

ANNEX 2 FEASIBILITY STUDY COMMUNITY-BASED AGRICULTURE SUPPORT PROGRAMME 'PLUS'

CHAPTER VI: STRENGTHENING FARMING LIVELIHOODS FOR ENHANCED RESILIENCE THROUGH MARKET-BASED APPROACHES

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Annexes:

- MOU
- TORs

Abbreviation and definition of terms

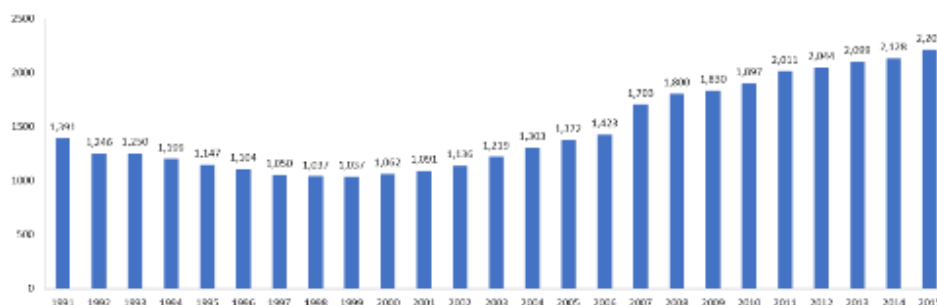
CASP	Community-Based Agricultural Support Project
IFAD	International Fund for Agricultural Development
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
GCF	Green Climate Fund
SWOT	Strengths, Weaknesses, Opportunities, and Threats
GBAO	Gorno Badakhshan Autonomous Region
DRS	District of Republican Subordination
FSC	Food Security Committee under the Government of RT
HACCP	Hazard Analysis and Critical Control Points
MHSP	Ministry of Health and Social Protection of RT
MOA	Ministry of Agriculture of the Republic of Tajikistan
WFP	World Food Program
NBT	National Bank of Tajikistan
GEFF	Green Economy Financing Facility
TJS	Tajik Somoni
PP	Productive Partnership
MCC	Milk Collection Center
FAO OECD	Food and Agriculture Organization Organisation for Economic Co-operation Development
NDS - 2030	National development strategy of the Republic of Tajikistan 2030
NIP	National Investment Plan for Sustainable Agriculture Development and Food Security of RT 2021-2030
ECU	Eurasian Customs Union
EU ECTAP	European Union Enhanced Competitiveness of Tajik Agribusiness Programme
VAT	Value added tax
CIG	Community Interest Groups
VET	Veterinarian
TAU	Tajik Agrarian University
TJ	Tajikistan
OBOR	One Belt One Road programme
Tajstat	Agency on Statistics of the President of the Republic of Tajikistan
GDP	Gross domestic product
WHO	World Health Organization
WTO	World Trade Organization
CIS	Commonwealth of Independent States
LLC	Limited liability company
OJSC	Open joint-stock company
D/F	Dehkan farm - midsized peasant farms that are legally and physically distinct from household plots
PE	Private entrepreneur
Ha	Hectare
VC	Value Chain
PMU	Project management Unit
MOA	Ministry of Agriculture
TOT	Training of trainers
MGF	Matching Grant Facility
SP	Service provider
MOU	Memorandum of Understanding
LPDP	Livestock and Pasture Development Project

Chapter VI: Strengthening Farming livelihoods for enhanced resilience through market-based approaches

