Bioversity International/UNEP-GEF Project
"*In situ*/On farm conservation and use of agrobiodiversity (fruit crops and wild fruit species) in Central Asia"

Report
Regional Training Workshop on
"Linking information from Focus Group Discussion, Household Surveys, and Farm and Forest Assessment for Cultivated and Wild Fruit Tree Diversity in Central Asia"

22-25 February, 2010
Tashkent, Uzbekistan

CONTENT

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"*In situ*/On Farm Conservation & Use of Agricultural Biodiversity
(fruit crops & wild fruit species) in Central Asia"

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"Linking information from Focus Group Discussion, Household Surveys, and Farm
and Forest Assessment for Cultivated and Wild Fruit Tree Diversity in Central Asia"

February 22 – 25, 2010
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Executive summary

Regional Training Workshop on "Linking information from Focus Group Discussion, Household Surveys, and Farm and Forest Assessment for Cultivated and Wild Fruit Tree Diversity in Central Asia" was organized within the Bioversity International/UNEP-GEF project "*In situ*/On Farm Conservation & Use of Agricultural Biodiversity (fruit crops & wild fruit species) in Central Asia" on 22-25 February 2010 in Tashkent, Uzbekistan. 17 national partners from Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan participated in the workshop. Dr. Devra Jarvis, Senior Scientist, Agricultural Biodiversity and Ecosystems, Bioversity International, facilitated the workshop.

Day 1, 22 February, 2009

Opening session
Muhabbat Turdieva, Regional Project Coordinator Bioversity International/UNEP-GEF project "*In situ*/On Farm Conservation & Use of Agricultural Biodiversity (fruit crops & wild fruit species) in Central Asia", opened the workshop by welcoming the participants, and thanked them for accepting invitation to participate in this workshop. In her statement she noted that the workshop was the first event in the range of workshops planned for 2010, and emphasized the importance of this workshop, as all national partners have collected huge data through focus group discussion, household surveys, farm and forest sites, but there is a problem with processing and compiling the collected data. In this regard, the workshop is intended to fill in this gap.

Muhabbat Turdieva also thanked Dr. Devra Jarvis for participation in the workshop as and introduced the workshop participants. Then Muhabbat Turdieva briefed the participants on the workshop's objectives which covered: introduction to the output table, linking collected data to research questions and development objectives; processing and compiling landrace descriptors by crop (and among crops), setting up data tables for analysis; management practices that affect the evolution of crop

populations including spatial/temporal arrangements, and selection of planting materials; processing and compiling management practices and related practices to diversity on-farm and in the wild; processing and compiling information on seedling sources (wild and cultivated); data comparisons across crops – coming up with overall "non-crop specific" results and developing a plan of further actions on diversity level assessment. Dr. Devra Jarvis suggested amending slightly the presented workshop's agenda. List of Participants and amended program of the workshop is provided in Annexes 1 and 2.

Then Dr. Devra Jarvis welcomed participants and introduced the expected outputs of the workshop, through, in particular, processing data gathered within household surveys in partner countries. Outputs included: a) level of diversity at household (yield stability, quality, preferences); b) reasons why farmers cultivate particular variety; c) management practices: what practices are suitable for maintaining high level of diversity and production stability of a particular crop/variety; d) level of access to seedlings, planting materials, existing constraints and problems.

Further Dr. Devra Jarvis presented steps and methods for data standardization and analysis, which included: the steps of information processing and analyzing, constructing dummy tables, setting up tables, taking into account varieties' distinctive features and mega dictionary for crops coding (Annex 3).

Dr. Devra Jarvis demonstrated to the participants the table for entering data on overall diversity of fruit crops at regional level, paying particular attention to the importance of measuring diversity on farm, and exactly at such aspects as: what varieties, the number of varieties, area allocated for each variety, as well as proportion of local and introduced varieties (Annex 4).

Dr. Devra Jarvis jointly with the participants developed the list of target crops and varieties at regional level and coded them (Annex 5). Further, participants were asked to sort out names of apricot and grapevine varieties on possibility of varieties' duplication at the regional level. After excluding duplicate varieties, the facilitator jointly with workshop participants showed how to code the varieties. Varieties' codes at regional level are given in Annex 6.

The first day was concluded by summarizing the achieved results, and participants were suggested to prepare data on their own countries for exercising the tables at the next day.

Day 2, 23 February, 2010

Muhabbat Turdieva, Regional Project Coordinator welcomed the workshop participants and summarized the results of the first day, during which knowledge on

compiling the list of varieties of the target crops, calculating the evenness of distribution and richness of diversity were gained.

Dr. Devra Jarvis also welcomed participants and demonstrated how measure diversity on farm, which included: minimum information to be collected for each household and community, as well as the concept of determining the richness and evenness (Annex 7). Particular attention was paid to richness and evenness of diversity. **The richness of diversity** – is a number of varieties in the household or community. **Evenness of diversity** – is a uniform distribution of varieties at the level of household or community. Participants did practical exercises to determine the level of diversity.

Further the lecturer demonstrated an example of processing the available data, based on data on diversity of grapevine varieties from Turkmenistan. During the processing, following data were received: 1) Total number of trees of local varieties at the household level (Annex 8); 2) Average number of trees per household (Annex 9); 3) Summary table for calculation of richness and evenness (Annex 10), which, in turn, is the basis for the next calculations.

Workshop participants jointly with Dr. Devra Jarvis calculated based on the basic table the average level of diversity richness in households, defining the number of trees per household, the average area allocated for local varieties of fruit crops, as well as the number of years during which particular local variety has been cultivated. It was noted that obtained data can be used to compare data within and between countries.

The next step of data processing was the calculation of average evenness of distribution of local varieties at household level using Excel functions, primarily determining the percentage of occupied area covered by each variety at household level.

Muhabbat Turdieva summarized results of the second day.

Day 3, 24 February, 2010

Dr. Devra Jarvis introduced the agenda of the third day of the workshop, which included definition of the following parameters based on household survey data: farmers' preferences on cultivation of particular fruit crop; identification of methods suitable for maintaining high level of diversity and production stability; farmers' statements and the seeds flow.

For receiving the above data, participants were asked to complete tables (Annex 11), prepared by the lecturer, which included the following parameters: varieties diversity, farmers preferences for variety cultivation (depending on the size of fruit, appearance, drought resistance, shelf keeping quality, transportability, term of maturity etc.), management practices, farmers beliefs, information on seeds flow. It was noted that sections, where data is available, should be marked as "1", and for those parameters,

where information is not available, should be marked as "99", the fruit size could be specified quantitatively in centimeters, or qualitatively as "large", "medium" or "small".

Further, to obtain generalized data on diversity of fruit crops at the regional level, participants put diversity data from their countries into one general table (Annex 12). Using this table, Dr. Devra Jarvis demonstrated how to make analysis of available data by countries, noting that this table makes possible to conduct an extensive analysis.

Day 4, 25 February, 2010

Dr. Devra Jarvis welcomed participants and announced that the fourth day of the workshop would be devoted to analysis of data on wild fruit species. For processing available data the participants had to put data from their countries into the following tables: 1) The size of population of wild fruit species (Annex 13); 2) Use of wild fruit species (Annex 14); 3) Conservation practices of wild fruit species (Annex 15)

Lecturer emphasized that for completion the table on use of fruit species, it is necessary to use a unified coding system at the regional level.

Further Muhabbat Turdieva, Regional Project Coordinator, explained the coding system of fruit species, explaining that provided by the participants the list of fruit species was not yet completed and partner countries should add their own data and send it to the regional office. In the process of reviewing the list of coding wild fruit species, for ease coding wild fruit species and their forms, it was decided to add the number of species to code number of wild form. It was also noted that due to lack of information on the research sites, there is no unified system of coding sites. This coding system will be developed in the presence of complete information for research.

Workshop continued by carrying out practical tasks for determining the population of wild forms of fruit crops, for which participants had to enter such data as: latitude, longitude and height of the plot; total area under the wild type; % of female trees; area from which farmer harvested (wild species), area from which wild form is harvested, overall size of trees population (total number of trees) in this area and the data of total population of wild forms, the sweetness of nuts, fruit size, thickness of the shell, openness of the shell, color of the fruit, etc. After completing entering the data in the table, representatives of all countries presented data on wild fruit species, resulting from their processing.

