can go back to – limited amount of material which is locally produced and locally relevant: videos from Europe and South Africa are of limited use

Group 2 (research scientists)

(a) What has been promoted?

New varieties (i.e. those identified by Dr C Madata, above)

(b) What methods and channels have been used?

- OFT
- demonstrations
- field days
- agricultural shows
- leaflets and posters
- farmer visits to ARI-Uyole
- seminars, workshops and meetings
- radio
- newspapers
- mobile van
- laminated handouts

(c) Strengths and weaknesses

Method	Strengths	Weaknesses
OFT	– farmers pick up the varieties they want – proves what works and what does not work	– few farmers are covered – limited use in promoting technology (cp. varieties)
Demonstration	– as for OFT, but more focused and simple	– farmers have limited choice
Field Day	– bigger audience – more interactive – has a big impact when it is in the farmer's field	– too brief
Agricultural Show	– attract more people – diverse people (traders, consumers as well as producers) – opportunity to buy seed	– not frequent – less focussed
leaflets / posters	– farmers can keep them longer – can be shared – can be reproduced	– expensive – only effective for those who can read
farmer visits	– farmers get more information – more enthusiasm – can get starter seed – demand driven (farmers see what they want to see; ask questions of the scientists)	– farmers have to travel a long distance – few farmers can come to the station

seminars, workshops, meetings	– interactive learning – discussion can be documented and shared; and referred to later – focused	– limited audience – expensive – limited topics covered
radio	– wide, fast coverage – cheap	– short lived – can be misunderstood
newspaper	– Majira and Nyasa cover Southern Highlands	– limited coverage – not kept for reference – expensive to the reader
mobile van	– attract more, and diverse, people – flexible: can go right to the village	– very few; visits are rare – expensive

The plenary discussion confirmed that participants already have experience of promotion activities, and an awareness of some of the weaknesses that need to be tackled in order to achieve a more effective and widespread promotion of beans and related knowledge and production practices.

Friday 9 November

Session 4: Review of Day 1 and objectives for Day 2

CG highlighted the following points from the previous day's discussion, which seem important for planning of future promotion activities:

(1) Farmers' information sources about beans:

- two key sources are the market place (particularly for women), and other farmers (particularly for men): can we make use of the market place as a forum for distribution of information, and for two-way communication with farmers and traders?
- research and extension services are seen as sources of credible information about new varieties and their performance, but are not easily accessible to most farmers
- farmers use visual characteristics - germination, growth potential, yield potential - as indicators of the potential of bean varieties.

(2) Varieties: there are varieties at different stages of development, which might be promotable to different audiences. They include

- released varieties
- improved crosses which have already been subject to on-farm testing and farmer evaluation
- new material - including the "NRI/CPP" lines - which are shortly due to go into on-farm testing if they are cleared by TOSCA inspection

(3) Current promotion activities: features of these are

- partnership between stakeholders: ARI-Uyole, public sector extension, NGOs, farmers (individuals, and farmer groups)

- channels used are face-to-face interaction (OFTs, demonstrations, field days, etc.): these are effective, but resource-intensive and therefore reach limited numbers of farmers

(4) Potential channels, which are currently not used very much:

- radio (national; regional (RT Songea); local private (Songea, Sumbawanga)
- print - for which there is a demand from farmers, and from extension; but we recognised problems of effective distribution
- mobile vans at the Regional centres (including Zonal Communication Centre, Mbeya)

Objectives for the second day of the meeting were suggested as:

- agree what can and should be promoted
- decide how these things should be promoted
- decide who should be involved in, and responsible for, the various promotion activities
- agree on the next steps, following the meeting.

Session 5 What can and should be promoted

To tackle the first objective, the participants divided into two mixed groups (with research scientists and extension/NGO/farmers represented in each) to address the following questions.

Group 1	Group 2
• what varieties can and should be promoted? • Content: what information should be provided about these varieties? • Audience: who should the varieties be promoted among? • Objectives: what change do we expect to see as a result of the promotion?	• what else, other than varieties, can and should be promoted, in relation to beans? • Content: what information or other content should be included? • Audiences: who should these things be promoted among? • Objectives: what change do we expect to see as a result of the promotion?

The findings from the two discussion groups were as follows:

Group 1: Varieties for promotion

Released varieties

- Uyole ’94, ’96, ’98

Improved crosses

- Calima progenies
- MRRC (very promising indeed)
- Uyole ’84 x Kablenketi
- NRI improved Canadian Wonder type (some lines will be selected)

<u>Audiences</u>

Farmers

Traders

Consumers

Policy Makers

Information which should be promoted

Farmers

- yield potential
- reaction to diseases
- reaction to environmental stresses including drought
- maturity period
- time of cooking
- marketability
- seed size
- seed colour
- leaves (i.e. palatability of leaf when used as a garnish)
- popularity of the variety
- shelf life after cooking
- post – harvest characteristics e.g. storage

Traders

- marketability
- popularity
- density[3]
- seed colour

Consumers

- palatability
- cookability
- shelf life
- seed colour
- broth quality
- diversity of use

Policy makers

- adoption levels
- contribution to food security
- contribution to nutrition

[3] Beans which are particularly heavy may be of particular interest since traders buy by volume and sell by weight

- contribution to income

Objectives of the promotion

At zonal level these are to

- Improve food security and nutrition
- Improve income
- Empower the household members

They may be achieved through

- increasing / widening the genetic potential
- improving stability of production of farmer acceptable varieties
- maintaining and improving marketing opportunities (for beans)
- increasing participation of stakeholders in research and development[4]
- monitoring and promotion of the process and outcome (target audience, policy makers, donors etc.)

The group discussed these areas with respect to released varieties versus varieties further back along the development / variety evaluation process. The group considered that

- content is similar as for released varieties, but the methods of promotion are different because they are likely to be promoted locally rather than over a wide area. Also, the information available about crosses in the process of being evaluated is necessarily different from the information available about varieties developed to the stage of release
- the audience is the same namely farmers, traders, consumers and policy makers
- the objectives i.e. improvement of food security, nutrition and household income which empowers household members are the same. A key difference, of course is that the more preliminary the evaluation of a variety the longer term the investment.

In discussion of this group's findings it was felt that those crosses at a more preliminary stage of development would necessarily be promoted more locally.

Group 2: Other factors[5] to be promoted

The group identified four things which should be promoted

A) "Scientific" knowledge and understanding among farmers

Contents

- disease, and disease resistance
- insect pests and their life cycles

Audiences

- all farmers
- traders who supply seed to farmers

[4] especially women and young farmers

[5] i.e. apart from, or in addition to, varieties

Objectives

- clean bean seed used
- better feed-back to researchers on variety performance
- better farmer decisions about choice of variety (farmer empowerment)
- improved management of pests and diseases

B) Market

Contents

- market channels
- utilisation
- market information

Audience

- Consumers
- Producers
- Traders
- Policy makers

Objectives

- better farmer trader co-operation e.g. contract growing
- empowering farmers through market intelligence

C) Production technology

Content

- post-harvest technology
- seed handling and management
- production techniques

Audience

- all farmers in all AEZ
- traders who sell seed / seed stockists

Objectives

- farmers use better seed
- traders / stockists supply clean seed
- pre- and post-harvest problems minimised

D) Early farmer involvement in new variety development

Content

- early incorporation of farmer identified attributes into the breeding programme

Audience

- researchers
- farmers
- NGOs

- Extension

Objectives

- to enhance acceptability of newly promoted lines

E) Farmer knowledge and management strategy

Contents

- how farmers manage their beans and why

Audience

- research
- extension

Objectives

- enhance understanding of farmer knowledge and practice
- incorporation of farmers' criteria for and attributes of Phaseolus into the breeding programme

The findings of the two groups were discussed by the complete set of participants and seven promotable aspects or areas were identified:

1) Released varieties
2) Crosses in earlier stages of development / evaluation
3) "Scientific" knowledge and understanding among farmers
4) Market and marketing knowledge / information
5) Technology of bean production, including post-harvest technology and seed handling
6) Early farmer involvement in new variety development
7) Farmer knowledge

Session 6 Identifying channels: how should these things be promoted?