I. Agriculture sector

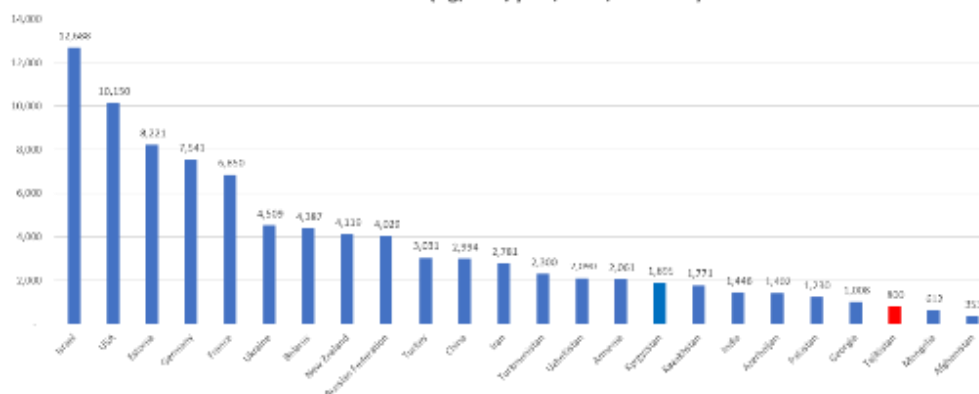
1. Agriculture generates 22.6% of Tajik GDP and employs most of the rural population (45.7% of total population). Since end of soviet union, there has been robust growth in output. There has also been a radical change from collective farming to family farming. There were only 587 farms in 1991 and 123,395 in 2015. 62% of output is produced by households who control 28% of arable land, 32% by Dekhan (family farms) farms and 5% by collective and corporate farms. Pressure on land has increased mainly because of demographic growth with only 0.10 ha of arable land per rural inhabitant in 2015 against 0.21 ha in 1992.
1. While grains and cotton are mostly produced by Dekhan farms, household plots provide 94% of animal production and control 93% of cows. Most of their output is self-consumed or sold informally without real care for food safety standards. Since the end of Soviet Union, there has been a switch from cotton towards wheat. Areas dedicated to fodder crops have also more than halved.
2. Growing wheat does not much sense as Tajikistan is faced with tough competition from Kazakhstan. High value activities such as dairy or vegetable production could ensure better use of its scarce arable land resources which account for only 4.6% of the total territory. Despite the high endowment of pastures, animal production has progressed much less than vegetable production and levels of production per capita are lower than in the former Soviet Union although the numbers are steadily increasing. Poor performance of animal husbandry has been associated with an increase in the number of cattle (1.4 million heads in 1991, 2.2 million in 2015), largely because households use cattle as a “store of value”.

Cattle: number of heads (Tajstat)



3. The combination of high number of cattle and much lower acreage of fodder crops has led to a scissors effect, putting at risk the environment (overgrazing and land degradation) and leading to low yields. Milk yields in Tajikistan are extremely low at 800 kg/cow/year.

Yields of milk (Kg/cow/year, 2014, FAOSTAT)



4. The production of beef-and-dairy is at very low levels. But there are also positive signs with a re-emerging and fast-growing segment of large farms which aim at reaching high quality volume and quality in milk production on the basis of close integration with dairy processors. These modern farms constitute a nucleus for building and disseminating modern practices in animal husbandry.
5. Processors get 50% of their milk from these large farms. The further development of their procurement base will allow them to cope with the increase in domestic demand.
6. The best development model for Tajikistan is fewer animals and better fed animals leading to much higher yields and output. Some consider that the key element in improvement of yields is improvement in fodder and feed. But in current conditions, if there is only more fodder and feed, households will keep on increasing the number of poor quality animals which can lead to multiplication of poor quality cows. Tajik breeders need improvement in their production potential. An effective way to rebuild the genetic potential of Tajikistan is artificial insemination with quality genetic material improving progressively local cows. Currently, the number of inseminations of local cows not owned by large-scale farms is minimal (around 30,000 per year). But there is strong willingness of veterinarians to promote this technology as part of their private activities.
7. Results of pilot projects that have introduced modern genetics through artificial insemination by donor projects such as European Union funded Enhanced Competitiveness of Tajik Agribusiness have proven to give excellent results. In remote and under-used mountainous pastures, better genetics can have immediate effect. But in other areas, the impact of better genetics will be limited if not associated with better access to fodder and feed. The acreage dedicated to hayfields, fodder maize and fodder beets remains much below Soviet levels and needs to increase to put animal husbandry on a better track. For fodder, the biggest constraint now is the massive decrease in the availability of equipment.
8. The main agricultural areas of the country are the Khatlon Region in the southwest, the Sughd Region in the north and the Hissor and Rasht zones in the western and southern parts of the DRS. The CASP+ targeted area are 16 districts of Khatlon, 3 districts of DRS and 2 district of Sughd region. The Khatlon Region has the largest population (2.7 million) and the largest agriculture area accounting for about 52 percent of the agricultural output, with 30 percent of cotton, 45 percent of cereals and about 50 percent grazing for cattle and small ruminants. Sughd Region makes a significant contribution to agricultural production: 29 percent, while the DRS and the GBAO contribute 17 and 2 percent, respectively.
9. Over the last 10 years, Tajikistan has made steady progress in reducing poverty and growing its economy. While the economy grew at an average rate of 7 percent per year the rate of job creation has not kept pace with the growing population, leaving the economy vulnerable to external shocks, and the private sector's role in the economy remains limited, contributing to only 13 percent of formal employment and 15 percent of total investments. Tajikistan's high vulnerability to climate change and natural disasters represents an additional challenge to successful economic management.
10. The current CASP+ project relies on the private sector to play a key role in strengthening and diversifying rural livelihoods. Diversification and shifting of livelihoods to more climate resilient options will decrease reliance on livestock; therefore the project envisages investment opportunities for the smallholders to strengthen their climate resilient production practices and market linkages.

