Alliance







Diversity Assessment Tool for Agrobiodiversity and Resilience

Integrating intra-specific diversity of crop, livestock and aquatic resources into agricultural development decision making

Innovation in the use of agrobiodiversity for sustainable agricultural development 25-26 Tashkent 25-26 September 2019

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Issue

Intra-specific diversity in the form of crop varieties, animal breeds and fish strains are usually left out of the assessment and analysis for agricultural development and environmental planning



Where we know intra-specific diversity can improve livelihoods

I. Improved productivity for low agrochemical environments, extreme temperatures, and drought, soils, salinity, poor soils

II. Improved productivity under unpredictable fluctuations in temperature rainfall, frost, pest, disease, markets

III. Meet consumer / market demand for

diverse, nutritional,

natural and safe food-based product

Reduce malnutrition

IV. Meet the gender and age Interested of

What is your* goal?

Can Intraspecific diversity achieve your goal



communities to retain control over their crop/livestock/aquatic genetic resourc and food sovereignty and cultural herita

> V. Restore the environment (over grazing over harvesting) to mitigate climate change and reduce migration

Partial list

Improve production when there is too much rainfall; too little rainfall

Improve production when Temperature is extreme high, extreme low

Improve production in Saline soils, Alkaline soils, poor soils

Improve sustainable production uner unpredicatable Temp, time, amount

sure sustainable production under changes in pest/ disease infestations

Meet consumer demand for diverse food

Improve nutrition

Provided for Consumer demand local = 0 km

Provide Safe food (chemical free)

Reduce the loss of cultural heritage

Provide ownership and food sovereignty at community/national level

work over Gender and social equity in resource use and benefits

agroecosystems after natural disasters and reduce migration

Restore lands and water bodies after over grazing and over harvesting

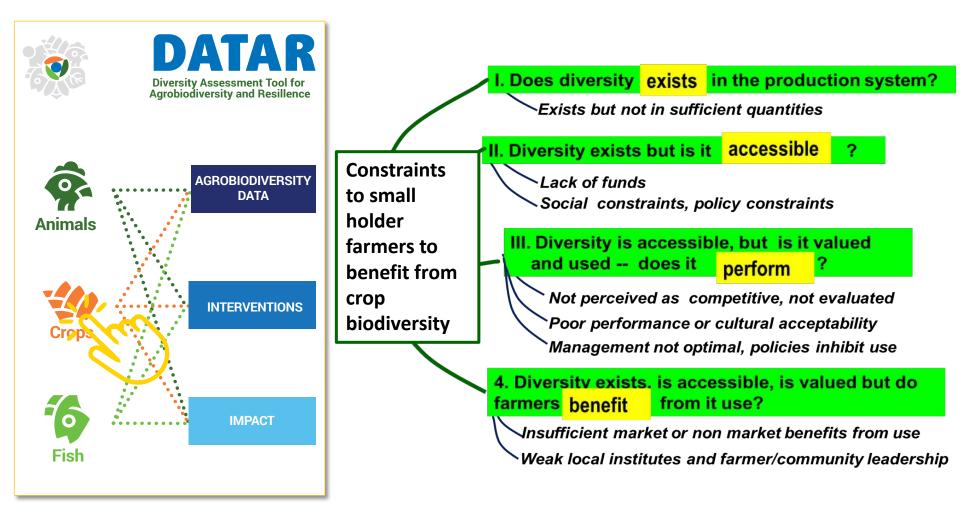
Restore land and water after conflict and economic disaster reduce migration

Mitigate green house gases through restored landscapes





An IT tool to integrate <u>intra-specific</u> crop, livestock and aquatic diversity into decision making plans to improve on farm productivity for small holder farmers for researchers, development workers and farmers.



External databases

(DAD-IS, WIEWS, CG Genebanks, national catalogues, projects reports etc.), Market information, GPS soil info, GPS climate info, GPS land use info, institutional capacity, policy, ect.

Empirical data

- Field observation
- •On-farm trials
- •On-station trials
- Laboratory work

FGD tables*

- •Country, Province, Village, GPS
- Varieties + descriptors
- •Seed sources
- Management practices

PIC/ABS Issues



Policy Survey tables

PIC/ABS Issues

PIC/ABS Issues

Where does the information come from?

HHS tables*

- •Varieties + GPS
- •Seed sources
- Management practices
- Constraints

PIC/ABS issues

Seed (Reproductive Materials) Suppliers Survey S(RM)SS tables* (if it takes place before the HHS) **PIC/ABS** Issues

Portal 1* Variety **Descriptors+ Functional** traits + GPS **ABS** Issues

Portal 2* Seed / breed / farm type suppliers + GPS

ABS Issues

Portal 3

Ecological Management practices to improve value of GD (soil, IPM, GD water,

Portal 4

Socio-economic aspects to improve value of GD Markets, policies, Institutions



DATA





Does Intra-specific diversity exists?

Step 1. Review and Access databases for national list of varieties and functional traits

Review and download current databases with intra-specific crop, livestock and aquatic diversity data of the species in questions at national level

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Does Intra-specific diversity exists?