The workshop divided into the same two groups as previously to consider these seven areas with respect to:

a) Where should these aspects be promoted?
b) Which methods should be used to achieve this?

Group 1 addressed the first two areas and group 2 the remainder.

The deliberations of the two groups were presented to the workshop and, after discussion, the following summary agreed as the basis of how (method) and where (area) the seven identified aspects for promotion could be carried forward.

(1) Released varieties

Varieties

- Uyole '94
- Uyole '96
- Uyole '98

Areas

- a range of altitudes from 1 000 – 2 000 m
- AEZ 3, 4 and 5 (Note: AEZ 3 is a quite low rainfall whereas AEZ 5 has quite high rainfall and altitude)

Method of promotion (and who[6] could be involved in the promotion)

Promotion to farmers

Demonstration	NGO	F	E
Field day	R	F	E
Agricultural shows	R	E	
Radio	R	ZCC	
Leaflets	R	ZCC	
Posters	R	ZCC	
Mobile vans	R	ZCC	
Newspapers	R	E	
Extension workshop	E	R	

Promotion to traders

Posters	R	ZCC
Radio		
Newspapers		
Stickers on trucks		
Mobile van		

Promotion to consumers

- Radio
- Posters
- Newspapers
- Stickers / Khanga / T-shirts
- Mobile van
- Agricultural shows

Promotion to policy makers

Leaflets	
Newspapers	
Radio / TV	
Telephone /e-mails /	
Fax / Internet	R
Workshops	R
Agricultural shows	
Field days	

[6] F= farmers; E= District/Regional/Zonal extension service; R=research (ARI-Uyole); NGO = non-governmental organisations; ZCC = Zonal Communication Centre

(2) Crosses in earlier stages of development / evaluation

These include the crosses referred to as the CPP crosses in the PMF and are improved Canadian Wonder types as well as material developed at Uyole (see session 2 above; presentation by Dr C Madata)

Areas

- from low to high rainfall for adaptability
- especially lower, drier areas i.e. AEZ 2 and AEZ 3

Method of promotion

Promotion to farmers				
On-farm trials	R	E	F	NGO
Field days				
Farmer / farmer visits	R	E		
Seminars	R			
Tasting Panels	E			
Promotion to traders				
Field days				
Agricultural shows				
Promotion to consumers				
Field days				
Agricultural shows				
Tasting panels				
Promotion to policy makers				
Field days				
Agricultural shows				

(3) "Scientific" knowledge and understanding among farmers

Areas

- all bean producing areas in SHZ

Method

- face-to-face interactive methods
- leaflets
- seminars at ARI UYOLE
- radio
- posters in market places
- group discussion facilitated by mobile vans
- schools, churches
- other "vehicles" e.g. information on milk cartons

Audience

- All stakeholders across Tanzania

(4) Market and marketing knowledge / information

(A) Market intelligence

Areas

- all bean producing areas in SHT

Methods

- Radio (enhancing information already broadcast by radio Tanzania such as price information)
- Collaboration with e.g. FEDA, MLLCO

(B) Promoting understanding of how markets function

Areas

- same as (A)

Methods

- training e.g. through SACCO and farmer groups

(5) Technology of bean production, post-harvest technology and seed handling

It was felt that only specific areas / topics can be addressed within the present project. It was agreed that

1. Aspects of post-harvest technology could be addressed under item (4) "market" e.g. encouraging producers to improve the post-harvest handling to extend storage
2. Aspects of seed handling could be addressed under item (3) "promotion of “scientific” knowledge among farmers"

(6) Early farmer involvement in variety development

Areas

- villages where we have existing rapport with farmers
- R + E country wide

Method

- On-farm trials with researcher assisted plot design (plots subsequently may be researcher and/or farmer managed
- Posters advertising the methodologies, to be displayed at research meetings, workshops, conferences

(7) Farmer knowledge

Areas

- country-wide

Methods

- A4 leaflets based on outputs from two previous projects (functional diversity and *in situ* conservation)

Session 7 Experience of leaflet production and use in beans IPM project

D Kabungo, ARI-Uyole

A leaflet was produced, at the request of one of the farmers' groups participating in the promotion aspects of the IPM project. As background, Mr Kabungo described the group's activities in the project to date. They held a Farmers' Field Day after the 1999-2000 variety trials. In 2000-2001, they carried out agronomic and IPM trials. Another Farmers' Field Day was held and a video of it was taken, by the ZCC. The video was shown to other villages, using the mobile van. The group then asked for support in participating in the local (?District?) Nanenane 2001. The leaflet was produced, to tell what the group had done and describing the findings from the trials. It was given out to those buying seed from the group, and to others interested in bean production.

Session 8 Plenary discussion on content, channels and priorities for promotion strategy

Discussion continued on the seven aspects/areas for promotion. They were linked to location and promotion methods as follows:

Methodology	Scope / Area of application of promotion activity			
	On-farm in village	Specific AEZ	Bean Areas of Southern Highlands	Tanzania
Demonstration		1[7]	3	
Field day	2	1		
On-farm trial	2,6			
Ag Shows		1	2	
Radio		1	3, 4	7
Leaflets		1	3	7
Posters		1	3	6
Mobile van		1	3	
Newspapers		1	4	
TV				1
Stickers		1		
Phone/fx/e-mail				1
Ext'n w'shops		1	3	
Tasting panels	2	1		

Note: Shaded areas represent those methods identified by the workshop as not yet being used or little used which appear both in demand and suitable for "next steps" activities

[7] Key: 1 = Released varieties; 2 = Crosses in earlier stages of development / evaluation 3 = Promotion of scientific knowledge; 4 = Market; 5 = Production technology; 6 = Early farmer involvement in variety development and assessment; 7 = Farmer knowledge

Further discussion followed on the specific methods highlighted in the table above, focusing on the shaded ones - i.e. those where some specific new initiatives or activities would be needed in order to develop promotional materials and activities.

1) Radio

It was felt that this could be used for promotion activities in specific areas of SHT. It could for example be used to alert audiences to visits by mobile vans. Possible action – identify who is responsible for broadcasting and discuss with them. ARI-Uyole may need to interact with ZCC → Radio Tanzania.

Could also be used for promotion of information relating to item 3 (market information) and item 4 (early farmer involvement). Applicable to all bean producing areas. Possible action – Officer responsible for statistics at regional communication office could lead on item 3. Uyole staff could take lead on item 4.

Radio could also be used on item 7 (farmer knowledge). Possible action – researchers to take lead

2) Print Material

Leaflets and posters designed for different audiences as identified in group discussions.

Possible action - a leaflet and poster design and production workshop, to develop specific print materials and enhance capacity for producing future materials.

3) Newspaper

Either researchers write article and submit through Uyole processes to newspaper, or expert writer is commissioned to interview staff and draft articles. Alternatively, the newspaper itself is asked to take the lead and provide a field journalist.

4) TV

Approach made directly to TV through ZCC.

Brief discussions were held on the time and resources available for such activities. The workshop perceived potentially limiting factors as

- time
- financial resources
- staffing

1) Time – the project has approximately 15 months remaining: November 2001 – March 2003
2) Financial resources c. £ 20 K in the project budget specifically for promotion materials and activities
3) Staffing – existing core staff of the project remain in place with exception of one (Dr Bisanda) at ARI-Uyole. This however is against a background of wider staffing realignment at Uyole.

These constraints mean that we need to prioritise promotion activities. Through discussion, it was agreed that the promotion channels should be prioritised as follows:

1: print materials

2: radio

3: mobile van (i.e. more intensive use of the mobile vans)

4: newspaper

5: television

Following a recommendation by the Director, the meeting agreed that the next step was for the Uyole team to consider the outputs of the workshop and identify a Secretariat at Uyole who would then assign staffing, responsibility and time scale for promotion activities. It is recognised that any new activities and materials will complement the existing work programmes of all the stakeholders represented at the meeting.