A. Precipitation and calendar of agricultural activities

11. The country has abundant surface water resources, sufficient for irrigated cropping. Glaciers are the main source of water for agriculture, but about 55 percent of the area is rainfed, where cereal crops are sown before the winter and yields mainly depend on rainfall during the growing season. The area planted with cereal and oilseed crops in the rainfed lands of the foothills tends to increase in years with favourable rains. The rains usually start in September and lasts until May, which create optimal conditions for the autumn and spring sowing and for crop growth during the spring months. In years with abundant snowfall, the melting of the snow provides a significant amount of moisture needed for crop growth in rainfed areas. The absence of

precipitation from June to October determines the high dependency of spring crops of the first main season crop and cereals of the second season crop on supplementary irrigationⁱⁱⁱ.

B. Climate change effect on crop production

12. According to Hydromet Tajikistan, the average annual temperature in 2019 in Khatlon was 7 percent higher than its average annual value, while in Sughd and central Tajikistan it was 11 percent higher which lead to precipitation fall by 66 mm in Khatlon and by 28 mm in central Tajikistan compared to the average annual amount. Excessive snowfall in the central part of the country in early April 2020 caused damage to fruit trees as it broke the branches leading to a decrease in yields. Heavy rainfall and cold weather in April 2020 damaged standing grain crops. After an unseasonably warm February, two days of frost at the end of February covered almost all of Tajikistan causing considerable concern among the country's farmers in 2021. This caused significant damage to orchards in the Central and Northern parts of Tajikistan there are above average losses in the orchards that had begun to bloomiv.
13. FAO/WFP food security assessment mission report recommends promoting crop diversification and introducing crop rotation, especially in rainfed areas that are mostly characterized by monoculture of wheat and other cereals as well as increase the use of local crop varieties that are more resistant to unfavourable weather and are adapted to local soil and climatic condition. Improve national seed production system, establish small-scale processing of agriculture products, promote and support farmers to adopt energy and water saving technology for their agriculture practices.

C. Agricultural inputs

Seeds

14. Farmers use seeds purchased from seed farms and agro-shops, while about half of them use their own seed from the previous year's harvest. Parts of the farmers also purchase seeds from the market, which have low quality and unknown origin. This is the main cause of poor germination, increase in diseases and weeds, and low yields. In small farms, seeds are not even treated with fungicides.

Fertilizers, chemicals and machinery

15. Source of fertilizers, chemicals, machinery and fuels are from Russia, Kazakhstan and Uzbekistan. A significant share of the fertilizers comes illegally from neighbouring republics. The most widely used fertilizers are ammonium nitrate and urea, which reportedly contain an average of 34.5 and 46 percent of nitrogen. Fertilizers are mainly used in cotton fields as well as in wheat cultivation. While the basic application of phosphate fertilizers has become rare and potassium fertilizers are not used, the application of nitrogen fertilizers in the spring remains part of the standard agro-technical practice. Soil fertility in household/garden plots and parts of dekhkan farms is restored annually due to the application of manure, while this practice is not feasible in agricultural enterprises where big amounts of manure are neededv.

II. Beef and dairy

16. Private Dekhan farms and households today provide around 24% of total Tajik marketed milk production – of which 44% is contributed by large farms. Overall, demand for dairy products is increasing. As a consequence Tajik dairy factories need bigger volumes and better quality of milk. The highest prices are paid to large farms who are able to produce the best quality milk. Dekhan farms are currently marginal players in animal husbandry because this activity has not been profitable in the past due to lack of domestic demand. As domestic demand is expected to recover in the near future, Dekhan farms could well see an interest in re-entering this sector. Dekhan farms control the most critical part of livestock breeding: the production of fodder (roughage). They have a strategic interest in introducing crop rotations with the inclusion of legumes such as soybeans, groundnuts and alfalfa. And they can use the by-products of their other crops such as straw from wheat or rice, or cotton cake. Finally, fodder maize is an excellent second crop after many of their other crops and in particular after wheat.
17. Today, dairy processors are not very interested to work with Dekhan farmers because they