Step 2. Collect Site (group) level diversity information

Participatory diagnostic assessment and characterization of Intra-specific crop, livestock and aquatic diversity data is collected at site level







National level databases

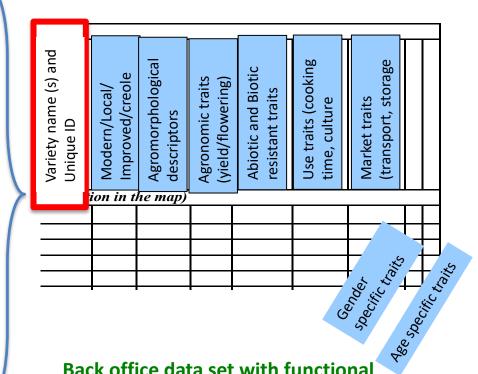
Step 3. Li	nking the Back-Office Database of Variety x Descriptors
(Functior	al traits) for the target species with site level data

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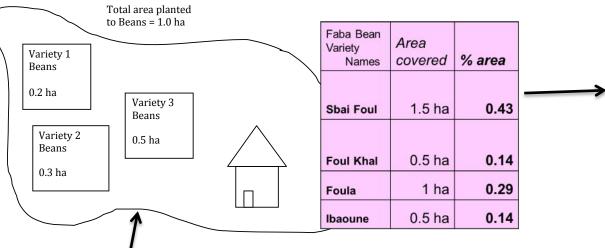
Site level data

ID number of the questionn aire	Crop ID	Variety ID	High Yield	Good Taste	Resistance to diseases and pests	Meets market requir	Drought resistance	Long shelf life	Good for Processing	Easily Transported
5001	1	1002	99	1	99	99	1	99	99	99
5001	1	1019	99	1	1	99	1	99	99	1
5001	1	1028	1	1	99	1	99	99	99	99
5001	1	1039	99	1	99	99	1	99	99	99
5001	1	1047	99	1	99	1	1	1	99	99
5001	1	1052	1	1	99	99	1	99	99	99
5001	3	3021	1	1	99	1	99	1	99	1
5001	3	3022	1	1	99	1	99	1	99	1
5001	3	3024	99	1	99	1	99	99	99	1
5001	3	3025	99	99	99	99	1	99	99	1
5001	4	4001	99	1	99	1	99	1	99	99
5001	4	4014	99	1	99	1	99	1	99	1
5001	4	4015	99	1	99	1	99	1	99	1
5002	4	4001	99	1	99	1	99	1	99	99
5002	4	4002	99	1	99	99	99	1	99	1
5002	4	4009	99	1	1	99	99	1	99	1
5003	1	1004	1	1	99	1	1	99	99	99
5003	1	1014	1	1	99	1	99	1	99	99
5003	1	1028	1	1	99	1	99	99	99	99

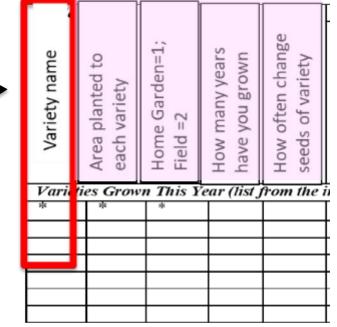


Back office data set with functional traits for each variety

Step 4. Collecting household location/GPS and Household Info (age/gender/social cultural group) linked to Household survey on the area planted to each variety

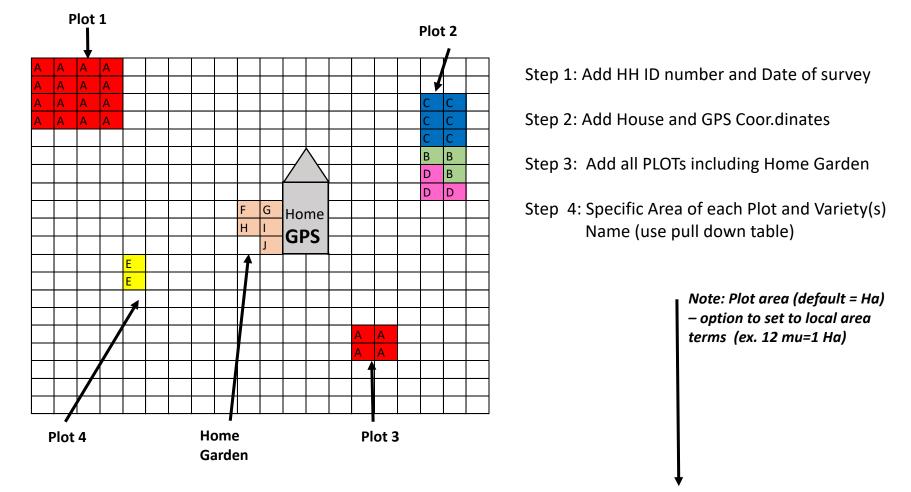






House Hold ID	GPS Coord.	Village ID	Agro zone Prov ID	ک م Gender Informant	Age Informant

House Hold Survey On farm Data Input (Part 1 Diversity) with farmers



						Option to		Option to add		%				
			Number of		Variety Name	additional name		notes for	Field =1/	coverage	Seeds (g)	Number		Amount
		Plot Area	plants (trees,		(pull down	Local/indeginous)	Option to	additional	Home	of plot by	or saplings	of years	Amount	chemical
HH ID	Plot ID	(ha)	bushes)	Check	variety name)*	given by farmer	add photo	functional traits	Garden =2	variety	(number)	grown	pesticide	fertilizer
1001	1	2			А	Raffa-lovely		sweet taste	1	100	30	5	0	0
				* pull do	own list comes fro	om National Varie	ety x Functio	onal Trait X photo	o database.					