C Garforth and N Hayden agreed to circulate a draft report of the meeting by e-mail, by 12 November.

The meeting closed at 1730.

Annex 1: Participants

1	Dr M Msabaha	ARI-Uyole	PO Box 400 Mbeya
2	Dr G Madata	ARI-Uyole	PO Box 400 Mbeya
3	Dr C Madata	ARI-Uyole	PO Box 400 Mbeya
4	Fredrica Mwalyego	ARI-Uyole	PO Box 400 Mbeya
5	Dr S Bisanda	ARI-Uyole	PO Box 400 Mbeya
6	D Kabungo	ARI-Uyole	PO Box 400 Mbeya
7	Margaret Mkuchu	ARI-Uyole	PO Box 400 Mbeya
8	M P Matambi	District Extension Officer, Mbeya Rural	PO Box 253 Mbeya
9	Jerome A Maimu	Ileja Rural Development Trust Fund	PO Box 160 Ileja
10	Mary Aloyce Moshy	District Extension Officer, Iringa	PO Box 290 Iringa
11	Elimpaa D Y Kiranga	Regional Extension Office	PO Box 1982 Mbeya
12	Reuben O Mwambene	Farmer	PO Box 2045 Mbeya
12	Dr Bakari Asseid	The University of Reading	PO Box 1041 Zanzibar
13	Prof. Chris Garforth	The University of Reading	PO Box 237 Reading RG6 6AR, UK c.j.garforth@reading.ac.uk
14	Tisha Wheeler	Mediae Trust	t.mediae@africaonline.co.ke
14	Dr Nicholas Hayden	Natural Resources Institute	Chatham Maritime, Kent, UK n.j.hayden@gre.ac.uk
15	Richard Lamboll	Natural Resources Institute	Chatham Maritime, Kent, UK

Appendix 6.3.1

Participatory Promotion of Disease Resistant and Farmer Acceptable Beans in the Southern Highlands of Tanzania: survey to assess the impact of the communication and promotion strategy

Asseid, B, and Garforth, C, The University of Reading
April 2003

1. Background

This report is based on the outcome of the project Activity 6.1. and 6.2 as highlighted in the promotion strategy workshop report (Garforth and Hayden 2001). The workshop report calls for the participatory formulation of a promotion strategy based on the priorities for audiences, content and channels identified at the workshop, followed by the design and dissemination of promotion materials, as subsequent outcome of the project activities. It was agreed during the workshop that the promotion materials toward farmers should focus on print (leaflets and posters), radio programmes, demonstrations, field days, agricultural shows, mobile vans, newspapers, extension visits and workshops.

However, due to the limited time to complete the study the priority focus was given to radio, leaflets and posters as communication pathways and information uptake for farmers which would also have an impact through their use in agriculture shows, and during on-farm demonstration and extension activities. It was agreed that these should cover sound practices of bean husbandry with emphasis on disease and pest control measures, on-farm seed production and increasing awareness of and interest in new bean seed varieties with improved qualities. It was agreed also that the primary focus should be on the released varieties, including:

- Uyole 94,
- Uyole 96, and
- Uyole 98.

In addition, it was agreed that the promotion material should take into account promotion of upcoming varieties which were not yet formally released but were showing promise and acceptance by farmers in on-farm and on-station evaluation. These were to include lines such as:

- Wanja,
- TM Uyole and
- NRI lines.

The initial development of the promotion material was completed during the workshop (Garforth and Hayden, eds., 2001) which involved scientists from ARI-Uyole, NRI, the Mediae Trust, The University of Reading, representatives from NGOs, farmers, research stations and extension units from Southern Highlands. Further work was done by members of the R7569 research team from Uyole and Reading in 2002, in finalising text and overall design, and producing photographs. The design of the print materials was then finalised by professionals from Premadasa, a graphics company in Dar es Salaam.

The printing was done by the *Mkulima wa Kisasa,* the Extension Unit of the Ministry of Agriculture and Food Security, Dar es Salaam. A radio programme, based on the content of the print materials, was broadcast by Radio Tanzania in February 2003.

2. Objective of the study

Once the promotion materials were produced and distributed to farmers through various outlets this study set forth with the following main objective:

- to assess the impact of the promotion material among the target group of farmers within the Southern Highlands of Tanzania.

3. Distribution of promotion materials

Six posters, three leaflets, and one radio programme were made within the project. A total of 9,000 leaflets, and 1650 posters were completed and handed over to ARI-Uyole for dissemination to farmers and to be posted to the respective information outlets. The initial distribution of these materials coincided with the national celebration of World Food Day in Mbeya that was attended by many people from all over Tanzania, between 10th. and 20th. October, 2002. During this event leaflets were distributed free of charge to farmers and others interested in beans promotion and production. Posters were distributed to people with some responsibility for community facilities or activities, on the assumption that they would display the posters in communal areas for people to see and learn from them. Informal feedback from politicians, research scientists from other parts of Tanzania, and staff of NGOs and government departments was very positive: the print materials were thought to be eye-catching, relevant and informative. The radio programme was developed by the Zonal Extension Officer and broadcast by the Radio Tanzania Southern Highlands, with the co-operation of the Director of *Mkulima wa Kisasa* in Dar es Salaam.

4. Description of the promotion materials

Efforts were made to make sure that the leaflets and posters were of good quality in terms of the contents and the material used in their production. These are glossy and in various attractive colours. The leaflets are printed on A4 size paper on both sides and with two folds, giving six “pages”. The posters are size A2 printed on one side. Each item has the address of ARI-Uyole just in case any one would like to make further enquiries. The posters follow a similar design, so that they all are easily recognised as belonging to the same series: this design can be used a template for future posters promoting new varieties, or new knowledge about the production, management, processing and marketing of beans that ARI-Uyole may want to produce in the future. Posters 2, 3, 4 and 5 all carry the same heading – “Beans from Uyole”. The leaflets also have a common overall design that can be used as a template for production of future leaflets.

4.1 *Poster 1: Farmers involvement in improved bean seeds production.*

This poster is intended for extension agents and, particularly, for researchers rather than for farmers. Only 150 running copies were printed and distributed. It has a friendly natural sky blue colour background fading towards the top. It has five coloured picture which emphasis farmers' involvement in various stages of the development of improved bean varieties. There are a few words describing every picture. The pictures show seed selection, farm assessment, on-farm trial, seed assortment and dissemination. A limited amount of text emphasises the benefits of farmers' involvement in variety development, including:

- Good varieties can be obtained in a short period of time
- Released seeds will be accepted more readily by farmers
- Variety development is enriched by the exchange of expertise between researchers and farmers.

4.2 *Poster 2: Improved bean seed – Uyole 94*

A total of 300 posters of this kind were produced and some of these were distributed in public places around villages in Southern highlands. The poster features prominently a photograph of seeds of Uyole 94.Below it, in large print, the characteristics of the variety are summarised. This poster puts particular emphasis to the superior qualities of Uyole 94 which include:

- It flourishes between 800m and 1800m above sea level;
- It matures in three months;
- It produces 10 – 15 bags/ha;
- It is resistant to some diseases;
- It tolerates drought;
- People prefer it because it:
    - takes only a short time to cook
    - is palatable
    - produces broth which is relatively heavy and lasts a long time after cooking
    - has good market value;
- The leaves are good as relish, palatable and soft.