All participants were given the opportunity to evaluate the workshop, providing comments and recommendations. Information on workshop evaluation is given in Annex 16.

Regional Training Workshop
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PROGRAMME

Time	Day 1	Day 2	Day 3	Day 4
9:00 – 10:30	**Session I: Welcome and OVERVIEWS** Introduction to output table linking data collected to research questions and development objectives	**SESSION II: (cont.)** Processing and compiling landrace descriptors by crop (and among crops), setting up data tables for analysis	**SESSION III: Cont.** Processing and compiling management practices and relating practices to diversity on-farm and in the wild	**SESSION IV** *(cont.)* Processing and compiling information on seedling sources (wild and cultivated)
10:30–11:00	**COFFEE/TEA**	**COFFEE/TEA**	**COFFEE/TEA**	**COFFEE/TEA**
11:00– 13:00	**SESSION II: THEME 1: Variety, Characterization and Diversity Measurements from cultivated and wild systems** 10 minute presentation by each country on variety descriptions and variety diversity for cultivated and wild species from FGD, HH Survey, and Diversity assessment data.	**SESSION II: (cont.)** Processing and compiling landrace descriptors by crop (and among crops), setting up data tables for analysis	**SESSION III: Cont.** Processing and compiling management practices and relating practices to diversity on-farm and in the wild	**SESSION IV** *(cont.)* Processing and compiling information on seedling sources (wild and cultivated)
13:00–14:00	**LUNCH**	**LUNCH**	**LUNCH**	**LUNCH**

Time	Day 1	Day 2	Day 3	Day 4
14:00–15:30	**SESSION II: (cont.)** Processing and compiling landrace descriptors by crop (and among crops), setting up data tables for analysis	**SESSION III – THEME II: Management Practices that Affect the Evolution of Crop Populations including spatial/temporal arrangements, and selection of planting materials)** 10 minute presentation by each country on "genetic diversity" management methods for cultivated and wild species	**SESSION IV - Theme III: Seed sources – seed/germplasm flows (access to planting materials from cultivated and wild sources)** 10 minute presentation by each country on seedling and seed sources from wild and cultivated sources	**SESSION V – Regional comparison across crops** Data comparisons across crops – coming up with overall " non-crop specific" results
15:30– 16:00	**COFFEE/TEA**	**COFFEE/TEA**	**COFFEE/TEA**	**COFFEE/TEA**
16:00–17:00	**SESSION II: (cont.)** Processing and compiling landrace descriptors by crop (and among crops), setting up data tables for analysis	**SESSION III: (cont.)** Processing and compiling management practices and related practices to diversity on-farm and in the wild	**SESSION IV** *(cont.)* Processing and compiling information on seedling sources (wild and cultivated)	**SESSION VI – Future plans** Developing a plan of further actions on diversity level assessment

Linking information from Focus Group Discussion, Household Surveys, and Farm and Forest Assessment for Cultivated and Wild Fruit Tree Diversity in Central Asia

Dr. Devra Jarvis, Senior Scientist,
"Diversity for Livelihoods" Programme, Bioversity International

UNEP/GEF Full Project:
""In situ/On-farm Conservation of Agricultural Biodiveristy (Fruit Crops and Wild Fruit Species) in Central Asia""

Linking information from Focus Group Discussion (FGD), Household Survey, and Farm and Forest Assessment

Devra Jarvis (d.jarvis@cgiar.org)

Overview of phases and methods

1. Review of secondary data

2. Focus group discussion

3. Community data collection

4. Technical assessment

5. Individual interviews

6. Community validation

Targeting the research

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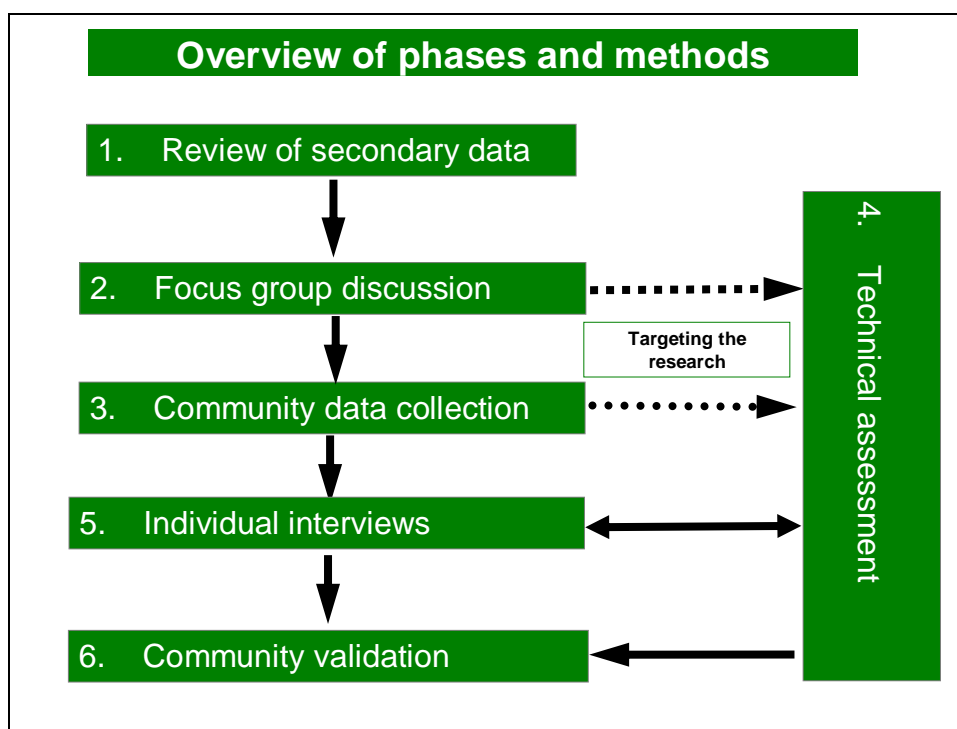
Processing and analysing information	
STEPS	**OUTPUT**
• Identify and construct the "Dummy Table" (= table or diagram that summarizes information and findings to be used in final report) table based on research themes/questions	**Dummy tables**
• Compile and review raw data set	**Data reviewed for completeness, consistency and accuracy**
• Structure and code the data set	**Coding guide, dictionary and template**
• Enter the raw data using coding guide and template	**Database**
• Run statistical analyses	**Analytical tables**
• Generate presentation tables and charts	**Data presented according to dummy tables**

Theme 1:

Landrace Diversity at village and farm level

Constructing Dummy Tables

Guide thematic questions	Dummy tables	Notes
1. What varieties are found in the farming community?	Spatial distribution (variety names x site)	Also used to develop country map with current and past varieties indicated per site
2. What are the key characteristics of these varieties as described by farmers and by scientists?	Distinctiveness of varieties (variety names x clusters of morphological traits)	Also used to develop a PCA of variety names per cluster of traits
3. What is the amount and distribution of these varieties in terms of richness, evenness and divergence at household and community levels?	Frequency of variables (variety names x morphological traits)	

1.2 Distinctiveness of varieties – arriving at Dummy Tables

Raw Data: Agronomic traits to distinguish varieties
-Farmer's characterization of varieties at village level (FGD)

Variety Name	M/L	Fruit shape	Fruit color	Fruit wieght	seed shape	Seed size	Pedicle Length	seed cavity	pulp color	ripening season
Zarizak	L	Round	Yellow	30-40	Round	0.4 – 0.6	2 – 4 cm	Closed	White	Summer
Pestrushka	L	Flat-round	Green with red strips	60 – 80	-	Large	Short	-	White	Summer
Rashtmun	L	Round	Chlorine	35 – 45	-	-	Short	-	White	Summer
Shakar olma	L	Round	Chlorine	30-40	Egg-shaped	0.5 – 0.4	3 – 4 cm	Closed	White	Summer
Melba	M	Round	Green with red strips	40 – 50	-	-	Short	-	White	Summer
Savzmun	L	Round	Green	40 – 45	Egg-shaped	0,6	3 – 4 cm	-	White	Summer
Zvezda Vostoka	M	Round	Light Green	30 – 35	Egg-shaped	0.3 – 0.4	Short	-	White	Summer

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Data Table: Coding and Dictionary

- **Data table – where the actual data is stored across crops (wild relatives) and countries**

- **Coding and Dictionary are also used for finalising the individual surveys**

MEGA DICTIONARY

- **FGD 101** = Focus Group Discussion, Country identified by hundreds (ie., 100= Kazakstan, 200 = Kyr…), Each focus group number is unique by crop and type of focus group (Male/Female/Leader).