HH ID 1001	Plot ID 1	Plot Area (ha) 2	Number of plants (trees, bushes)	Check	Variety Name (pull down variety name)* A	Option to additional name Local/indeginous) given by farmer Raffa-lovely	Option to add photo	Option to add notes for additional functional traits sweet taste	Field =1/ Home Garden =2 1	% coverage of plot by variety 100	Seeds (g) or saplings (number) 30	Number of years grown 5	Amount pesticide 0	Amount chemical fertilizer 0
		Plot Area	Number of plants (trees,		Variety Name (pull down	Option to additional name Local/indeginous)	Option to	Option to add notes for additional	Field =1/ Home	% coverage of plot by	Seeds (g) or saplings	Number of years	Amount	Amount chemical
HH ID	Plot ID	(ha)	bushes)	Check	variety name)*	given by farmer	add photo	functional traits	Garden =2	variety	(number)	grown	pesticide	fertilizer
1001	2	2			B				1	50	20	2	0	0
					С				1	20	10	10	0	0
					D				1	30	10	10	0	0
HH ID	Plot ID	Plot Area (ha)	Number of plants (trees, bushes)	Check	Variety Name (pull down variety name)*	Option to additional name Local/indeginous) given by farmer	Option to add photo	Option to add notes for additional functional traits	Field =1/ Home Garden =2	% coverage of plot by variety	Seeds (g) or saplings (number)	Number of years grown	Amount pesticide	Amount chemical fertilizer
1001	3	1			A	Raffa-lovely		sweet taste	1	100	15	5	0	0
		Plot Area	Number of plants (trees,		Variety Name (pull down	Option to additional name Local/indeginous)	Option to	Option to add notes for additional	Field =1/ Home	% coverage of plot by	Seeds (g) or saplings	Number of years	Amount pesticide	Amount chemical
HH ID	Plot ID	(ha)	bushes)	Check	variety name)*	given by farmer	add photo	functional traits	Garden =2	variety	(number)	grown	(cc)	fertilizer
1001	4	0.5			E	Ma Va		drought resistant	1	100	30	2	10	0
						Option to		Option to add		%				
HH ID	Plot ID	Plot Area (ha)	Number of plants (trees, bushes)	Check	Variety Name (pull down variety name)*	additional name Local/indeginous) given by farmer	Option to add photo	notes for additional functional traits	Field =1/ Home Garden =2		Seeds (g) or saplings (number)			
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					Н				2	10	5	6	0	0
	1				I				2	20	5	10	0	0
	1				J				2	30	5	10	0	0

Data inputted to tablet by farmer with researcher

HH ID 1001	Plot ID 1	Plot Area (ha) 2	Number of plants (trees, bushes)	Check	Variety Name (pull down variety name)* A	Option to additional name Local/indeginous) given by farmer Raffa-lovely	Option to add photo	Option to add notes for additional functional traits sweet taste	Field =1/ Home Garden =2 1	% coverage of plot by variety 100	Seeds (g) or saplings (number) 30	Number of years grown 5	Amount pesticide 0	Amour chemic fertilize 0
HH ID	Plot ID	Plot Area (ha)	Number of plants (trees, bushes)	Check	Variety Name (pull down variety name)*	Option to additional name Local/indeginous) given by farmer	Option to add photo	Option to add notes for additional functional traits	Field =1/ Home Garden =2	% coverage of plot by variety	Seeds (g) or saplings (number)	Number of years grown	Amount pesticide	Amou chemi fertiliz
1001	2	2			В				1	50	20	2	0	0
					C D				1	20	10	10	0	0
						Option to		Option to add		%				
HH ID	Plot ID	Plot Area (ha)	Number of plants (trees, bushes)	Check	Variety Name (pull down variety name)*	additional name Local/indeginous) given by farmer	Option to add photo	notes for additional functional traits	Field =1/ Home Garden =2	% coverage of plot by variety 100	Seeds (g) or saplings (number)	Number of years grown	Amount pesticide	Amou chem fertili
1001	3	1			A	Raffa-lovely		sweet taste	1	100	15	5	0	0
HH ID	Plot ID	Plot Area (ha)	Number of plants (trees, bushes)	Check	Variety Name (pull down variety name)*	Option to additional name Local/indeginous) given by farmer	Option to add photo	Option to add notes for additional functional traits	Field =1/ Home Garden =2	% coverage of plot by variety	Seeds (g) or saplings (number)	Number of years grown	Amount pesticide (cc)	Amoi chem fertili
1001	4	0.5			E	Ma Va		drought resistant	1	100	30	2	10	0
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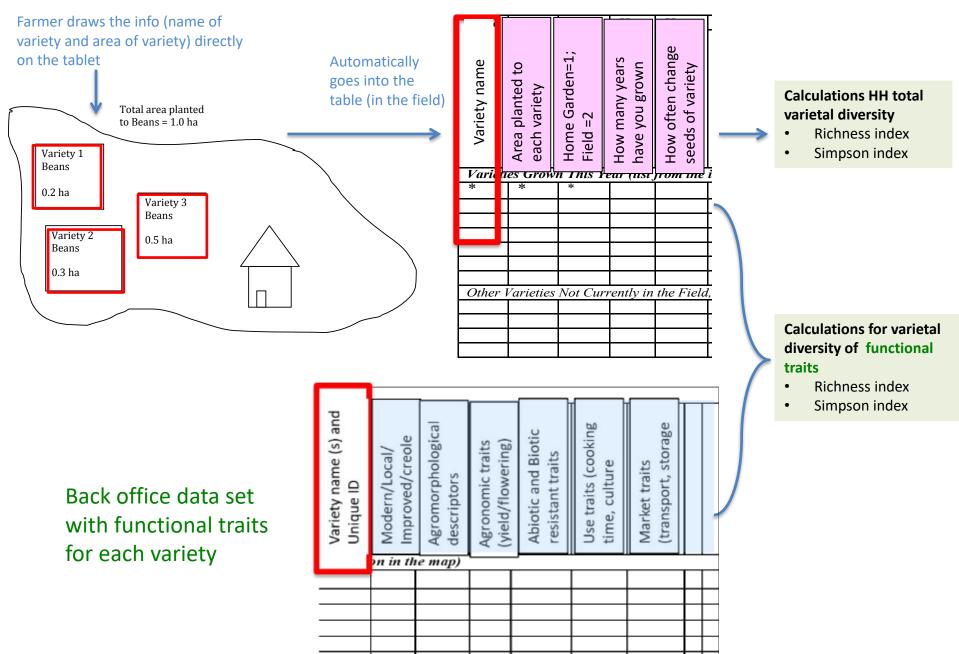
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						Number of		
			Total	Field =1/ Home	Total Seeds (g)	Years		Chemical
	HH ID	Variety Name	Area	Garden =2	used	Grown	Pesticide use (cc)	Fertilizer
	1001	A	3	1	35	5	0	0
	1001	В	1	1	20	2	0	0
	1001	С	0.4	1	10	10	0	0
	1001	D	0.6	1	10	10	0	0
	1001	E	0.5	1	30	2	10	0
	1001	F	3	*+2	5	2	0	0
	1001	G	1	2	5	7	0	0
1	1001	Н	0.4	2	5	6	0	0
: I	1001	I	0.6	2	• 5	10	0	0
•	1001	J	0.5	2	5	10	0	0

HH ID linked to HH ID data table, and to date of survey – NOTE Marco – so each time survey is done is a different data point – correct?