cannot generate the volume and quality of milk they need. Dehkan farmers need technical support on dairy provided by strategic partners such as dairy processors involved in off-take agreements; financial support with a focus on value chain finance; and institutional support for the organization of smallholders^{vi}. Considering the importance of the sector and the potential for increased productivity and quality, project activities have been designed to improve to strengthen the beef and dairy value chain in the 21 target districts under CASP+. During stakeholder meetings¹ under CASP+ design have raised concerns that they are located quite far from the dairy processors and there is a need for mini scale dairy processing equipment on site. This need was also discussed with a number of processors including Kombinati Shiri Dushanbe, Avicenna milk, Kombinati Shiri Kulob. Kombinati shiri Dushanbe the biggest processor in the country confirmed that their interest in working in 10 of the following districts.

List of potential districts for PP for dairy with Kombinati Shiri Dushanbe					
	Oblast	District	To set up MCC	To set up chilling trucks for collecting milk	Factory has Processing
1	Khatlon	Yovon	Yes	Yes	
2	Khatlon	Jomi	Yes	Yes	
3	Khatlon	Khuroson		Yes	yes
4	Khatlon	Kushoniyon	Yes	Yes	
5	Khatlon	Dangara		Yes	yes
6	DRS	Rudaki		Yes	
7	DRS	Hisar		Yes	
8	DRS	Shahrinav		Yes	
9	Sugd	Zafarabad		Yes	yes
10	Sugd	Mastchoh		Yes	yes

18. However from Sh. Shohin, Baljuvon, Farkhor, Hamadoni, Temurmalik, Panj, Balkhi, Vakhsh are quite far and bringing milk from that far to their processing point has a risk of spoiling and has high transport cost because of long distance. Kombinati Shiri Kulob confirmed that they are looking to increase the milk collection points from nearby Kulob and are interested to take milk from Khovaling, Vose which also leaves the further districts behind. Therefore, under window II CIG matching grant the model of mini scale dairy processing is foreseen for the more remote areas.

A. The pull force of the market

19. According to FAO/OECD, in the next decade 80% of the increase in world consumption of beef and dairy will come from emerging countries where there is strong income elasticity for food, especially better food (animal proteins, fruit and vegetables).
20. In Tajikistan, per capita consumption of animal products fell abruptly in the 1990s because of the impact on household income of the end of the Soviet Union and of the Civil war. It still remains much below former Soviet levels. Levels of consumption of beef per capita in Tajikistan are currently much lower than in most neighbouring countries all together 4.4 kg per year according to FAO statistics 2013. The same applies to milk for which FAO recorded levels of 45 kg/capita/year are also much below the minimum level recommended by WHO. These very low consumption figures reflect the fact that Tajikistan remains the poorest post-Soviet Republic, even though its poverty rate has reduced from 96% of the population in 1999 to 31% in 2015. Reduction of poverty rates is a result of fast GDP growth, the fastest among post-Soviet countries that do not benefit from an oil-and-gas natural resource rent. Due to pandemic poverty reduction paused for the first time in two decades^{vii}.
21. Growth in GDP has impacted the volume and structure of consumption. While in 1999, 87% of

¹ Districts were Hamadoni, Sh. Shohin, Shahritus, Mastchoh,

expenses of households were for food only, and more than half of food consumption was bread. In 2015 the share of food has fallen to 57% of total expenses and bread now accounts for only 34.5% according to Tajstat 2015. This change is partially driven by remittances from Tajik migrants to Russia. Another reason is the USD 200 bn (OBOR) Silk Road strategy of China. Apart from the construction of infrastructure, Chinese firms invest in industry which currently increases by 20% per annum.