  FGD 101 = Focus group discussion from
  - *Country: Kazakstan,*
  - *Site: Jungarskiy Alatau;*
  - *Crop: Apple;*
  - *Type of Group: Male*

- **Variety =** The unit that a farmer recognises and manages. It may or may not equal a named variety. It may be recognised by a set of traits and for a subset of a farmer-named variety

- **Farmer Descriptors:** agronmomical characters used by farmers to describe their varieties

- **Color** = Outside color of the fruit

Theme 1: OUTPUT Table

Variety Name	Modern/ Local	Descriptor 1	Descriptor 2	Descriptor 3	Descriptor 4	Descriptor …	Descriptor …	Descriptor …
(samples in group)								
(varieties currently grown but not brought to the focus group)	**Modern/ Local**							
(varieties no longer grown in the village)	**Modern/ Local**							

Coding of FGDs

Country	Country code	Site	Site code	Crop	Crop code	FGD	FDG code	Final code
China	1	Xun Dian (Kunming)	2	Barley	1	Old Male	1	1211
	1	Xun Dian (Kunming)	2	Barley	1	Young Male	2	1212
	1	Xun Dian (Kunming)	2	Barley	1	Old female	3	1213
	1	Xun Dian (Kunming)	2	Barley	1	Young female	4	1214
	1	Xun Dian (Kunming)	2	Barley	1	Leaders	5	1215
	1	Shangri la	4	Barley	1	Old Male	1	1411
	1	Shangri la	4	Barley	1	Young Male	2	1412
	1	Shangri la	4	Barley	1	Old female	3	1413
	1	Shangri la	4	Barley	1	Young female	4	1414
	1	Shangri la	4	Barley	1	Leaders	5	1415
	1	Xun Dian (Kunming)	2	Faba bean	3	Old Male	1	1231
	1	Xun Dian (Kunming)	2	Faba bean	3	Young Male	2	1232
	1	Xun Dian (Kunming)	2	Faba bean	3	Old female	3	1233
	1	Xun Dian (Kunming)	2	Faba bean	3	Young female	4	1234
	1	Xun Dian (Kunming)	2	Faba bean	3	Leaders	5	1235
	1	Chu Xiong	6	Faba bean	3	Old Male	1	1631
	1	Chu Xiong	6	Faba bean	3	Young Male	2	1632
	1	Chu Xiong	6	Faba bean	3	Old female	3	1633
	1	Chu Xiong	6	Faba bean	3	Young female	4	1634
	1	Chu Xiong	6	Faba bean	3	Leaders	5	1635
	1	Zhao Jue	7	Maize	4	Old Male	1	1741
	1	Zhao Jue	7	Maize	4	Young Male	2	1742
	1	Zhao Jue	7	Maize	4	Old female	3	1743
	1	Zhao Jue	7	Maize	4	Young female	4	1744
	1	Zhao Jue	7	Maize	4	Leaders	5	1745
	1	Xi Ding (Xishuangbanna)	3	Maize	4	Old Male	1	1341
	1	Xi Ding (Xishuangbanna)	3	Maize	4	Young Male	2	1342

FGD	Var	DESCRIPTORS ripening period	spike colour	spike size	spike shape	etc	etc	etc
1211	wheat variety 1	1	3	2	99			
1211	wheat variety 2	1	1	2	2			
1211	wheat variety 3	2	1	2	2			
1212	wheat variety 1	1	2	2	1			
1212	wheat variety 2	2	2	3	1			
1212	wheat variety 4	2	2	3	1			
1213	wheat variety 2	2	99	1	1			
1213	wheat variety 5	99	2	1	1			
1213	wheat variety 6	99	2	1	1			
1214	wheat variety 2	2	3	99	3			
1214	wheat variety 1	1	99	99	3			
1214	wheat variety 6	99	2	1	3			
1215	wheat variety 1	1	2	3	3			
1215	wheat variety 4	2	1	3	99			
1215	wheat variety 7	2	3	2	99			

ripening period	spike colour	spike size		spike shape
early=1	white=1	long=1	20-25 cm	long and na
late=2	dark brown=2	medium=15-19 cm		round=2
	light brown=3	short=3	7-14 cm	flat=3

Example of arriving at a dummy Table

Variety Names	Consistency of names with traits
Zarizak	100% agreement in agromorphological descriptions across sites
Pestrushka	60% (40% of what is called Pestruchka has different traits = Pestruchka 1 and Pestruchka 2)
Rashtmun	Same traits as = **Shakar olma**
…..	

Revised list of Local Varieties (that represents the diversity farmers recognize)	Description
Zarizak	Round, yellow fruit, round seed, closed seed cavity…
Pestrushka 1	Flat round, green with red stripes, white pulp
Pestrushka 2	Flat round, green with red stripes, yellow pulp
Rashtmun/Shakar olma	Round, short white fruit, white pulp. Seed covered
……….	

Example of Dummy Table

Mango SITE Name	Total no. of Mango currently grown	% Modern = m/(m+l)	No. of local varieties currently grown	% local varieties no longer grown = no longer grown/(g+nlg)	% modern varieties no longer grown
Thailand 1	5		4		
Thailand 2	4		4		
Malaysia1	9		7		
Malaysia 2	9		8		
India 1	12		12		
India 2	16		14		
Indonesia 1	14		13		
Indonesia 2	10		8		

Community and household area statistics and estimates of diversity for traditional varieties in crops

Crop	Total Area (ha)	% TV area	Number of HH	Ave area (ha)	Range community means of household areas (ha)	Average Farm Richness (TV)	Average Farm Evenness (TV)	Community Richness (TV)	Community Evenness (TV)	Average Divergence (TV)
Rice								34.83	0.77	0.64
Barley								6.33	0.60	0.72
Maize	8?00	9?%	4?	1.85	0.?2-3.0?	1.?7	0.18	8.50	0.60	0.73
Cassava	4183	100%	159	0.48	0.26-0.63	2.05	0.33	60.33	0.96	0.66
Faba Bean						1.77	0.28	6.50	0.68	0.60
Durum Wheat						1.49	0.21	3.50	0.57	0.64
Beans						1.80	0.27	8.92	0.63	0.57
Pearl Millet	2365	100%	49	0.76	0.56-0.99	2.42	0.47	12.67	0.86	0.46
Peanut	2?5?	100%	96			1.69				
Sorghum	18					4.25				
Squash	14					1.51				
Okra	2					2.22				
Finger Millet	2					1.38				
Chili	30	100%	175	0.10	0.0001-0.19	1.42				
Taro	24	100%	361	0.03	0.0069-0.053	1.44	0.12	17.20	0.65	0.81
	Total 63,600	High	Total 4074	High variation		1.82	0.26	14	0.70	0.64

High richness: households and communities habored a large number of varieties

High farm **evenness:** farm diversity is not made up of one dominant and other rare varieties

Any two samples drawn at random within a farm differed in 26% (within a community 70%) of the cases

High **divergence**: high potential of any two randomly chosen households within the same community to grow different varieties

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Data Table: Coding and Dictionary

- **Data table – where the actual data is stored across crops (wild relatives) and countries**

- **Coding and Dictionary are also used for finalising the individual surveys**

Theme 4:

Practices that use intra-specific diversity

Practices that use intra-specific diversity

22 of 60

22

DATA TABLE	Arrange1	Arrange 2	Arrange 3	Arrange 4	Arrange 5
FGD101	0	1	1	1	1
FGD102	1	0	0	0	1
FGD103	1	1	1	0	1
FGD104	0	1	1	1	1
FGD105	1	1	1	1	1

List of arrangement are then used and coded in individual surveys

Dummy Table 2.1		% sites using this arrangement
Arrangement 1		60%
Arrangement 2		80%
Arrangement 3		80%
Arrangement 4		60%
Arrangement 5		100%