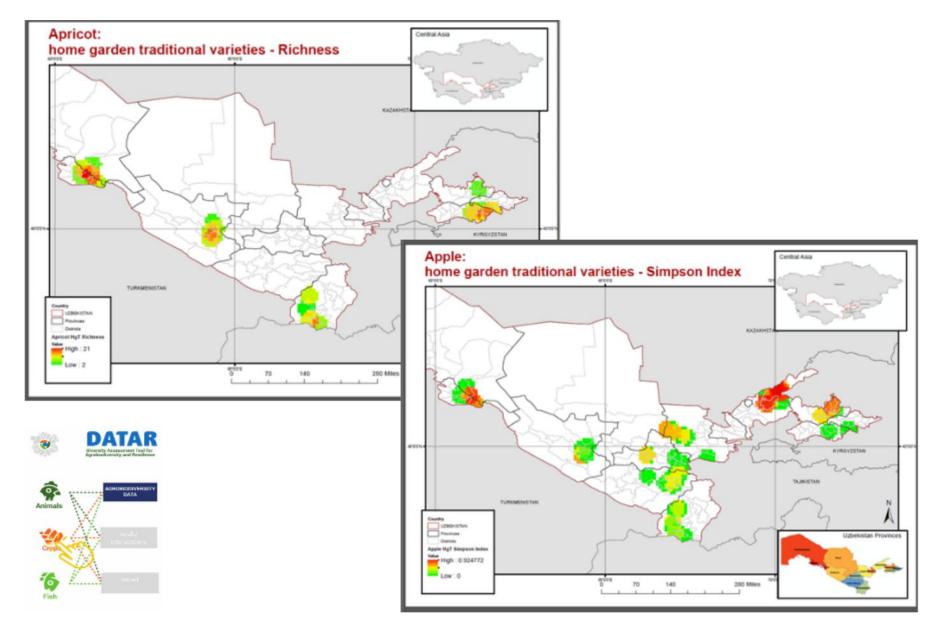
Variety name (Variety Unique Id) linked to Variety X Functional Trait data table

Step 5. Linking Site Level Household Diversity Data with Back Office Database on functional traits, and calculating diversity indices

Household survey

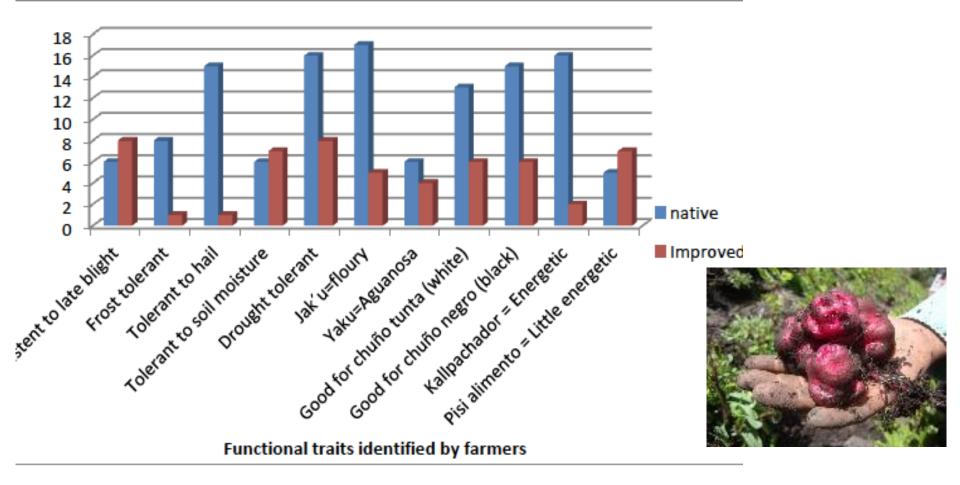


Example: Overall Diversity Richness (Apricot) and Evenness (Apple)of Varieties



Example Functional Data: Richness of functional traits at site level

• Significant number of varieties have diverse functional traits Priority traits for farmers are not always the same as for scientists and breeders



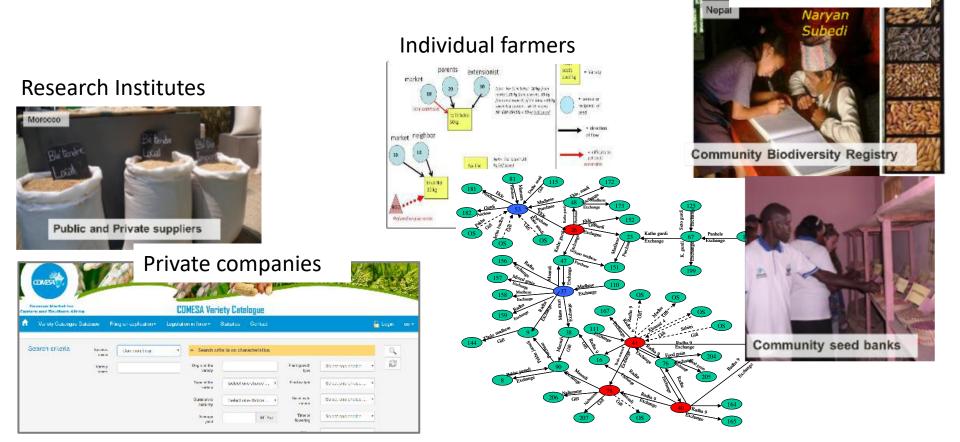


Is diversity of reproductive materials accessible?