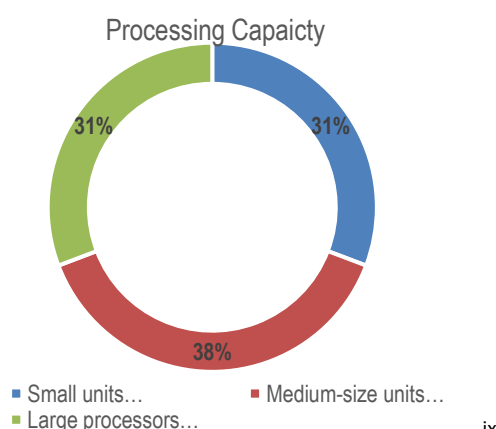
22. In dairy and meat processing, local investors have also increased their official output. But real growth is higher as firms are under-reporting because of an excessive tax burden. Total Tax and Contribution Rate is 65.2% according to the WB against a regional average of 33.4%. Subject to better tax environment, there could be a significant increase of local agro-processing as current volumes produced per capita are small. Only 3% of milk consumed in the country is officially processed by local dairy factories.
23. The pull force of the market is also impacting the quality of produce. Most food products are still sold informally, but modern retail in Tajikistan is growing quickly, following in particular the opening by Schiever TJ of the first hypermarket Auchan. Tajik retailers such as Paykar, Yovar are also learning and raising the bar for their suppliers to meet the demand of their consumers.

B. Dairy value chain mapping

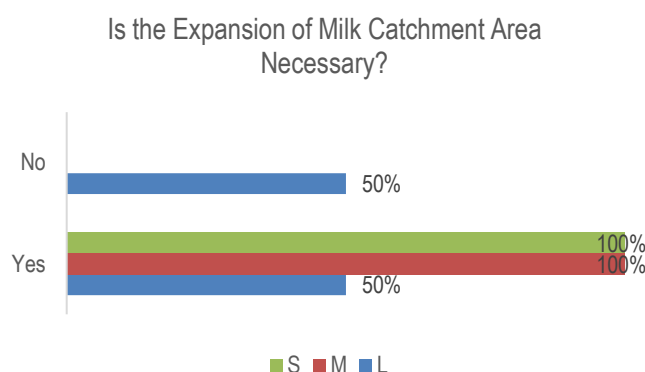
24. Milk in volume is produced by the farming households. Dairies source this milk typically through a middleman. Milk collection is usually done with a vehicle. Milk collection and cooling centres are very rare. Milk produced by farms is cooled on-farm and collected by the dairies^{viii}. Raw milk commercialization rate is extremely low (3%) in comparison with 34% in Kazakhstan, 50 % in Russia.

C. Market opportunities for smallholders

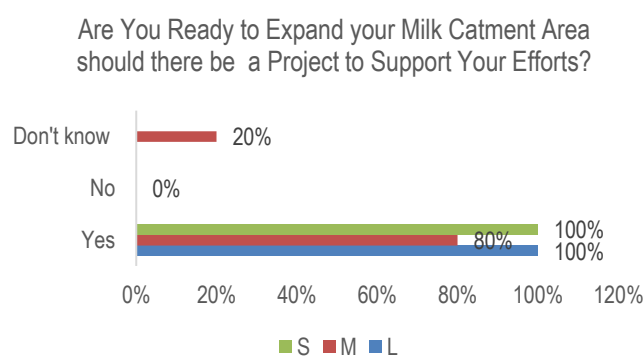
25. Milk processors' location is defined by market vicinity. Raw milk availability within a certain radius is often suboptimal. In fact, most of the processing capacity is located in the cities of Dushanbe and Khujand, some areas of the Sughd Region and some areas of Khatlon region. According to survey conducted under National Investment Plan 2020-2030 on dairy sector number of processors were asked about their capacity needs as well as the sector shortages. All small dairies reported their processing capacity is more or less used during the summer months (over 50% at least). Among medium-size dairies only 40% make use of over 50% of their capacity, while another 20% use less than half of the capacity. Most of the large dairies struggle to source enough raw milk to use full capacity during the year.



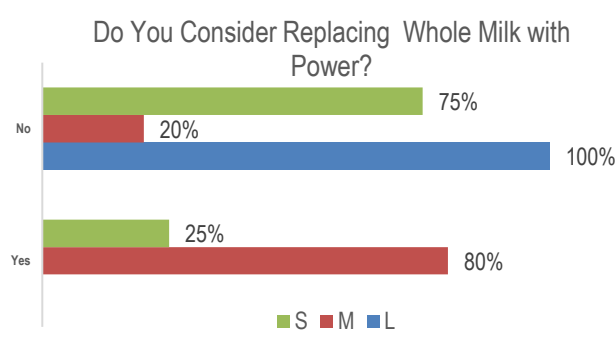
26. Respondents were equally distributed as per their processing capacity: 31% are small-scale processing facilities, 31% - medium-scale, and 38% - large milk processing companies.