Theme 3:
Transmission of seeds/pest/diseases

Constructing Dummy Tables

Theme 3: farmers systems that supply and create (root stock x grafting) of planting materials	**3.1. What are the ways through which farmers access planting materials (saplings, root stock, mother plant material for grafting)?**	**3.1 Percent source by crop: sources of planting material (sites x sources)**	*Gives and idea of percentage of different sources to materials, and to be used for refining individual questionnaires*
	3.2. What are the key constraints farmers have in accessing planting materials?	**3.2 FDG X Key constraints for accessing materials**	*to be used for refining individual questionnaires*
	3.3. Which persons are responsible for supply of planting materials?	**3.3 FDG X list of key informants for supply of planting materials**	*to be used for refining individual questionnaires*

Constructing Dummy Tables
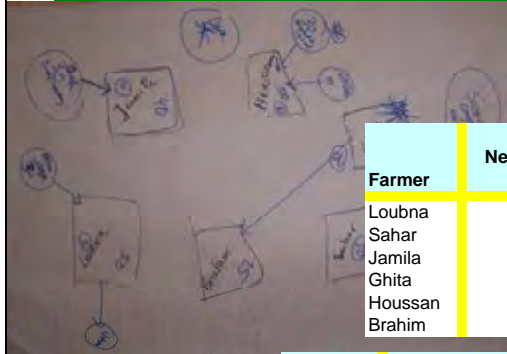
Farmer	Neighbor (kg)	Market (kg)	Seed company (kg)	Self (kg)	Total (kg)
Loubna	30	0	0	20	50
Sahar	0	0	0	30	30
Jamila	0	0	30	10	40
Ghita	0	0	200	0	200
Houssan	20	30	0	50	100
Brahim	25	0	0	0	25
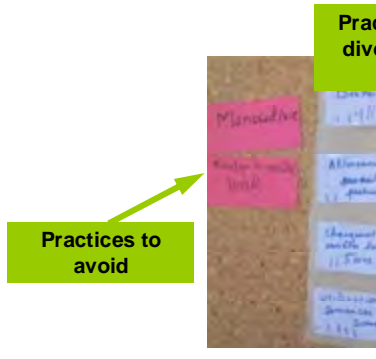
Proportion

Farmer	Neighbor	Market	Seed Company	Self	Total
Loubna	0.6	0	0	0.4	1.0
Sahar	0	0	0	1.0	1.0
Jamila	0	0	0.75	0.25	1.0
Ghita	0	0	1.0	0	1.0
Houssan	0.2	0.3	0	0.5	1.0
Brahim	1.0	0	0	0	1.0
Total	**0.30**	**0.05**	**0.29**	**0.36**	**1.0**

Theme 4:
Adoption of practices

Constructing Dummy Tables

Theme 4: Adoption of practices to improve fruit tree production using intra-specific diversity	4.1. What existing practices that use intra-specific diversity to improve fruit tree production and sustainability can be tapped, enhanced and promoted more widely?	4.1 FGD x practices that use intra-specific diversity	*to be used for refining individual question naires*

Practices to avoid

4.1	Practices farmers recommend to use	Practices farmers would use if they had more resources
Practice 1	75%	50%
Practice 2	50%	100%
Practice 3	100%	80%
Practice 4	75%	50%
Practice 5	10%	10%
Practice 6	20%	30%

Theme 5:
Extend and use of wild fruit and nut harvest

Constructing Dummy Tables

Theme 5: Extend and use of wild fruit and nut harvest	5.1. What is the extent of wild fruit tree resources?	5.1 Distinctiveness of varieties (species/types names x clusters of morphological/use traits) - (similar to information in 1.2)	*to be used for refining individual questionnaires*
	5.2. How many trees are in the forest?	5.2Tree species by frequency and age group for forest area	
	5.3. What is the size of population of trees that farmers harvest or use?	5.3 Spatial distribution (species/types x site) - from forest maps	
	5.4. What are these wild nuts and fruit used for?	5.4 FGD X Nut and Fruit tree use.	*to be used for refining individual questionnaires*

Constructing Dummy Tables

Theme 6: Sustainable production of wild fruit tree sources	6.1. What practices are used to protect young seedlings, e.g.,	6.1 FGD x practices to protect young seedlings	*to be used for refining individual questionnaires*
	6.2. practices to limit removal of saplings by grazing or by hay cutting?	6.2 FGD x practices that limit removal of saplings	*to be used for refining individual questionnaires*
	6.3. What practices are used to ensure that sufficient amounts of nuts and fruits remain in the wild for regeneration?	6.3 FGD x practices to ensure that sufficient amounts of nuts and fruits remain in the wild for regeneration	*to be used for refining individual questionnaires*
	6.4. What practices are being used to regenerate wild materials in forest ecosystems?	6.4 FDG x practices to regenerate wild materials	*to be used for refining individual questionnaires*

Common diversity of target fruit crops at regional level

Country	Crop	Code (name) of the site	Number of Households	Total Area (HA) (traditional + introduced/modern)	% Traditional Varieties Area	Average area of the household planted to the crop	Range (min and max) in the community of household areas (ha)	Total number of Trees planted	% Traditional Trees	Average number of trees per household	Range (min and max) in the community of household number of trees	Average Farm Richness (TV)	Average Farm Evenness (TV)	Community Richness (TV)	Community Evenness (TV)	Average Divergence (TV)	Average number of trees per ha, num./ha

List and codes of target fruit crops at regional level

Name	Code
Apricot	1
Alycha	2
Grapes	3
Pomegranate	4
Pear	5
Fig	6
Almond	7
Pistachio	8
Apple	9
Peach	10
Sea-buckthorn	11
Walnut	12

Varieties' codes at regional level

Apricot (example)

Variety Code_1.0	Crop code	Variety Code	Crop Code + Variety Code	Name of apricot variety_1.0	Origin: M (local), И (introduced), С (modern selection)
1.1.	1	1	1001	Ак кандак	М
1.2.	1	2	1002	Ак пишар	М
1.3.	1	3	1003	Ак урик	М
1.4.	1	4	1004	Ак ширпайванди	М
1.5.	1	5	1005	Арзами	М
1.6.	1	6	1006	Арзами поздний	М
1.7.	1	7	1007	Ахрори	М
1.8.	1	8	1008	Бодом	М
1.9.	1	9	1009	Бодом урик	М
1.10.	1	10	1010	Бодомак	М
1.11.	1	11	1011	Венгерский	М
1.12.	1	12	1012	Вымпел	М
1.13.	1	13	1013	Ёгли (мойли)	М
1.14.	1	14	1014	Ёзги хашаки	М
1.15.	1	15	1015	Жавзаки	М
1.16.	1	16	1016	Жамбил	М
1.17.	1	17	1017	Исфарак	М
1.18.	1	18	1018	Йирик хурмаи	М
1.19.	1	19	1019	Кандак	М
1.20.	1	20	1020	Кандак желтый	М

Measuring diversity on farm
Dr. Devra Jarvis, Senior Scientist,
"Diversity for Livelihoods" Programme, Bioversity International

Measuring diversity on-farm

Three key notions of diversity:

- **Richness**, i.e., the total number of different genotypes or alleles present

- **Evenness** or equity in the frequency of genotypes or alleles (Frankel et al. 1995).

- **Divergence**: how different are different farms in the community. The potential of any two randomly chosen households within the same community to grow different varieties

So what is the minimum information to collect from each farm and the community?