Step 6. Collect Site and National level information on Seed (Reproductive Materials) Suppliers

Communities

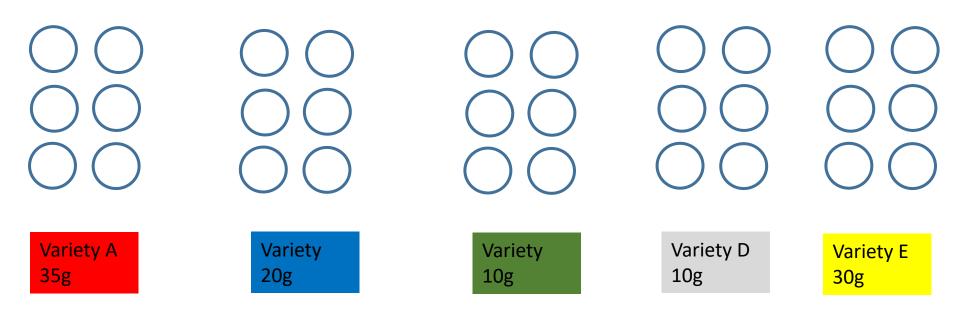
Participatory diagnostic assessment of Intra-specific crop, livestock and aquatic access to reproductive materials



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Supplier ID	Supplier Name	TYPE of Supplier governmental/public organization, private company, NGO, farmers' association, individual farmer, others –specify	a ال	Age a a a b a b a b a b a b a b a b a b a	Locatio GPS of supplier	Country	Province	City/Village	Сгор	Variety Name	Variety ID	Seed quantity for each crop, in Kg (average for 3 years)	Quality of Seed: How does this supplier quarantee at Seed Ct quality Cetuncation, supplier is certified)
	UzRIPI	Research Institute				Uzbekistan	Surhandarya	Tashkent	Apple	Borovinka tashkentskaya			
	UzRIPI	Research Institute				Uzbekistan	Surhandarya	Tashkent	Apple	Winesap			
	UzRIPI	Research Institute				Uzbekistan	Surhandarya	Tashkent	Apple	Golden Delisious			
	Shreder	Research Institute				Uzbekistan	Surhandarya	Tashkent	Apple	Borovinka tashkentskaya			
	Shreder	Research Institute				Uzbekistan	Surhandarya	Tashkent	Apple	Winesap			
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	Shreder	Research Institute				Uzbekistan	Surhandarya	Tashkent	Apple	Renet Simirenko			
	Shreder	Research Institute				Uzbekistan	Surhandarya	Tashkent	Apple	Kizil taram olma			
	Shreder	Research Institute				Uzbekistan	Surhandarya	Tashkent	Apple	Malika			
	Shreder	Research Institute				Uzbekistan	Surhandarya	Tashkent	Apple	Oydin			
	Shreder	Research Institute				Uzbekistan	Surhandarya	Tashkent	Apple	Pervenets Samarkanda			
	Shreder	Research Institute				Uzbekistan	Surhandarya	Tashkent	Apple	Saraton			
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	Shreder	Research Institute				Uzbekistan	Surhandarya	Tashkent	Apple	Hosildor			
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	Termez Forestry Ent	te Nurseries				Uzbekistan	Surhandarya	Termiez	Apple	Golden Delisious			
	Termez Forestry Ent					Uzbekistan	Surhandarya	Termiez	Apple	Renet Simirenko			
	Termez Forestry Ent					Uzbekistan	Surhandarya	Termiez	Apple	Pervenets Samarkanda			
	Termez Forestry Ent	te Nurseries				Uzbekistan	Surhandarya	Termiez	Apple	Saraton			
	Termez Forestry Ent	te Nurseries				Uzbekistan	Surhandarya	Termiez	Apple	Jonathan			
	MR. A	Individual farmers				Uzbekistan	Surhandarya	??	Apple	Kizil olma			
	MS. B	Individual farmers				Uzbekistan	Surhandarya	??	Apple	Kelin yanok			
	MS. B	Individual farmers				Uzbekistan	Surhandarya		Apple	Mayskiy			
	Ms. C	Individual farmers				Uzbekistan	Surhandarya		Apple	Atlas			
	Mr. D	Individual farmers				Uzbekistan	Surhandarya		Apple	Besh yulduz			
		Individual farmers				Uzbekistan	Surhandarya		Apple	Kirmizi			

House Hold Survey Data Input (Part 2 - Seed suppliers and Contraints)

- Step 1: Ask how many suppliers for Variety A.
- Step 2. Click on the number of circles of each variety for
- Step 2. Pull down list of suppliers for each supplier
- Step 2: note how much seed from each supplier
- Step 2. Select if any constraint to get seeds



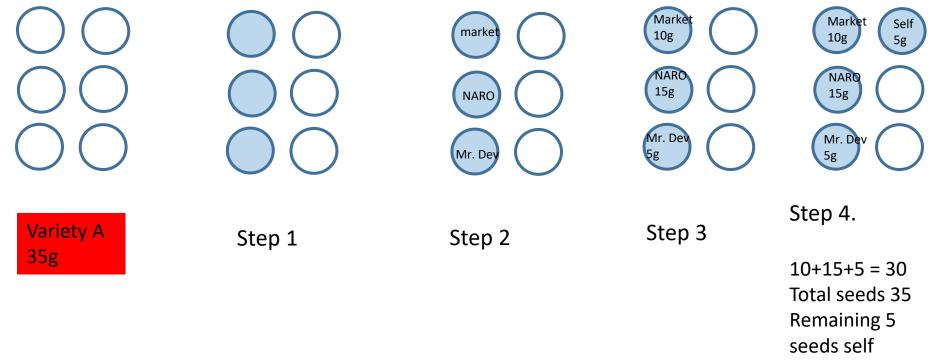
House Hold Survey Data Input (Part 2 - Seed suppliers and Contraints)

Step 1: Ask how many suppliers for Variety A and click on the number of circles of each variety for