4.3 *Poster 3: Improved bean seed – Uyole 96*

The majority of the farmers prefer this bean type. The poster has a striking red background, fading to light pink towards the top. As this poster was intended for farmers, about 300 posters were produced. The visual qualities of this variety are reflected in a photograph of the seeds, below which is text that highlights its production and cooking qualities as follows:

- It flourishes between 800 and 1800m above sea level;
- It matures in three months;
- It produces 10 – 15 bags/ha;
- It is resistant to some diseases;

- It tolerates drought;
- People prefer it because it:
    - takes only a short time to cook
    - is palatable
    - produces broth which is relatively heavy and lasts a long time after cooking
    - has good market value;
- The leaves are good as relish, palatable and soft

4.4 *Poster 4: Improved bean seed – Uyole 98*

According to farmers and the bean breeder at ARI-Uyole this improved bean variety is on top of the range of all beans produced in ARI-Uyole. The poster for this variety reflects this view. The background has been printed in light green fading towards the top, which makes the heading in green more conspicuous. The natural colour of the beans is yellowish mixed with dark orange which distinguish it from other bean varieties. The picture is reinforced by bullet points which highlight the outstanding characteristics of the beans as follows:

- It flourishes between 800 and 2000m above sea level;
- It matures in three months;
- It produces 12 – 20 bags/ha;
- It resists diseases[1];
- It tolerates drought;
- People prefer it because:
    - takes only a short time to cook
    - is palatable
    - produces broth which is relatively heavy and lasts a long time after cooking
    - has good market value;
- The leaves are good as relish, palatable and soft

4.5 *Poster 5: Upcoming bean varieties*

This poster presents complex information in a simplified manner to which people can relate with their previous experience and future expectations on improved bean varieties. The colours of the poster catch these expectations which are reinforced by a catch phrase, *'Mbegu Mpya Zinakuja'*. It shows improved bean varieties which are at various stages on the way to formal release. On top of the poster there is one picture showing a woman selecting beans from her mixtures, a typical situation in Southern Highlands of Tanzania. The poster also builds more confidence in these upcoming varieties by announcing that they have been tested and assessed by the farmers, and are going through the release procedures which will soon be completed. Three bean varieties are presented: the first two, Wanja and TM Uyole, have been produced by ARI-Uyole under the ongoing bean programme, while the third variety has been developed under the auspices of the

[1] According to the Breeder at ARI-Uyole this bean type can be grown under farmers' conditions without disease problems.

collaboration between ARI-Uyole and NRI. These upcoming varieties are distinctive in colours and in size. The Wanja is brown and a bit greenish with almost the same size as Uyole 94. The TM Uyole and NRI varieties are red in colour and smaller in size compared to Wanja. TM Uyole however, is a bit round and brighter while the NRI beans are dark red. All these upcoming varieties have similar attributes as follows:

- Resist drought;
- Resist some diseases;
- Mature early;
- Have good market value;
- Palatable;
- Take short time to cook;
- The broth is good and lasts long.

4.6 *Poster 6: Destructive insects*

With all efforts to breed disease resistant beans varieties, the question of insect attack remains unresolved through breeding programs. This poster with red spikes sends warning signals to farmers on the devastation that can be caused by insects. The warning reads '*Usipojikinga Watakuletea Njaa*'. This literally means, 'if you don't prevent these insects hunger will strike'. The poster has three pictures of insects at different stages of attack. The first one is on the plants, the second is on the pods and the third is on the beans, showing beans attacked by Bruchids.

This is the last poster in the series of posters developed and distributed to farmer. It was supposed to be a stand-alone poster but the information was complemented by a leaflet on various methods of controlling insects.

4.7 *Leaflets 1: Controlling of Bean Insects*

This leaflet is printed on a light blue colour background on A4 paper with folds. The front page has a picture of devastated bean plant. The following pages have one picture showing an insect on a bean leaf and three other picture showing important plants for controlling bean insects. These[2] are Utupa, Lidupala na Isongolo. The text within the leaflet gives some detailed information about insects and their effects and then prescribes important measures in controlling bean insects:

- Description of insects which attack beans at various stages;
- Devastation caused by insects at various stages of development;
- Controlling measures:
    - Using industrial chemicals
    - Using local technologies, especially chemicals from local plants like *Utupa, Lidupala* and *Isogolo*.

[2] These names differ in different places depending on the locality and the language of the people.

4.8 *Leaflets 2: Good bean husbandry*

This greenish leaflet prescribes good practices of bean farming with focus on Southern Highlands of Tanzania. The front page has a picture showing mature crop derived from good practices. There are no pictures on subsequent pages but detailed guidelines on good bean husbandry are given as follows:

- Preferred area - consideration of rains and soil;
- Land preparation;
- Time of planting;
- Plant spacing;
- Weeding;
- Preventive measures against diseases;
- Harvesting;
- Storage.

4.9 *Leaflets 3: Production of bean seeds*

It is apparent that the ultimate goal of this work is to feed into the process that will help farmers to produce their own seeds/beans and subsequently improve their household food security and reduce the level of poverty. This leaflet addresses the seed production element of the process. The flamboyant leaflet is printed on a mixture of attractive red, black and light green/cream fading towards the top of the leaflet. The front page has a picture of matured bean pods overlapped by various bean types. The picture on the second page shows a healthy bean seed production plot. The text of the leaflet sets forth considerations for good bean seed production as follows:

- Reasons for production of good bean seeds;
- Qualities of good bean seeds;
- Planting places;
- Times for planting;
- Considerations during planting ;
- Fertilisation;
- Weeding;
- Insect control measures;
- Disease control measures;
- Harvesting and cleaning up;
- Storages;
- Prevention towards vermin;
- Production levels.

5. Study methodology

The study used two approaches. The first was a sample survey to generate quantitative data (Appendix 2). The second was group discussions to generate information that would otherwise be difficult to be collected through sample survey. Decision was made to conduct the study in the second or third week of February 2003 since at that time most of the farmers would have planted their crops and would be in a position to assess the new

varieties. It was also expected that the promotion material would have reached the targeted communities by that time.

During the data collection farmers had already planted their crops and they were at a stage of weeding; however distribution of the new promotion materials had not covered all the communities. The decision was made therefore, to study only those communities that would have access to the new promotion materials.

Distributing promotion material in the Southern Highlands of Tanzania faces constraints due to the large size of the area and the number of people who are engaged in bean farming living in isolated villages and homesteads. The ARI-Uyole Zonal Extension Unit has limited funds which makes it more difficult for the staff to reach all communities in a short period of time. As a result, the sample population was drawn from villages in Njombe and Mufindi districts as shown in the map (Map of Tanzania, Appendix 1, Activity 6.3).

6. Results and discussion

The main source of these findings is the quantitative data generated from the sample survey. However, some qualitative information is used to qualify some of the findings generated from the quantitative data.

6.1. Description of the sample survey

A total of 103 respondents were interviewed, including both men and women, in five villages of Southern Highlands (Table 1). Efforts were made to have the balance of male and female within the sample population but it was not possible due to the way people organise themselves in the villages, and the time at which the interviews were conducted. For instance, in Mayale village women are well organised and would readily respond to development issues and collaborate with researchers and extension agencies. Over the years they have been upfront in agricultural development and on-farm trials of various bean seeds. The village Chairperson is a woman which gives an additional advantage for engagement of women in research programmes (72.4%) compared to men (27.6%).

The number of respondents in Iramba village was mostly affected by the time at which the interviews were conducted, late afternoon. At this time most of the villagers would have returned from their farms but the women would have been busy attending to household chores making them less likely (12.5%) to be interviewed, while men were congregating in the Clubs enjoying themselves and hence easily available for interviews (87%). However, the total number of women interviewed in all villages was slightly higher than half the sample (53.8%) since in most cases during the data collection women were found to work in groups making it easy to interview them compared to men who were mostly working alone (46.2%).

Table 1: *Description of the respondents*

Villages	Gender of Respondents					
	Male		Female		Total	
	No	%	No	%	No	%
Kilimanzowo	20	45.5	24	54.5	44	41.5
Iramba	14	87.5	2	12.5	16	15.1
Mayale	8	27.6	21	72.4	29	27.4
Igodivaha	4	40.0	6	60.0	10	9.4
Lyadebwa	3	42.9	4	57.1	7	6.6
Total	49	46.2	57	53.8	106	100

Within the sample villages Mayale was found to be relatively better off with the following description:

- There are many houses with iron sheets;
- There are houses for hiring/ shops/kiosks/transport;
- Keep big number of livestock & sell animals to other areas;
- Most people have regular job or are self employed;
- Have some few renown witch doctors and medical facilities near by;
- Most people have small families/ matured and employed children;
- Most people have good access to farming resources;
- Religiously active villagers.