To calculate importance of traditional versus modern varieties at the household level:
1. **Total area** of the farmer planted to the target crop (traditional and modern)
2. **Proportion** of the farm grown to traditional varieties of the crop (or number of trees in the case of fruit trees)

To calculate the area represented by your sample of 60 households:
3. **Total area of the community devoted to each crop**
   - NOTE: not the target area sampled, but the entire area the of the community/province that the sample size represents

The concepts of richness and evenness

Farm A

Farm B

Area planted

Different varieties (v)

V1 V2 V3 V4

Richness = 9 (local varieties): A=B

Evenness (less dominance): A>B

	Ак кандак	Бодом	Жавзаки	Лючак	
Farm 1	0.70	0.30			
Farm 2	0.85	0.05	0.05	0.05	
Farm 3	0.60	0.40			
Farm 4			0.90	0.10	
Average	0.54	0.16	0.24	0.04	

Percent of each Apricot variety grown on farm by farming household

Community evenness

Which farm has the highest richness?   Farm 2

Which farm has the highest evenness?   Farm 3

Apricot Variety Names	Number of Trees
Ак кандак	98
Бодом	6
Жавзаки	6
Лючак	6
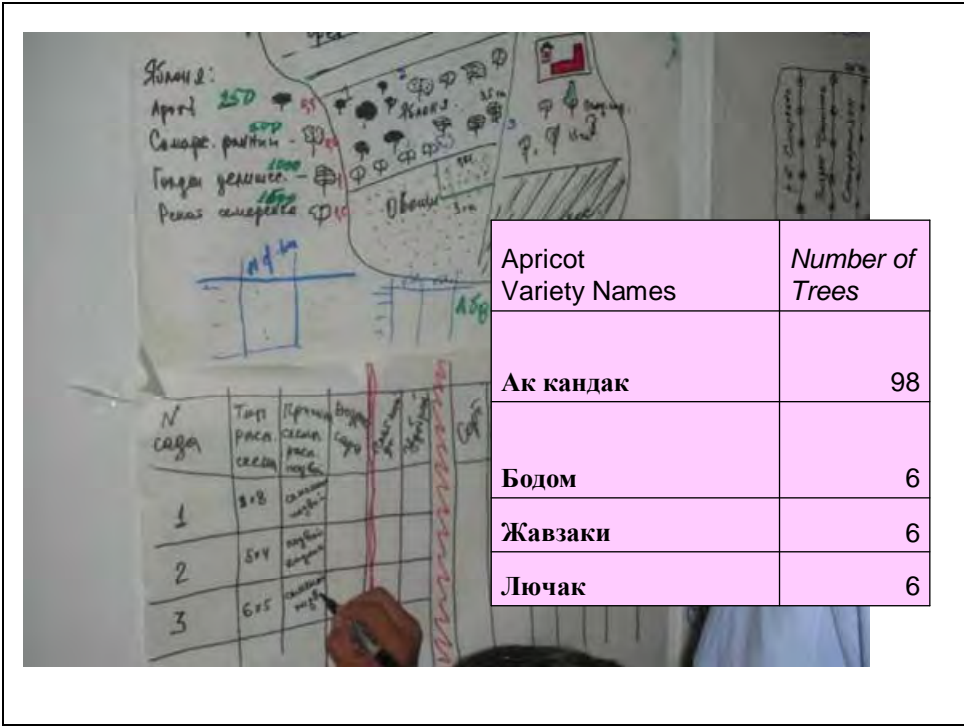
Diversity indices (household data): Richness; Evenness, Divergence			
Households	**HH Area (sqm)**	**Richness**	**Evenness**
Ghafsai	100	2.00	0.49
Ghafsai	500	1.00	0.00
Ghafsai	500	2.00	0.50
Ghafsai	1000	1.00	0.00
Ghafsai	1000	3.00	0.62
Ghafsai	2000	1.00	0.00
Ghafsai	2000	1.00	0.00
….	….	….	…
….	….	….	…
….	….	….	…
….	….	….	…
MEAN	**9038**	**1.55**	**0.20**
STDEV	*11774*	*0.83*	*0.27*
Total Sampled	**262100**		

Faba Bean

Sadiki et al. (2006)

Locality	Ghafsai	Ourzagh
Total Area Planted to Faba (ha)	1165	2660
Total Area Sampled (ha)	26.20	97.30
Mean HH Area (ha)	0.90 *(1.17 std)*	1.68 *(1.57 std)*
HH Richness	1.55 *(0.83 std)*	2.00 *(0.85 std)*
HH Evenness	0.2 *(0.27 std)*	0.35 *(0.26 std)*
Community Richness	6.00	7.00
Community Evenness	0.65	0.70
Divergence	0.70	0.40

So what is the minimum information to collect from each farm and the community?

7 -- Types of data
6 -- Calculations

So what is the minimum information to collect from each farm and the community?

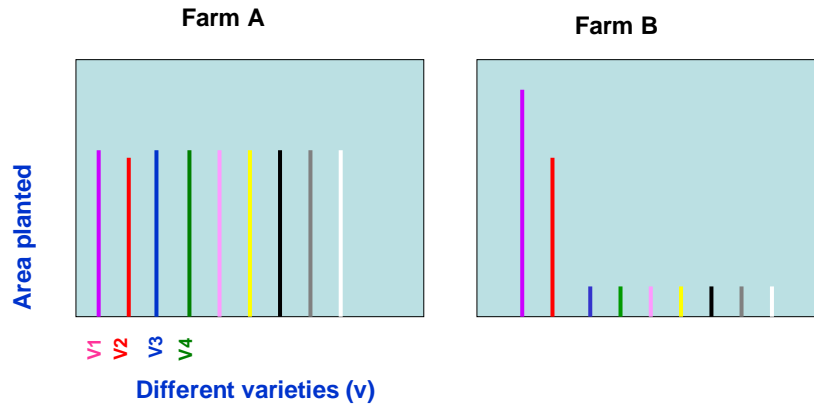**To calculate importance of traditional versus modern varieties at the household level:**

1. **Total area** of the farmer planted to the target crop (traditional and modern)
2. **Proportion** of the farm grown to traditional varieties of the crop

To calculate the area represented by your sample of 60 households:

3. Total area of the community devoted to each crop
   - NOTE: not the target area sampled, but the entire area the of the community/province that the sample size represents

So what is the minimum information to collect from each farm?

NOTE: only farms that grow at least one traditional variety of the target crop

To calculate richness, evenness (*Dominance* - Simpson Index)

4. Number of *traditional/local* varieties (or distinct units the farmers manager) – needed to calculate RICHNESS
   – *make sure you have associated the names and traits farmers use to distinguish these varieties*)

5. Area grown for each traditional variety per farm (in order to calculate percent coverage of each variety per farm) Needed to calculate EVENNESS

So what is the minimum information to collect from each community?

To calculate richness, community evenness and divergence:

6. Number modern varieties grown in the community

7. Number of traditional varieties grown in the community

What to calculate

1. **Average number of varieties per farm that grow at least one traditional variety (Richness-farm)**

2. **Average evenness (dominance – Simpson Index), over farms that grow at least one traditional variety**

3. **Total number varieties in community (Richness - community)**

4. **Average evenness (dominance Simpson Index) at community level,**

5. **Divergence among farms Between/Total (%)**

6. **Standard errors**

The Exercise

- Pick a friend (site level people with site level people; students with students; professors with professors) – possible male with males and females with females

- Write your two names on a card and decide who will be the farmer and who will be the interviewer

- You will randomly become either a interviewer or a farmer from one of two sites

- Make sure you have the handout for DAY 1 - Diversity Assessment

The Exercise

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Mango	Number of trees
LOCAL	
LOCAL	
LOCAL	
MODERN	
TOTAL AREA/Total tree number	
TOTAL AREA/Total tree number LOCAL	
TOTAL AREA/Total tree number MODERN	

The Exercise

- Step 4: When you have finished your map(s), tape them up on the wall and get another piece paper to put under each map.

- Step 5: Make a table with variety names and area covered.

- Step 6: Make a second table converting the area covered from absolute area to percentages

- Step 7: We will now together calculate richness, evenness and divergence

Mango Variety name	*% area covered of traditional varieties*

Area covered by each variety by household in ha

Farmer	Modern Gang you	Traditional Variety % area						Total Area to crop	Traditional total area (ha)	% Tradional area
		Hong zang	Ma zhan	Hei Luo	Hong Luo	Yue lian guo	Hei Gu			
Yuan	0.3	0.1	0.15					0.55	0.25	0.45
Peng	1.3			0.2	0.1			1.6	0.3	0.19
Fu	0.033			0.023		0.12	0.067	0.24	0.21	0.86
Zhu		0.3	0.25	0.65				1.2	1.2	1.00
Bao	0.147	0.13	0.21					0.49	0.34	0.70
He		1.5	0.8	0.8				3.1	3.1	1.00
Tu	0.15			0.13	0.1			0.38	0.23	0.61
Zhang Lei	0.18					0.2	0.05	0.43	0.25	0.58
Devra	0.3		0.2			0.5	0.02	1.02	0.72	0.71
						Household Average		1.0011	0.7333	0.6774
						Community (total sampled farm area)		9.01	6.6	0.732519
					TOTAL AREA REPRESENTED BY THE SITE			???		