Step 2. Pull down list of suppliers for each supplier and add name to circle

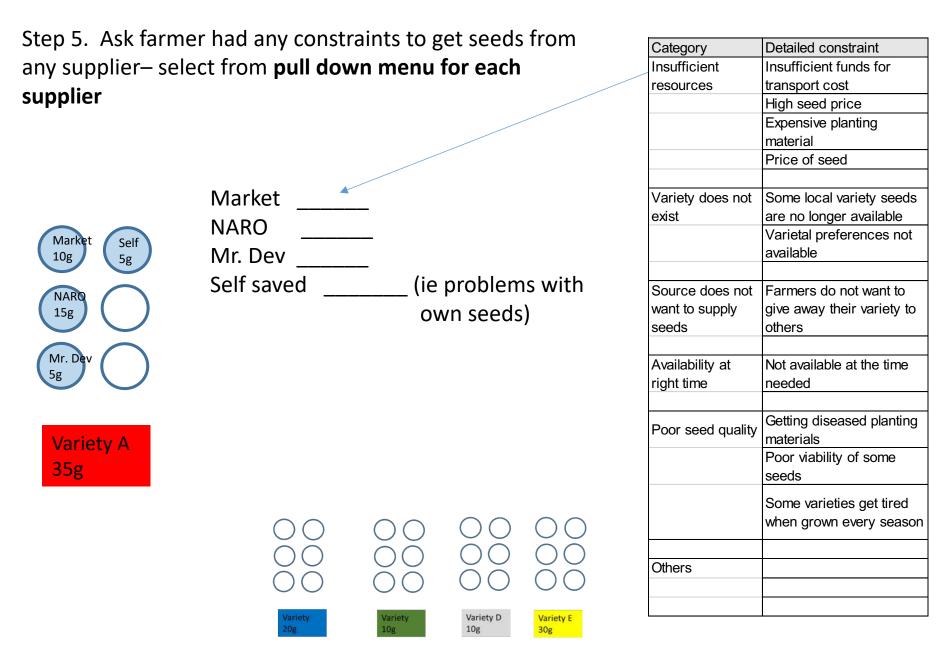
Step 3: Add how much seed the farmer got from each supplier

Step 4. Check calculations and ask if any self held seeds



supplied

House Hold Survey Data Input (Part 2 - Seed suppliers and Contraints)



Example: Table of variety versus traits (yes/no) and supplier

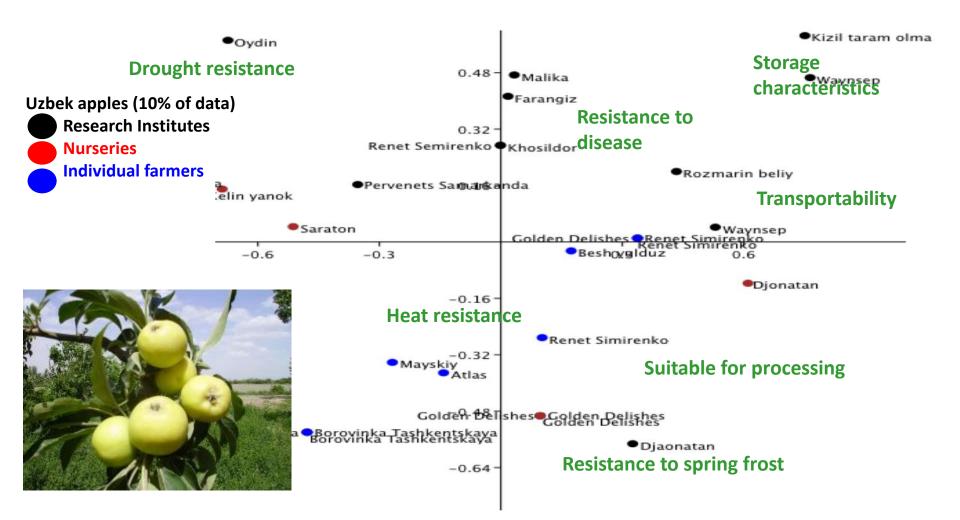
Black dots = Research Institutes; Red dots = Forest Nurseries; Blue dots = individual farmers