The rest of the villages were found to be relatively poor with descriptions as follows:

- Poor housing conditions;
- Poor soil fertility;
- Few livestock in the village;
- High level of illiteracy;
- High level of alcoholism;
- High level of mortality among children under five years;
- Poor village infrastructure and transportation system;
- High number of divorcees and school drop-ups;
- Limited crop diversity;
- Large number of immigrants who depend on hiring-out their labour.

Nevertheless, there are strong community organisations within all villages, whether dominated by men or women. This is the effect of local institutional arrangements at grass root level in Tanzania making an ideal environment for research and development work.

6.2 Assessment of communication pathways/materials

The study team discovered that the posters and leaflets had not been distributed effectively at village level. In most cases, they had reached the extension workers and NGOs active in the area. These, however, had not thought it appropriate to distribute leaflets to farmers, or to display the posters in public places: rather, they kept them for use at meetings and extension activities. Consequently most farmers had not seen them

before the study team arrived in the village. The original plan of assessing their impact could not, therefore, be followed through. This raises questions about the perception of extension staff of the role of print materials in the village, the numbers of leaflets that need to be available in order for extension staff to feel it is acceptable to hand them out freely, and the means of distributing print material in future (for example, distribution through schools might be more effective in getting leaflets to bean producing households than doing it through extension workers). In view of the situation, the study team used their time in the villages to test the materials, in order to generate some feedback on design, contents and usability. The overwhelming response from the farmers, when shown the posters and leaflets, was very positive. Posters were praised for their clear layout, straightforward message and striking pictures. Leaflets were regarded as relevant in terms of content and clear in their messages.

Villagers who were interviewed for the study, then, were not in a position to answer the survey questions with respect to the specific promotional materials produced for the project. Instead, they answered questions with respect to their general experience of information and promotion materials and pathways. Having seen, heard and been exposed to different kinds of communication pathways and materials, farmers' assessments of such pathways in relation to the effect they have on bean farming vary (Table 2). Generally, posters, leaflets and on-farm trials are considered to be important (Median = 4 on a 1-5 scale), compared to other promotion pathways such as nane nane[3], which is considered fairly important (Median = 3), radio which is considered not important (Median = 2), and visits to research station which are considered not important at all (Median = 1). This confirmed the importance of print material to bean producers in the area.

Table 2: *Farmers' assessment of communication pathways/materials*

Communication pathways	Scores in %										Median		
	1		2		3		4		5				
	m	f	m	f	m	f	m	F	m	f	m	f	all
Posters	42	58	50	50	36	64	45	55	45	55	4	4	4
Leaflets	35	65	75	25	54	46	32	68	54	46	5	4	4
Radio	39	61	50	50	68	32	39	61	47	53	2.5	1	2
On-farm trials	33	67	50	50	53	47	44	56	47	53	4	4	4
Research Stations	50	50	50	50	43	57	50	50	54	46	1	1	1
Nane nane	41	59	25	75	56	44	58	42	44	56	4	3	3

Legend
1 = Not important at all
2 = Not important
3 = Fairly important
4 = Important
5 = Very important
m = Male
f = Female

[3] Agriculture shows that are organised annually (usually 8th. August) at village, district, regional or at national level.

It can be noted, however, that those communication pathways which are considered important for bean promotion are very characteristic. For instances, during focus group discussion farmers indicated that, for posters and leaflets to have impact as an uptake pathway they need to be very relevant and appealing in terms of to lay out, contents and presentation, while on-farm trials must be seen to be economically viable and enjoyable to participate in.

The moderate importance that is accorded to nane nane shows as a communication pathway for promotion of beans farming within the sample population is probably due to the fact that they would attract only those who are active in pursuing agriculture information or those who have opportunity to visit the nane nane show grounds.

Scores for radio as communication pathway for the promotion of bean farming provide an interesting finding. It is considered not important (Median = 2) in the promotion of bean farming or indeed in agriculture in general. There are some people within the sample population who have radio but most of them use the radio to listen to other programmes such as news bulletins and entertainment. There are limited number of radio stations however which beam their broadcasting to Southern Highlands. These are Radio Tanzania and, more recently, Radio Tumaini and Radio Free Africa.

Qualitative information reveals that there is a tendency among the sample population to acknowledge the importance of radio in the promotion of agriculture. It has been found that many of the individuals who possess radio would leave their radios at home expecting those who are at home to listen and inform them on the matters that arise when they return. There are other respondents who would listen to radio in clubs where the concentration is hardly on matters of agriculture but of entertainment and drinking. Only two people of those who participated in the qualitative information gathering could recall hearing a radio broadcast[4] on beans husbandry that was aired between 2 to 3 days before the study team came to the village. Even those who had a chance to hear the programme did not pay much attention to the content since they heard it accidentally. Qualitative information revealed that people do not make deliberate efforts in seeking agriculture information from radio let alone information specifically about bean husbandry.

Although visiting research stations is considered to be one of the communication pathways for information about bean seeds and husbandry, results show visiting research station as a communication pathway is not important for most of the respondents (Median = 1). It is likely that the few who might consider visiting research stations for information about bean husbandry are the progressive farmers or those who were once involved in on-farm trials and subsequently developed friendship with the researchers. Otherwise it would be a group of farmers engaged in a development programme.

6.3 Preference towards communication pathways/materials

When all the sample population is taken together, farmers have indicated a group of 14 communication pathways of different magnitudes. Many of them indicated that leaflets

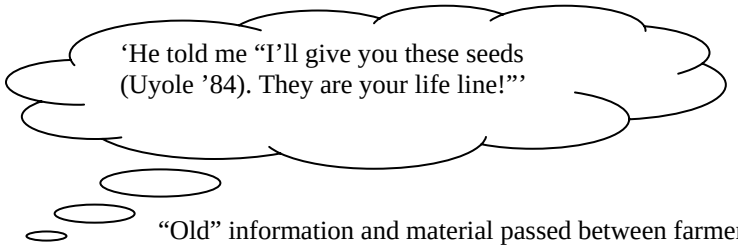
[4] The broadcast was made particularly to coincide with this study.

are their most preferred means of communication pathway or material (21.4%) following by on-farm trials (18.4%) and working with extension agents popularly know *Bwana Shamba* (17.5%) as indicated in Table 3.

Table 3: *Preferences on pathways accessing new agricultural information*

Pathways	Scores in %		
	Female	Male	All
Through Extension Agents	16.1	19.1	17.5
On farm trials	12.5	25.5	18.4
Posters	7.1	2.1	4.9
Leaflets	23.2	19.1	21.4
Field visits	3.6	8.5	5.8
Cinema/Video		6.4	2.9
Radio	12.5	2.1	7.8
Market places	1.8	4.3	2.9
Short trainings	5.4	8.5	6.8
Nane nane	7.1	2.1	4.9
Visiting Research Stations	1.8		1.0
Farmer to Farmer	1.8	2.1	1.9
Through seed distribution	1.8		1.0
News letters	5.4		2.9

It is interesting to note, however, that only 1.9% of the farmers prefer to have 'farmer to farmer' as communication pathway. This is due to the fact that consideration here is on the *new* information. It would have been a different scenario if consideration was on old information or the kind of information embedded in the community or household. In such instance, 'farmer to farmer', or information exchanged between friends and neighbours would have scored higher preference. Once the information about a certain technology has been, tested and well established among the farmers, extension agents have little role in the control of such information and its subsequent evaluation and adaptation – as the following comment made by a women farmer who received a handful of seeds from a resident in the village to which she came as a newcomer some years ago illustrates:



Such information sharing is robust in its nature since it would have been already tested in the locality over the years taking into consideration the varied environmental conditions and farmers' capability in handling the technology.