Evennes, Richness and Divergence at household and community level calculated from PERCENT land planted to each variety (for traditional varieties only)

Farmer	Modern Gang you	Traditional Variety % area						Richness traditional varieties	Simpson evenness (traditional varieties)
		Hong zang	Ma zhan	Hei Luo	Hong Luo	Yuelian guo	Hei Gu		
Yuan		0.4	0.6					2	0.48
Peng				0.667	0.333			2	0.44
Fu				0.11		0.571	0.319	3	0.56
Zhu		0.25	0.2083	0.542				3	0.60
Bao		0.38235	0.6176					2	0.47
He		0.48387	0.2581	0.258				3	0.63
Tu				0.565	0.435			2	0.49
Zhang Lei						0.8	0.2	2	0.32
Devra			0.2778			0.694	0.028	3	0.44
AVERAGE Household		0.16847	0.218	0.238	0.085	0.23	0.061	2.44	0.49
							Community Simpson		0.80
							Community Richness		6
							Divergence		0.39

Community and household area statistics and estimates of diversity for traditional varieties in crops
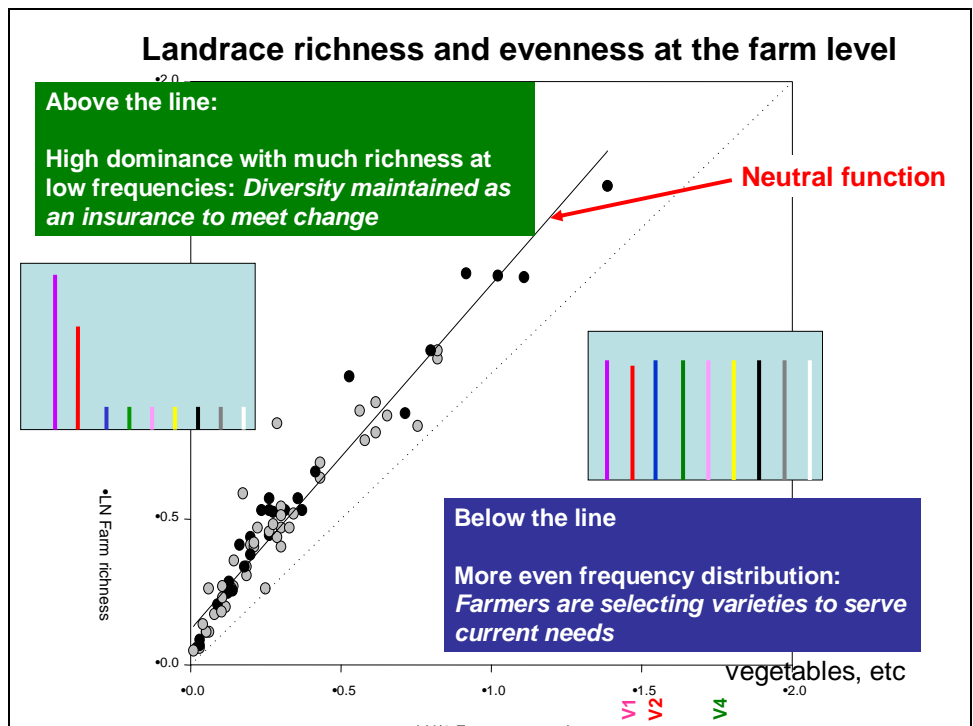
Crop	Total Area (ha)	% TV area	Number of HH	Ave area (ha)	Range community means of household areas (ha)	Average Farm Richness (TV)	Average Farm Evenness (TV)	Community Richness (TV)	Community Evenness (TV)	Average Divergence (TV)
Rice								34.83	0.77	0.64
Barley								6.33	0.60	0.72
Maize	8.598	97%	447	1.83	0.12-3.08	1.37	0.18	8.50	0.60	0.73
Cassava	4183	100%	159	0.48	0.26-0.63	2.05	0.33	60.33	0.96	0.66
Faba Bean						1.77	0.28	6.50	0.68	0.60
Durum Wheat						1.49	0.21	3.50	0.57	0.64
Beans						1.80	0.27	8.92	0.63	0.57
Pearl Millet	2365	100%	49	0.76	0.56-0.99	2.42	0.47	12.67	0.86	0.46
Peanut		100%	96			1.69				
Sorghum						4.25				
Squash						1.51				
Okra						2.22				
Finger Millet						1.38				
Chili	30	100%	175	0.10	0.0001-0.19	1.42				
Taro	24	100%	361	0.03	0.0069-0.053	1.44	0.12	17.20	0.65	0.81
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Landrace richness and evenness at the farm level

Above the line:

High dominance with much richness at low frequencies: *Diversity maintained as an insurance to meet change*

Neutral function

Below the line

More even frequency distribution: *Farmers are selecting varieties to serve current needs*

vegetables, etc

LN Farm richness

V1 V2 V4

Landrace richness and evenness at the community level

Above the line: *Diversity maintained as an insurance to meet change*

circle = outbred

filled = partial

circle = selfing

circle = clonal

LN Community richness

Below the line: *Farmers are selecting varieties to serve current needs*
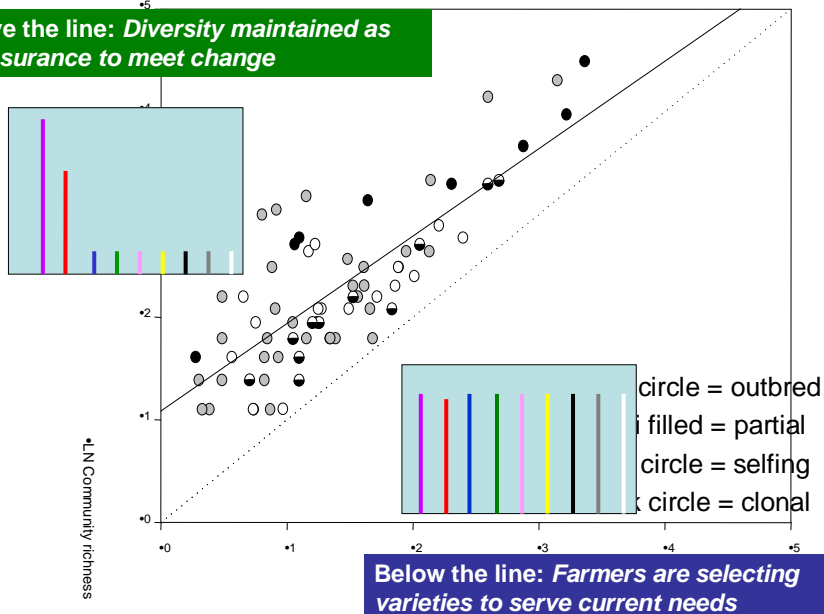
Relationship between farm area and divergence- plot one line the field crops.

White = outcrossing; Semifilled=partial outcrossing; Grey = i

Communities having smaller farm-field area showed more differentiation in varietal composition

Importance of a large number of small farms evolving distinctly diverse varietal strategies as a major force that maintains crop genetic diversity on-farm

-LN (1-divergenc

ln Farm Area (>50sqm)
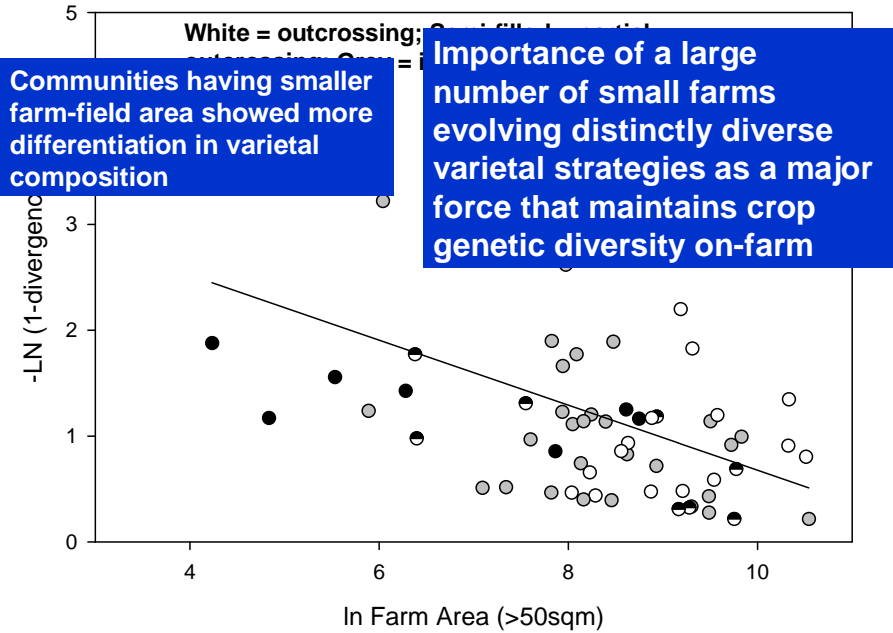
Number of trees of local varieties in farms