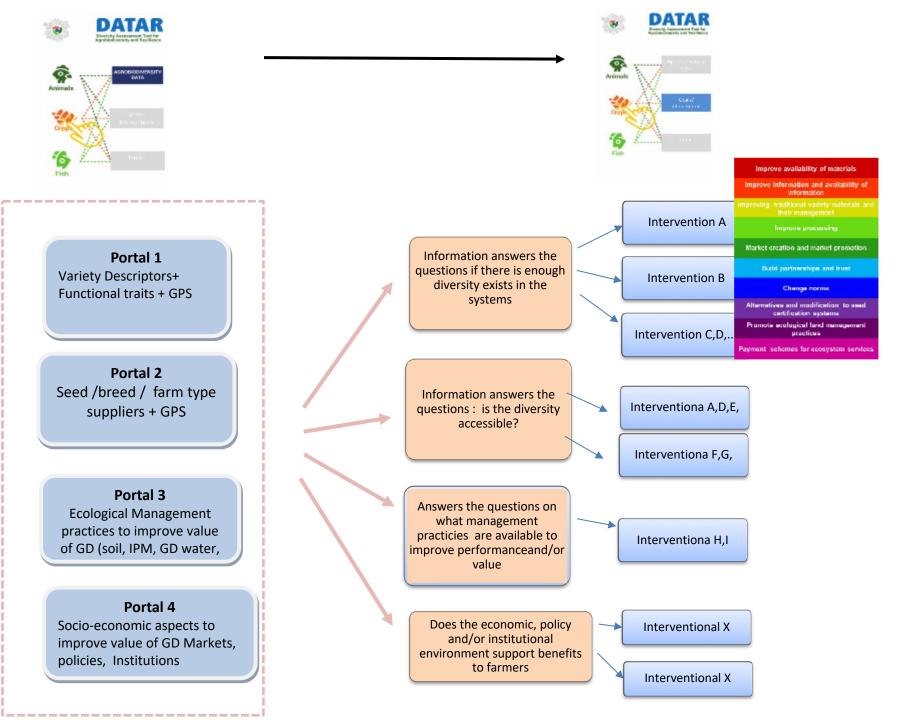
					Resistance			Storage	
		Drought	Heat	Salinity	to spring	resistance	suitable for	characterist	Transporta
Variety Name	Type of supplier	resistance	resistance	resistance	frost	to disease	processing	ics	bility
Borovinka Tashkentska	anesearch institute	0	1	0	1	. 0	0	0	0
Waynsep	Research Institute	0	0	0	1	. 1	0	1	1
Golden Delishes	Research Institute	0	1	1	1	. 0	1	. 0	1
Renet Semirenko	Research Institute	1	1	1	1	. 1	1	. 1	1
Afrosiabi	Research Institute	1	1	1	C	0	0	0	0
Borovinka Tashkentska	Research Institute	0	1	0	1	. 0	0	0	0
Kizil taram olma	Research Institute	0	1	0	C	0	0	1	1
Malika	Research Institute	1	1	0	1	. 1	1	. 1	1
Oydin	Research Institute	1	1	0	C	1	1	. 0	0
Pervenets Samarkanda	Research Institute	1	1	1	1	. 1	0	0	1
Farangiz	Research Institute	1	1	0	1	. 0	1	. 1	1
Khosildor	Research Institute	1	1	1	1	. 1	1	. 1	1
Renet Simirenko	Research Institute	0	1	1	1	. 1	1	. 1	1
Rozmarin beliy	Research Institute	0	1	0	1	. 1	1	. 1	1
Waynsep	Research Institute	0	0	1	1	. 1	1	. 1	1
Golden Delishes	Research Institute	0	1	1	1	. 0	1	. 0	1
Djaonatan	Research Institute	0	0	1	1	. 0	1	. 0	1
Parmen zimniy zolotoy	Research Institute	0	0	1	1	. 0	1	. 0	0
Golden Delishes	Forestry Nursery	0	1	1	1	. 0	1	. 0	1
Djonatan	Forestry Nursery	0	0	1	1	. 0	1	. 1	1
Renet Simirenko	Forestry Nursery	0	1	1	1	. 1	1	. 1	1
Saraton	Forestry Nursery	1	1	1	1	. 1	1	. 0	0
Pervenets Samarkanda	Forostny Nursony	1	1	1	1	. 1	0	0	0
Renet Simirenko	Individual Farmer	0	1	1	1	. 1	1	. 0	1
Kizil olma	Individual Farmer	0	1	0	1	. 0	0	0	0
Kelin yanok	Individual Farmer	1	1	0	1	. 0	1	. 0	0
Mayskiy	Individual Farmer	0	1	1	1	. 1	0	0	0
Atlas	Individual Farmer	0	1	1	1	. 1	1	. 0	0
Golden Delishes	Individual Farmer	0	1	1	1	. 1	1	. 1	1
Besh yulduz	Individual Farmer	0	1	1	1	. 1	1	. 1	0
Kirmizi	Individual Farmer	1	1	1	1	. 0	0	0	0
	TOTAL	11	26	21	28	17	21	13	18

Is diversity of reproductive materials accessible? Mapping varieties and traits against seed suppliers

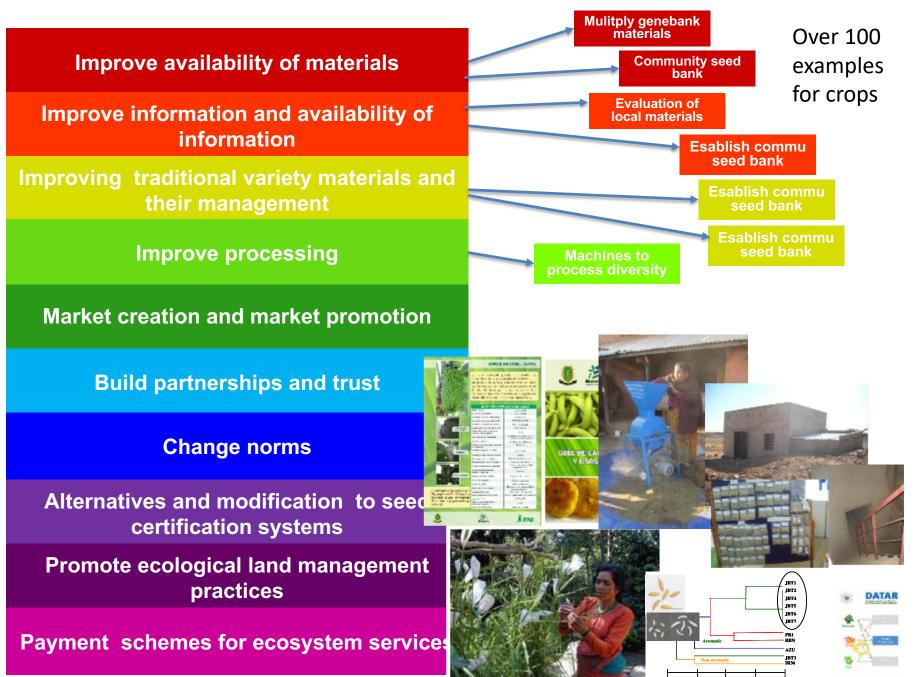
Uzbeksitan example (10% of the data):