Although cinema and video are not high in the preference for bean promotion (2.9%) qualitative information reveal an interesting scenario on cinema and video as preferred

means of promotion agriculture technologies. Farmers have indicated a great interest on video and cinema. This can be understood since cinema and video encompass exceptional entertainment to the rural communities. It is likely also that farmers gave low preference scores to cinema and video by taking into consideration their previous experience that provision of such facilities are limited in its realisation due to high running costs and in any case are rarely used for agricultural information.

6.4 Benefits of promotion efforts

Over the years ARI-Uyole and other research and development agencies within the area have been working with farmers using different kinds of communication pathways and materials in the promotion of different kinds of technologies, including improved bean seeds. During the study a specific question was asked in relation to the benefits that were brought about by the promotion material on beans. The majority of the farmers (54.5%) acknowledged that such promotion material made them aware of the technologies (Table 4).

Table 4: *Benefits towards promotion efforts*

	Scores in %		
	Male only	Female only	All
Awareness	54.2	54.7	54.5
Improved husbandry	18.8	22.6	20.8
Improved yield	10.4	9.4	9.9
Improved food security	4.2	5.7	5.0
Improved income	12.5	7.5	9.9

Some farmers went further to express a natural outcome as a result of the improved awareness by indicating the level of improved bean husbandry practices (20.8%) as a result of those promotion efforts. Some volunteered that they had subsequently improved their yield and income (9.9%) which in turn increased the level of food security (5%).

6.5 Conclusion

The study set forth to give direction for the future agriculture promotion efforts within the Southern Highlands of Tanzania. The emphasis in this instance is on a particular crop, *Phaseolus* beans. However, the findings can be theoretically applicable in the promotion of any agriculture crop within the region.

Results from this study indicate that, for new agriculture information or promotion materials, farmers would prefer to get such information from credible sources. Over the years in Tanzania, extension agents have played a major role on this front. They have been able to establish rapport with individual farmers and communities in the villages making them the most credible individual in the provision of new agriculture information regardless of the constraints they are facing in execution of their functions. On the other hand, the credibility of agriculture information varies when dealing with embedded

agricultural information where in most cases neighbours, friends and other farmers appear to be the most credible.

Another element that is important when considering communication pathway is the undisputed evidence of outcome in engaging with new production material such as new bean seed varieties. Within many villages farmer are prepared to take a specify level of risk in testing new material but under some conditions, specifically on-farm trials. Such engagement should be on their own farms or on their neighbours' farm in order to have some element of control of input and output. Many of the farmers involved in this study understand that production of new planting material can be tedious and very expensive and therefore farmers would always engage in on farm trials if the seeds or the new planting material are given free with no strings attached. Evidence from on-farm trials is seen by farmers as very influential on their subsequent decisions and behaviour with respect to new bean varieties.

With a credible source of information and evidence from the performance of bean varieties under local conditions, information in the form of recorded (e.g. print) material is very important. This can be introduced at the awareness stage or during the process of technological development with the farmers. Leaflets in particular turned out to be more effective in this respect compared to other promotion material such as posters and radio broadcasts. The combination of on-farm trials with high quality, tested print material, is potentially very powerful in the context of the Southern Highlands.

Appendix 7.1

Material from both 'DFID-funded Bean Research in East Africa, with emphasis on the Functional Diversity Project' and the 'Gene to Farmer: Identification and Promotion of Disease Resistant Phaseolus Beans in Tanzania', were presented in Tanzania at

1) CIAT-led Bean Cluster Stakeholder Meeting 28 January – 1 February 2001, Arusha, Tanzania

2) The PABRA Millenium Synthesis: a workshop on Bean Research and Development in Africa over the past decade, May 28 – June 1, 2001, Arusha, Tanzania

Appendix 7.1

Stakeholders' meeting: CIAT-Arusha 28 January - 1 February 2001

A Draft Programme Outline

DAY 1: 28/1/2001	Arrivals: Novotel Mt. Meru / New Arusha Hotel	
DAY 2: 29/1/2001	**SESSION I:**	
08:30-08:45	Opening/Welcome/Introduction	
	Chairperson: Dr. George Oduor **Rapporteur: Ursula Hollenweger**	
08:45-09:00	A statement from DFID	A. Ward
09:00-09:15	Briefing on Pathology Project (DFID Project R7568)	N. Spence/R. Buruchara
09:15-09:30	Briefing on NRI Bean Projects (DFID Project R7569)	D. Teverson/N. Hayden
09:30-10:30	Situation reports from different countries: (Uganda, Malawi, Northern Tanzania, Southern Tanzania, Kenya)	Agona, Ogecha, Kapeya, Ulicky, Kabungo, *et al.*
10:30-11:00	*Coffee/Tea Break/Group Photo*	
11:00-11:20	IPM Promotion Project: A briefing outline	Ampofo
11:20-11:40	Push Pull Project: A briefing outline	Torto
11:40-12:00	Presentation on Hai experience	Ulicky
12:00-12:30	General discussion	
12:30-13:30	*Lunch*	
	SESSION II: **Chairperson: A. Ward** **Rapporteur: R. Chirwa**	
13:30-15:30	Discussion on outputs and activities: (Common understandings)	All
15:30-16:00	*Coffee/Tea Break*	
	SESSION III: **Chairperson: R. Buruchara** **Rapporteur: N. Hayden**	
16:00-17:00	Working group discussion of project activities and methods	All
17:00-18:00	Plenary discussion of W/G reports	All
	Dinner	
DAY 3: 30/1/2001		
08:00-13:00	Field visit Sanya Juu, Hai district (Dr Ulicky & Mrs Koola)	All
13:00-14:30	*Lunch*	
	SESSION IV: **Chairperson: U. Hollenweger** **Rapporteur: B. Torto**	
14:30-17:00	Discussion: The way forward (adaptation, linkages between projects and sites…)	All
DAY 4: 31/1/2001	**SESSION V:** **Chairperson: N. Spence** **Rapporteur: B. Chibamba**	
08:00-10:30	Site groups develop site work plans: (NS, AW, NH, GO, BT, RB, UH, KA join different site groups) some sites can work together where numbers are few.	All
10:30-11:00	*Coffee/Tea Break*	
11:00-12:30	Site groups develop site work plans- cont'd.	All
12:30-13:30	*Lunch*	
13:30-15:00	Plenary discussion and consolidation of site work plans	All
15:00-15:30	*Coffee/Tea Break*	
15:30-17:00	AOB Closure	All
DAY 5: 1/2/2001	Departure	

From Gene to Farmer: Identification and Promotion of Disease Resistant *Phaseolus* Beans in Tanzania

Teverson, D. M., and Hayden, N. J. (2001)

Introduction

Acetate 1 (Woman bean trader)

The theme of this meeting is bean research and development in Africa over the last decade. The DFID-funded work on bean pathogen interactions, biodiversity and farmer management of bean mixtures is an ideal example of collaboration between the Tanzanian National Bean Programme in both North and Southern Tanzania, NRI, HRI and, more recently the University of Reading.

Disease resistance is the only practical and sustainable method of controlling most bean diseases in subsistence agriculture. However, it is vital that the relationship between pathogenic variation in the disease and variations in resistance in the host, are properly understood before potentially resistant cultivars are released to the farmers. Furthermore, disease resistance is only one of a range of factors required in a variety by the farmer and consumer. Beans are a vital source of protein, especially for the rural and urban poor, but it is important that beans are also palatable. Cooking qualities are also important, especially in areas where firewood is in short supply, and beans should preferably be readily marketable so that any not required for household consumption can be sold to provide extra income.

Acetate 2 (Map of TZ)

The Research

The collaborative work which will be described here was conducted and is applicable in both a worldwide, an African and the local context.

The work was initiated at the request of CIAT who found that resistant bean varieties developed at Headquarters in Colombia were not resistant when grown in the field in Africa. It was apparent that variation in the pathogen was the cause of this problem and that something needed to be done to sort the situation out.