Number of household	3010	3032	3034	3043	3044	3125	Total
4001					400		**400**
4002						750	**750**
4003					1400		**1400**
4004			500				**500**
4005						200	**200**
4006		17					**17**
4007				10			**10**
4008						30	**30**
4009	1000						**1000**
Total	**1000**	**17**	**500**	**10**	**1800**	**980**	**4307**

Results of data processing on grapes varieties diversity in Turkmenistan

Number of farm	Crop Code	Variety Code	Local varieties cultivated at present time	Area, ha	Number of trees, pieces	Age of local variety
4001	3	3044	M	1	400	12
4001	3	3022	M	0,7	200	20
4001	3	3075	M	1	50	17
4002	3	3125	M	1,7	750	30
4003	3	3044	C	1	1400	18
4003	3	3075	M	1	200	5
4004	3	3034	C	0,75	500	27,5
4005	3	3125	M	0,2	200	27,5
4006	3	3032	M	0,1	17	25
4007	3	3043	M	0,1	10	25
4008	3	3125	M	0,1	30	25
4009	3	3010	M	1	1000	28
4009	3	3045	M	1	150	10
4009	3	3125	M	1	100	7

Calculation of average number of trees on farms in Turkmenistan

Number of trees, pieces	Local varieties cultivated at present time	Variety code													Grand total
	M				Total M	M					Total M	C		C Total	
HH number	3022	3045	3075	3125		3010	3032	3043	3044	3125		3034	3044		
4001	200		50		250				400		400				650
4002										750	750				750
4003			200		200								1400	1400	1600
4004												500		500	500
4005										200	200				200
4006							17				17				17
4007								10			10				10
4008										30	30				30
4009		150		100	250	1000					1000				1250
Total	200	150	250	100	700	1000	17	10	400	980	2407	500	1400	1900	5007

Summary table of calculation of richness and evenness

Number of trees, pieces	Local varieties cultivated at present time	Variety code							M Total	C		Total C	Grand total	Local varieties richness at household level	% of local varieties
	M														
HH number	3010	3022	3032	3043	3044	3045	3075	3125		3034	3044				
4001		200			400		50		650				650	3	100
4002								750	750				750	1	100
4003							200		200		1400	1400	1600	1	12,5
4004										500		500	500	0	0
4005								200	200				200	1	100
4006			17						17				17	1	100
4007				10					10				10	1	100
4008								30	30				30	1	100
4009	1000					150		100	1250				1250	3	100
Total	1000	200	17	10	400	150	250	1080	3107	500	1400	1900	5007		

Measuring diversity level of varieties

Number of farm	Crop code	Variety code	M (local), И (introduced), С (modern selection), Д (wild)	Orchard = 1, household=2	Area, ha	Number of trees, pieces	Age of local variety
5001	1	1019		1	1		15
5001	1	1028		1	2		15
5001	1	1039		1	2		15
5001	1	1047		1	2		15
5001	1	1052		1	1		15
5001	1	1003		2	0,0009	2	17
5001	1	1042		2	0,0009	2	20
5001	1	1048		2	0,0009	2	22
5002	3	3005		1	2		10
5002	3	3012		2	0,0011	4	5
5003	3	3011		1	2		14
5003	3	3027		2	0,0014	5	18
5003	3	3035		2	0,0008	4	16

Determining farmers' preferences

ID of survey form	Crop code	Variety code	Productivity	Gustatory qualities	Resistance to diseases	Meets market requirements	Marketable condition	Drought resistance	Keeping capacity	Processing	Transportability	Other (indicate)	Period of ripening (early=1, medium=2 late=3)	Fruit shape	Fruit colour	Fruit size(cm)
5001	1	1019	1	1	1	99	1	1	99	99	99		1	rounded	yellow	2,3
5001	1	1028	99	1	99	1	1	99	99	1	99		2	oblong	orange	4,5
5001	1	1039	1	99	99	99	99	99	99	99	99		1	rounded	white	2,6
5001	1	1047	1	1	1	1	1	99	99	99	99		2	rounded	orange	3,1
5001	1	1052	99	1	1	99	1	1	99	1	99		2	oblong - rounded	cream	4,2
5001	1	1003	1	1	1	1	1	99	99	99	99		3	oblong - rounded	yellow	3,7
5001	1	1042	1	1	99	99	99	99	99	99	99		2	oblong	cream	2,2
5001	1	1048	1	1	99	1	1	99	99	99	1		2	rounded	cream	3,4
5002	3	3005	1	1	1	99	99	1	99	99	99		2	oblong	red	2,1
5002	3	3012	1	1	99	1	1	99	1	99	99		3	oblong	white	3,1
5003	3	3011	1	1	1	1	1	1	99	99	1		3	rounded	black	1,6
5003	3	3027	1	1	99	1	1	99	1	1	99		3	oblong - rounded	yellow	2,7
5003	3	3035	1	1	1	99	99	1	99	99	99		2	oblong	black	2,2

Currently in use

Currently use															
Currently in use _ Pruning dry, unnecessary and sick branches	Currently in use _ Shaping	Currently in use _ Choosing varieties	Currently in use _Choosing root-stock	Currently in use _Positioning trees in orchard	Currently in use _ Digging the soil around tree trunk	Currently in use _ Feeding (manure)	Currently in use _ Tilling the soil in autumn	Currently in use _ Removing weeds	Currently in use _Winter watering	Currently in use _ Combating pests and diseases	Currently in use _ Fencing for protection from damage caused by grazing cattle	Currently in use _ Whitewashing tree trunks to protect against sunburn	Currently in use _ Removing root suckers	Other (specify)

Recommendations

Recommended											
Recommended to use _ Shaping in young age	Recommended to use _ Shaping	Recommended to use _ Planting of good seedlings	Recommended to use _ Planting of varieties of late maturity	Recommended to use _ Planting of early-maturity high yielding varieties	Recommended to use _ Digging the soil around tree trunk	Recommended to use _ Feeding (manure)	Recommended to use _ Tilling the soil between rows	Recommended to use _ Watering at night time	Recommended to use _ Combating pests and diseases	Other (specify)

Recommended to use if resources are available

Desirable to use if resources are available _ Reestablishment	Desirable to use if resources are available _ Rejuvenation of trees	Desirable to use if resources are available _ Flowers and fruit-thinning by shakings the branches method	Desirable to use if resources are available _ Pollination by bees	Desirable to use if resources are available _ Planting of high yielding varieties that meet market requirements	Desirable to use if resources are available _ Regular tillage	Desirable to use if resources are available _ Use of siderites	Desirable to use if resources are available _ Feeding trees during abundant fruiting	Desirable to use if resources are available _ Drip irrigation	Desirable to use if resources are available _ Carry out watering in sufficient quantity	Desirable to use if resources are available _ Whitewashing tree trunks to protect against sunburn	Desirable to use if resources are available _ Remove root sprouts	Other (specify)

Not recommended to use

Not recommended to use _ Early autumn pruning.	Not recommended to use _ Spring pruning	Not recommended to use _ Winter pruning	Not recommended to use _ Grafting on old trees especially by the method of "splitting"	Not recommended to use _ Use seedlings grown in other areas	Not recommended to use _ Long time sodding	Not recommended to use _ Shallow plowing in orchards	Not recommended to use _ Watering the orchard in hot summer months - June and July	Other (specify)