• Different suppliers supply different varieties with different traits



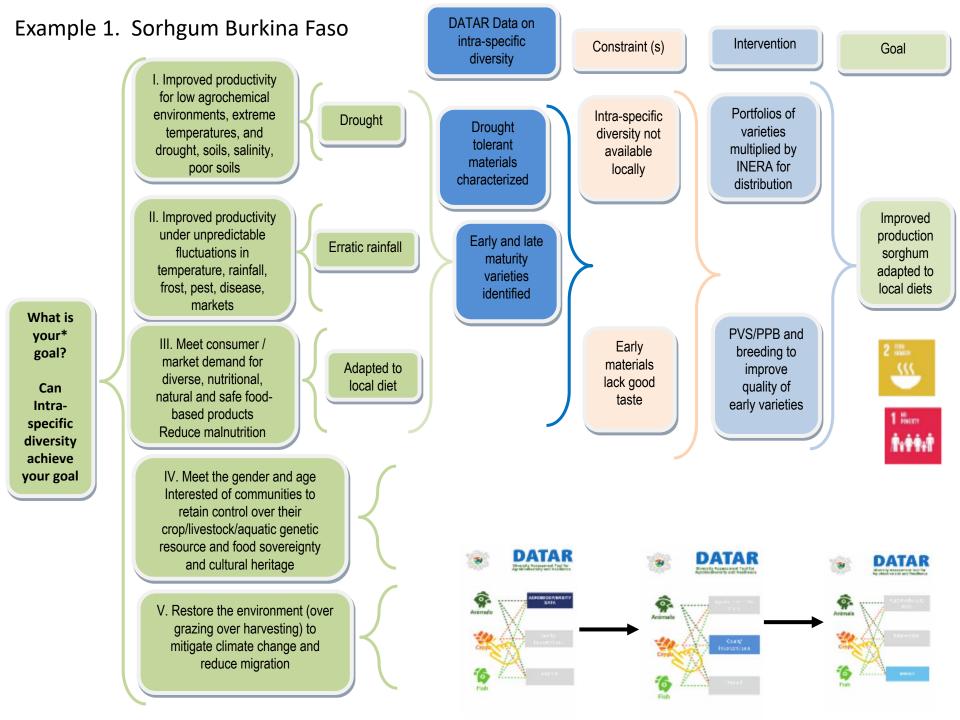


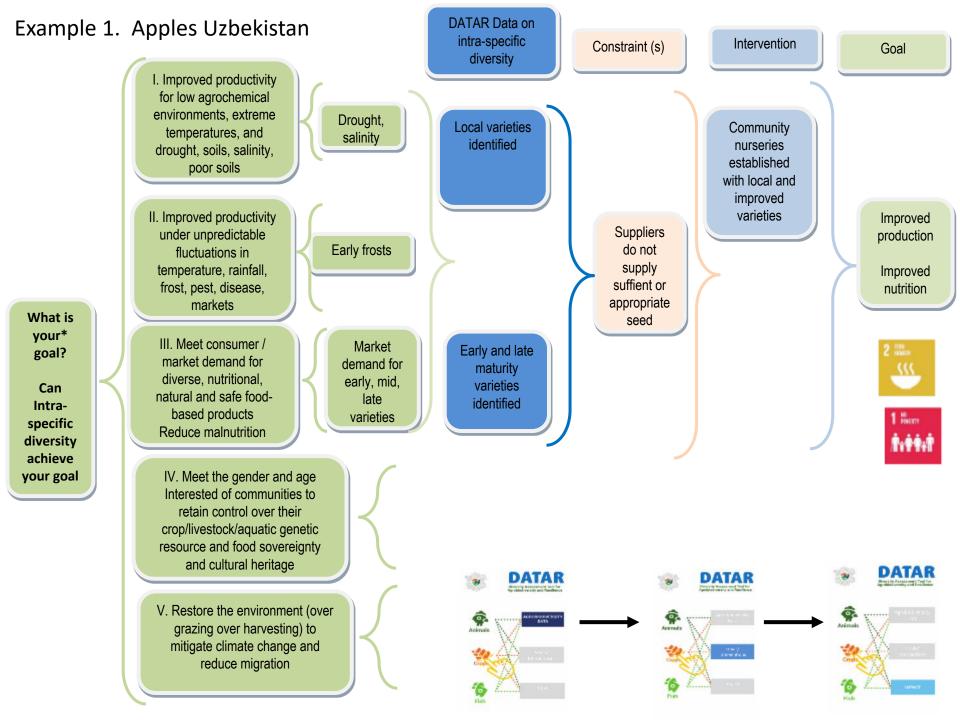
Categories of interventions that we know promotes sustainable use





Examples using DATAR







Intervention Impact

Baseline

1. Diversity Exists Indicators:

- Richness, Evenness, Divergence of varieties
- Richness, evenness of Functional Traits -- so issues of yield, drought resistance...managing under stress (preference traits by gender/age)

3. Diversity Performs/Valued Indicators:

- Richness of equipment to process diverse materials (harvesters that harvest diverse material, processing threshing for diversity materials (gender and age sensitive)
- Diversity of information sources (formal/informal sector (this has a policy component)
- Richness of management options (PPB, PVS Genetic Mixtures)
- Number of IPM, NRM extension packages that use intra-diversity

2. Diversity is Accessible Indicators

Number and diversity of types of Seed suppliers (by gender /age)

Action completed

 Number of varieties supplied by different suppliers (modern/traditional) – suppliers include individual Farmers (by gender and age), community seed banks, seed companies

4. Diversity will benefits target group-gender/age Indicators:

- Number gender and age networks on diversity
- Number of local institutions supporting diversity mgt.
- Number of markets for diversity
- · Reduced middlemen in market value change
- Increased policies supporting the use of intra-diversity
- Number of schools include intra-diversity in course

I. Improved productivity for low agrochemical environments, extreme temperatures, and drought, soils, salinity, poor soils

III. Meet consumer / market demand for diverse, nutritional, natural and safe food-based products Reduce malnutrition temperature, rainfall, frost, pest, disease, markets

II. Improved productivity under

unpredictable fluctuations in

IV. Meet the gender and age Interested of communities to retain control over their crop/livestock/aquatic genetic resource and food sovereignty and cultural heritage

V. Restore the environment (over grazing over harvesting) to mitigate climate change and reduce migration



Development Goal Impact







Thank you!









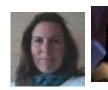




















The team











1



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