Initial work concentrated on Halo-blight, a seed-borne, bacterial disease which occurs at lower temperatures and higher altitudes.

In the second phase of the work, conducted in Arusha, the emphasis was shifted to encompass a whole range of diseases, bacterial, fungal and viral and also bean mixtures which are grown extensively in the southern highlands of Tanzania and the Great Lakes Region. Field trials consisted of complex bean mixtures of 200 plots + inoculated with ALS and Halo-blight.

The next phase was based in the southern highlands of Tanzania and involved a detailed study of the biodiversity of bean mixtures.

This has led on to the present project….Participatory Promotion of disease resistant and farmer acceptable beans in Tanzania – using bean materials developed in DFID-Crop Protection Programme funded work, material from the Selian breeding programme and also material from the Uyole breeding programme led by Dr Catherine Madata.

Acetate 4 (Symptoms of Halo-blight and Common bacterial blight)

Halo-blight collections were made from all over east Africa and compared with those collected from other African countries and worldwide. Over 1000 isolates were studied, about 200 in great detail.

Acetate 5 (Alternative hosts of halo-blight)

The work included studies of the alternative hosts of halo-blight which could act as a reservoir of the disease between cropping seasons and showed that common weeds growing around fields could harbour the disease which could potentially spread into the bean crop.

Acetate 6 (Halo-blight inoculation)

Artificial inoculation of halo-blight was carried out to investigate the interaction between different pathogenic variants of this bacteria and different varieties of bean. It was vital to provide practical answers to the question "Why are bean varieties which are resistant in one area susceptible in another?"

Acetate 7 (Differentiation of 3 races)

In the 1960's work by American researchers showed that two races of halo-blight existed and as soon as we looked at east African isolates, a third race was identified.

Acetate 8 (9 races timeline)

The work of Dawn Teverson and John Taylor showed that nine different races existed which had different geographical distributions throughout the world and showed resistance or susceptibility to different bean varieties.

Acetate 9 (Gene-for-gene diagram)

Three years of intensive genetic analysis of F2 populations (Dawn's PhD work) unravelled the genetic basis of resistance in these 9 races in their reaction to 8 differential cultivars.

Acetate 10 (Bean Diseases list)

Halo-blight is only one of a whole range of diseases which affect beans – indeed in most areas it isn't considered to be the most important.

This acetate shows the range of diseases that were studied as part of the Functional Diversity Project.

Acetate 11(Bean mixture)

The aim of the Functional Diversity Project was to find out – in plant pathology terms- how mixtures work. Why do farmers in the southern highlands of Tanzania and the Great Lakes area grow mixtures? Presumably their must be some advantage of growing mixtures or farmers would grow pure varieties?

The Functional Diversity Project 1991 – 1996 analysed farmers bean mixtures in terms of…..

- Diversity
- Disease Resistance
- Yield stability

Acetate 12 (Jill, John and Honorata planting)

The field work was conducted by Dawn Teverson at Selian in collaboration with Dr Mushi and the National Bean Programme scientists.

Acetate 13 (Field trial)

The field trials consisted of 2 x 100 plot experiments studying disease spread in mixture components grown either as pure stands or as mixtures. Halo-blight was studied in the first year and angular leaf spot in the second year of trials.

Acetate 14 (Angular leaf spot)

Three disease assessments were taken of all diseases over the growing season and individual yield evaluations were made and compared.

Acetate 15 (Dawn and Honorata harvesting)

Results took a considerable amount of analysis, but will provide a rational basis for the manipulation of disease resistance in bean mixtures.

Acetate 16 (Bisanda and women farmers in Lyadebwe)

The *In-situ* project – as it was known – was funded by DFID's Environmental Research Programme and the emphasis was shifted from pure plant pathology to biodiversity in bean mixtures and their sociological role. It was based at ARI-Uyole and Mr Bisanda conducted his PhD over the three years of the project.

Acetate17 (Dr Mushi, Bisanda, DMT, Farmer 2)

Twenty three farmers participated and were visited up to three times per year. Each season both harvested samples and sowing samples were given by the farmers. This allowed us to examine the influence of both environmental factors – pests and diseases, climate, soil etc and also sociological factors ie the farmers' manipulation of their bean mixtures. The change in the mixture composition between harvesting and sowing reflected the farmers' preferences which are affected by concerns such as palatability, cooking qualities and marketability.

Acetate18 (Woman with beans on her head)

The current project takes a decade of bean research to the farmers of Tanzania in a participatory manner. Participatory Promotion of Disease Resistant and Farmer Acceptable Phaseolus Beans in Tanzania includes resistant beans from the national programmes in both north and southern Tanzania as well as those incorporating the genes identified by CPP-funded research. The project also includes the study of communication and seed uptake pathways by collaborators at the University of Reading.

Bean research has come a long way in the last decade. We now work together with farmers in partnership to develop and promote varieties which will improve yields in a sustainable manner, whilst conserving and making best use of the vast range of genetic bean diversity for generations to come.

'DFID-funded Bean Research in East Africa, with emphasis on the Functional Diversity Project'

The PABRA Millenium Synthesis: a workshop on Bean Research and Development in Africa over the past decade, May 28 – June 1, 2001, Arusha, Tanzania

D M Teverson
N J Hayden
C S Mushi

Approximate Dates	**Project Activities**
1984	Halo-blight epidemiology
1987	Gen etic Analysis Gene-for-gene relationship

Functional Diversity Project

Analysis of farmer's bean mixtures

- Diversity
- Disease resistance
- Yield stability

- to provide a rational basis for their manipulation

1997 ***'In-situ' Project***

Dynamic Conservation, Enhancement and Utilisation of Agrobiodiversity *In-situ*: *Phaseolus vulgaris* beans in the Southern Highlands of Tanzania

- Assessment and documentation of farmer's practices and preferences in the acquisition, exchange, selection, management and conservation of bean mixtures……working towards……
- A methodology for *in-situ* conservation of bean germplasm

2000 Participatory promotion of Disease resistant and farmer acceptable *Phaseolus* Beans in the Southern Highlands of Tanzania – R7569

2003

Phase I 1984 – 1987

Halo-blight
Epidemiology

Phase II 1987 – 1991

Genetic Analysis of Halo-blight
Gene-for-gene relationship

- Explains the interaction between 9 different races (pathogenic variants) of halo-blight with 8 differential cultivars of *P. vulgaris*

Phase III 1991 – 1997

Functional Diversity Project
Analysis of farmer's bean mixtures
Diversity
Disease resistance
Yield stability

to provide a rational basis for their manipulation

Phase IV

'In-situ' Project
Dynamic Conservation, Enhancement and Utilisation of Agrobiodiversity *In-situ*: *Phaseolus vulgaris* beans in the Southern Highlands of Tanzania

- Assessment and documentation of farmer's practices and preferences in the acquisition, exchange, selection, management and conservation of bean mixtures……working towards……

- A methodology for *in-situ* conservation of bean germplasm

Appendix 7.2

R 7569 Participatory Promotion of Disease Resistant and Farmer Acceptable *Phaseolus* beans in the Southern Highlands of Tanzania: Dissemination of improved beans in Tanzania

Dr D M Teverson,
Dr C Madata,
Dr N Hayden
Prof. C Garforth

Presentation for the CPP-Bean Cluster Meeting 17th July 2002

a. Project Context

Starting and finishing dates

1 January 2000 - 31 March 2003

Project Partners

UK:

Natural Resources Institute

Dr Dawn M Teverson (Project Coordinator)
Dr Nick Hayden
Mr Richard Lamboll

The University of Reading

Professor Chris Garforth
(Agricultural Extension and Rural Development)

Dr Bakari Asseid

Tanzania

ARI-Uyole

Dr Catherine Madata
Head of Bean Research Programme (Bean Breeder)

Dr S Bisanda
(moved to new post in Ministry)

Other collaborators UK

Dr J D Taylor
Previously Horticulture Research International

Mrs B Everett
Horticulture Research International

Location of the project

Southern highlands of Tanzania

b. Livelihood context for the crop being researched

Tanzania is one of the poorest countries in the world, where the economy is heavily dependent on agriculture. In rural Tanzania, 51% of the population live below the poverty line.