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Farmers' statements

ID of survey form	Crop code	Variety code	Removing of fruits and flowers reduces income	Modern varieties of fruit crops give more productive than the local varieties	If you cultivate more different varieties in your orchard, you get more fertilized ovaries	If you cultivate a large number of trees of one variety, that means that you do not always get a stable and high yield	If you cultivate only one variety in your orchard, it's liability to pests would be higher than if you cultivated more than one variety	Cultivation more than one variety in an orchard gives you more profit from the production of fruit -growing, than if you grow only one variety	Cultivation more than one variety at one site requires more expenditures than the cultivation of one variety

Generalized data on the diversity of fruit crops at the regional level

Country	Crop	Code (name)of the plot	The number of households	The total area (ha) (local + introduced / modern)	% of the area under traditional crops in relation to the total area	The average area of households, reserved under the given crop (ha) (local + introduced / modern)	Range (min and max values) of area of households in given village (ha)	The total number of planted trees	% of trees of local crops	The average number of trees per household	Range (min and max values) of the number of trees per household in the village	The average wealth at the farm (local varieties)	The average evenness at the farm (local varieties)	Wealth at the village level (local varieties)	Evenness at the village level (local varieties)	The average deviation (local varieties)	The average number of trees per hectare, unit / ha
2	1		3	0,131	100	0,066	0.005-0.4	37	100	12,33	7-16	2,67	0,53	3	0,62	0,14	282,4427
1	9		8	111	61,26	24,67	4-32					10,67	0,75	35	0,91	0,18	
3	1	Бартанг	2	14,4	100	7,2	6-8.4	1376	100	688	480-897	5	0,49	10	0,75	0,35	95,55556
4	3	karakala	8	8,98	70,5	1,1	0.1-1.7	5007	62,1	556,3	10-1600	1,3	0,11	8	0,78	0,86	557,5724
5	1		2	10,9	99	5,4						3	0,49	4	0,73	0,32	
5	3		1	3,1	61,3	1,9						2	0,39	2	0,96	0,01	
5	9		4	6,5		1,6						1,7	0,29	5	0,76	0,62	

The population size of wild fruit species

ID of survey form	ID of wild speciess	ID of the plot	ID of wild forms	Name of the wild fruits or nuts, named by farmer	GPS Latitude	GPS Longitude	Altitude	The number of area (point different populations on the map)	The total area (ha) under the wild variety	The area (ha), from which farmer harvests crops	The total size of trees population (total number of trees) in given area	The number of trees from which farmer harvests crops	The age of trees, from which farmer harvests crops	Reasons for harvesting or selection of planting material from certain trees (if applicable)

Ways of wild fruit species use

ID of survey form	ID of wild species	ID of wild form / population	Use 1	Use 2	Use 3	Use 4	Other

Practice of wild fruit species conservation

ID of survey form	ID of wild species	ID of the plot	The number of wild form/ population	Selected area where cattle grazing is not allowed with purpose seedlings' cultivation	Fencing for protection against damage caused by grazing	Reservation of nuts and fruits for natural regeneration	Replantation of wild species seedlings	Other

Course evaluation

Course name: "Linking information from Focus Group Discussion, Household Surveys, and Farm and Forest Assessment for Cultivated and Wild Fruit Tree Diversity in Central Asia"
Date: February 22 – 25, 2010
Venue: Tashkent, Uzbekistan
Organizer: Bioversity International Regional Office

An evaluation should be conducted at the end of the course or training workshop.

An evaluation should be conducted at the end of a training course or training workshop.

The purpose is to sum up the effects of the programme, to see whether the curriculum has achieved its goals. The evaluation will provide important feed-back to the organizers regarding content, delivery and administration of the course, which will be used to improve future courses.

We kindly ask you to spend 10- 15 minutes to complete the form, and return it to the course organizers.

Thank you for your time!

The organizers

	Score 1 = Very poor/very low, etc. 2 = Poor/low 3 = Acceptable 4= Good/high 5 = Very good/ very high, etc.	**Number of participants**
A. Overall assessment of the course (or training workshop)		
1. Overall satisfaction with the course	☐1 ☐2 ☐3 ☐4	3 participants evaluated satisfaction with the course as high and 11 participants

		☐5	evaluated satisfaction with the course as very high
2.	Relevance of the course content in relation to my training needs	☐1 ☐2 ☐3 ☐4 ☐5	1 participant considered relevance of the course content as acceptable, 5 participants considered that the course relevant to their training needs, 8 participants considered that the course content as high relevant to their training needs
3.	Overall quality and effectiveness of course delivery	☐1 ☐2 ☐3 ☐4 ☐5	5 participants evaluate quality and effectiveness of course as high, 8 participants evaluate as very high
4.	Overall learning (knowledge and skills) achieved in the course	☐1 ☐2 ☐3 ☐4 ☐5	1 participant considered knowledge and skills, achieved in the course as acceptable, 5 participants as high and 9 participants considered the course as very high on this parameter
5.	How well did the course meet its objectives?	☐1 ☐2 ☐3 ☐4 ☐5	1 participant considered that the course meets its objective on acceptable level, 6 participants considered that the course highly meets its objectives and 6 participants considered that the course very highly meets its objectives

Comments:		
B. Evaluation of course content and teaching/learning methods		
6. Duration of the course/workshop	☐1 ☐2 ☐3 ☐4 ☐5 (1=too long/short 5=just right)	3 participants recognize the duration of the course as acceptable, 5 participants as satisfactory and 7 as just right
7. Contents covered in relation to time available	☐1 ☐2 ☐3 ☐4 ☐5 (1=too much/little 5=just right)	2 participants evaluated contents covered as too little, 3 participants as satisfactory and 7 as just right
8. Quality and effectiveness of theoretical teaching and learning methods (lectures)	☐1 ☐2 ☐3 ☐4 ☐5	2 participants evaluated as high the quality and effectiveness of lectures and 13 evaluated as very high
9. Quality and effectiveness of practical exercises & field activities	☐1 ☐2 ☐3 ☐4 ☐5	1 participant considered as poor the quality and effectiveness of practical exercises & field activities , 1 participant evaluated them as satisfactory, 3 participants as high and 10 participants graded as very high
10. Balance between theory/lectures and practical work	☐1 ☐2 ☐3 ☐4 ☐5 (1=poor balance 5=just right)	4 participants consider balance between theory/lectures and practical work as good, and 12 participants as just right
11. Quality and amount of	☐1	Quality and amount of

training materials distributed during the course	☐2 ☐3 ☐4 ☐5	training materials distributed during the course was considered as good by 5 participants and as very good by 11 participants
Comments: None		
C. Evaluation of administration and logistics		
12. Access to equipment during the course (e.g. LCD projectors, computers, laboratory facilities etc.)	☐1 ☐2 ☐3 ☐4 ☐5	Access to equipment during the course was graded as poor by 1 participant, as good by 2 participants and as very good by 13 participants
13. Quality and timing of information received prior to the training course	☐1 ☐2 ☐3 ☐4 ☐5	Quality and timing of information received prior to the training course 1 participant graded as very poor, 1 participant as poor, 4 participants as satisfactory, 3 participants as good as 5 participants as very good
14. Food and accommodation	☐1 ☐2 ☐3 ☐4 ☐5	Food and accommodation by 2 participants were evaluated as good and by 13 participants as very good
15. Travel arrangements	☐1 ☐2 ☐3 ☐4 ☐5	Travel arrangements 1 participant considers as good and 12 participants as very good
16. Financial arrangements	☐1 ☐2	Financial arrangements were evaluated as very

	□3	high by 11 participants
	□4	
□5		
Comments: None		
D. Others		
17. Number of participants	□1 □2 □3 □4 □5 (1= too few/many 5 = Just right)	Number of participants was considered as too many/ few by 3 participants , as many/few by 1 participant, as good by 4 participant and as just right by 9 participants
18. Active participation in the learning process	□1 □2 □3 □4 □5	Active participation 1 participant considers as acceptable, 5 participants as good and 10 consider as very good
19. Interaction with other participants	□1 □2 □3 □4 □5	Interaction with other participants 1 participant considers as acceptable, 3 participants as good and 11 participants consider as very good
20. Interaction with lecturers/instructors	□1 □2 □3 □4 □5	Interaction with lecturers/instructors 1 participant considers as acceptable, 1 participant as good and 14 as very good
Comments: None		