In the bean based farming systems of the southern highlands of Tanzania beans are eaten in association with *ugali* (maize meal) at least once a day. The southern highlands of Tanzania is one of the major production areas and the acreage of beans is increasing. Beans are increasingly grown as a cash crop as well as for household food security.

Beans require less soil amendment than other crops. Their symbiotic association with the nitrogen fixing *Rhizobium* sp. enhances both soil structure and fertility. This is beneficial both to beans and subsequent crops in the rotation.

Farmers grow beans both as landrace mixures and as stands of single varieties. The use of bean mixtures is a coping strategy; yields may not be as great as a high yielding variety, but compensation effects mean that yields tend to be more stable.

Women tend to deal with household food security and often have a wealth of indigenous knowledge of varietal characteristics. Men usually deal with marketing – associated with pure varieties.

Beans are grown in up to three seasons per year in both monoculture and as intercrops, usually with maize. Different bean landraces / varieties are grown according to agri-environment and socioeconomic requirements.

Sources: PRA, field observations, farmer groups, Tanzanian scientists

c. Importance of the crop protection constraint being researched for livelihoods

One of the most important needs identified by farmers is the requirement for disease resistant varieties. The NRI varieties combine resistance to angular leaf spot (identified as the most important constraint to bean production in East Africa) and the marketability of cv. Canadian Wonder.

Angular leaf spot is estimated to cause production losses of 281,300 tonnes per year, more than any other constraint in Eastern Africa. High levels of disease translate directly into lower yields and reduced market prices. These losses impact primarily on the vulnerable members of the community who are dependent on beans. Beans are the second most important source of human dietary protein and the third most important source of calories of all agricultural commodities produced in the region. Although 90% of the workforce is employed in agriculture, topography and climatic

conditions limit cultivation of crops to just 4% of the land area. Therefore livelihoods may be enhanced by ensuring that sustainable yields are optimised.
Angular leaf spot is ubiquitous in its distribution, but diseases such as halo-blight are becoming increasingly important as bean cropping extends to higher altitudes which are conducive to the development of the disease.

Source: Atlas of Common Bean Production in Africa, CIAT. PRA,

d. ***Technologies available to address the constraint***

The best and most sustainable method of combating *Phaseolus* diseases in East Africa is the use of resistant varieties. Chemicals are expensive and their availability may be erratic and the price too high for smallholders. They are not sustainable and therefore are not a viable option. Resistant germplasm can be grown as pure varieties, often for sale, or incorporated into farmers' bean mixtures, which are usually used for household consumption. The effectiveness of resistant varieties will depend upon the proportion of resistance in the bean mixture and the races / strains of the particular diseases present. It is impossible to breed a bean which is resistant to all diseases, so varieties need to be targeted to the area where particular pathogens are present. For example, halo-blight tends to occur at high altitudes where temperatures are cool, therefore halo-blight resistance is important for beans grown in these areas. In contrast, such resistance would be unnecessary for beans grown at low altitudes, where resistance to common bacterial blight would be more appropriate.

Seed-borne diseases such as halo-blight and anthracnose can discolour bean seed, necessitating sorting which causes an extra burden to the women managing the household. PRA has shown that women are usually the custodians of the family seed stocks, but it is women who are often less educated and have least access to financial resources. Thus it is particularly important to use a range of media to put across the message about improved varieties, not only posters and leaflets, but also radio and "word of mouth".

d. Institutional partners and roles:

The Role of NRI

- To coordinate project activities
- To coordinate, compile and write project documentation
- To assist in technology development and technology transfer in response or according to prevailing constraints and needs; information exchange on biotic/abiotic constraints.
- Technical backstopping
- Search for funds

The Role of University of Reading

- review current knowledge, and conduct new field research as appropriate, on producers' information sources on beans, and their knowledge about disease and disease resistance
- facilitate development of promotion strategies

- support Tanzanian partners in developing format and content for media and other communication channels
- conduct final field study on the reach and effectiveness of promotion activities

Role of ARI – Uyole Scientists

- To address constraints faced by farmers (biotic and abiotic factors).
- To respond to markets and consumer needs.
- To breed for varieties with resistance to multiple constraints and attributes required by consumers and traders.
- To continue with the diseases and insect pests' work in areas of ALS anthracnose, halo blight, BSM, Ootheca and aphids.
- The pests and disease work will include IPM & IDM
- To continue with plant nutrient management.
- To continue with technology transfer and promotion.
- To look for funding.

These activities can be achieved by collaboration with regional breeders, other NARS, International Institutions including NRI and other scientists.

Funds are needed for these activities.

Role of farmers

a. As stakeholders

Work with Research, Extension, and Policy makers in identifying constraints and possible solutions and technology requests.

b. For on-farm

- To provide the land for the field/work.
- To prepare the land according to the instruction given to them.
- To participate in planting and data recording
- To be responsible for general field management.
- To take part in discussing the work and observations in general.
- To show their fields to the neighbouring farmers.

The role of Extension

a. For on-farm work

- District/Extension Officer assigns village extension officer to supervise the work. VEO organizes the farmers for the work.
- To assist in the field supervision.
- To assist in data collection.
- To organize meetings with farmers and research.
- To report to research colleagues.

b. Routine work

- To assess farmers needs and communicate to research
- To assist and guide farmers in their agricultural activities.
- To provide valuable (on-the-ground) information.

Emerging issues

Scientists at ARI-Uyole are working with UK collaborators to develop and promote both NRI bred varieties, pre-release and released ARI-Uyole varieties. It is important to give the farmers a choice of germplasm from which they can choose the most suitable for their local farming conditions and socioeconomic requirements. Further to this, it is important to produce varieties that can be readily incorporated into farmers' existing bean mixtures and into existing intercropping systems.

Much valuable research has been conducted on bean mixtures in the southern highlands of Tanzania by our research team (DFID funded project R6670). Promotion and uptake of improved varieties would be enhanced by work to investigate and select the most appropriate germplasm for use in specified bean mixtures and intercropping situations.

Further informed research is required to refine the varieties and information to this level, to enhance uptake by the resource-poor farmers, rather than just the wealthier, more educated and adventurous farmers who are more likely to take up homogeneous improved varieties.

Selected varieties could then be promoted on this basis, so that they fit readily into the existing cropping systems of not only the southern highlands of Tanzania, but also similar agro-ecological areas such as the highlands of Malawi. (Note, much work has been conducted on bean mixtures in Malawi, but the emphasis has not been on disease resistance. This would be an ideal opportunity for mutually beneficial collaboration).

Cross fertilisation of ideas for promotion and dissemination from elsewhere. Other CPP-funded work in Tanzania (R7518) has successfully developed linkages with schools as a conduit through which information is channelled into the wider community. These linkages have proved highly successful in Central Tanzania and could easily be adapted to the Southern highlands

Source: Hayden *et al* (2002) Report of Teachers' Seminar - output from R7518.

Authors: Dr D M Teverson,
Dr C Madata,
Dr N Hayden
Prof. C Garforth

DFID Crop Protection Programme, Phaseolus Cluster Meeting

NRI, Chatham Maritime, Room P134

Wednesday 17th July 2002

Arrive 10.00 for a 10.15 start

10.15	Welcome and objectives	Andy Ward
10.30	Bean Root Rots	Nicola Spence
11.00	Bean Disease Resistance Promotion	Dawn Teverson
11.30	Bean IPM	Eli Minja
12.00	Bean Promotion	Chris Garforth
12.30	PABRA	Eli Minja
13.00	Lunch	
14.00	Promotion discussion: what, why, to whom, how, with what, with whom and how sustained?	
14.45	Research discussion: what, why, to whom, how, with what, with whom and how sustained?	
15.30	Future strategic options discussion	
16.15	Sum-up	Jill Lenne

Can all members bring an electronic copy of their presentation with them please?