27. Most of the dairies see the necessity to expand their milk catchment area. Average distance for milk catchment area for small scale dairy processors of 2 tons is 31 km with average milk delivery time of 40 minutes away. For medium scale processor of 2-20 tons per day is 50 km with average milk delivery time of 2.20 minutes away and large processors with capacity of 20 tons above per day is 63 km with average milk delivery time of -1.55 minutes away.



28. In addition, all large dairies, 80% of the medium-size processors confirmed to have milk catchment area expansion plans. Should there be development projects to support this expansion, companies report to stand ready to take part in this opportunity.



29. Use of milk powder, especially in winter months, is often unavoidable to sustain the production cycle.
30. Most of medium-size processors in fact use milk powder (80% of respondents) and 25% of small processing units. This difference is normal as greater processing capacities require more raw milk, 365 days a year. Small units might have seasonal operations.
31. At the same time, all dairies are ready to replace the use of milk powder by whole milk, if quantities increase and the milk meets food safety norms.
32. The main problems in the supply chain, hindering effective business development and requiring

an early solution, were identified by the respondent companies as the following:

- Insufficient development of milk collection and cooling centers (85% of respondents)
- Limited export potential as a result of non-compliance with the technical regulations of importing countries (85%)
- Inadequate raw milk quality and quantities (throughout the year)
- Ineffective monitoring system of epizootic situation (77%)
- Underdeveloped infrastructure (roads, electricity and water supply) (69%)
- Need to enhance technical competences (69%)
- Limited access to information, knowledge and best practices (69%)
- Ineffective control of food safety parameters of raw milk (62%)
- Obsolete/insufficient equipment (54%)
- Need to improve storage and transportation conditions of products (54%), their safety parameters (77%).

D. SWOT analysis^{xii} for dairy sector demonstrates the following:

Strengths	Weaknesses
Strong cultural reliance on cattle in the village to provide meat, milk, fuel and cash from surplus production	Very small herds (1-4 cattle), local breeds with very low milk yield potential
Beef animals provide a way of saving for one-off purchases or events like marriage	Poor feeding of cattle especially in the winter
Strong market demand for dairy products	High seasonality of milk production
Private VET association functioning. They have in many villages clinics, AI point, supply of vaccines and medicine and an active private VET. Good experience in training vets on feeding, housing, diseases and breeding. They closely cooperate with the public VET system.	Poor milk quality due to poor hygiene and hand milking
Increased demand for packed dairy products in shops. Supply of concentrate feed is increasing	High collection cost of milk for dairies
	Low amount of refrigerated milk tanks in the village
	No effective extension service
	Very low mechanisation
	Low profitability in processing and limited products and overall lack of hygiene standards like HAACP.
	Farmers have limited land and so fodder crops compete with food crops
	Transport network is limited, also due to its geographic landscape, in quality and capacity, constraining access to markets. The transport infrastructure is largely outdated;
	The logistic performance is assessed very low;
	A lack of modern fleets, facilities and quality logistics service providers hampers business;

Opportunities	Threats
<p>Political willingness to develop the segment</p> <p>Generally high (underused) capacity of dairy processors who want to increase volumes to use capacity more</p> <p>Good export potential to China which mainly uses (discredited) milk powder to reconstitute dairy products</p> <p>Refrigerated bulk tanks in villages can greatly improve milk quality and encourage farmer groups as a 'quick-win'</p> <p>Improved forage quality can make 'quick-wins'</p> <p>Improved genetics through AI can improve yields a lot</p> <p>Improved feeding of beef cattle (quicker fattening) will leave more forage for dairy cows</p> <p>Improved knowledge in local service providers can improve profitability on farms</p> <p>private VETs to develop as livestock advisors combined with vet and supplier AI.</p>	<p>Poor milk quality will limit increased sales and distribution – poor hygiene and lack of pasteurisation can cause health and other risks</p> <p>Poor cold chain logistics will further deteriorate milk quality</p> <p>Processing factories develop their own production units / farms for producing supply of milk. High quality and production. Potential risk/competitor for the small milk farmers and often will fail due to poor management</p>

33. The CASP+ dairy value chain activities will support 21 districts and increase productivity by organizing 8 PA to link with processors and demonstrate a model of collaboration between small producers and the market. For the remaining districts that are further from the processing facilities, the plan is to establish Community Interest Groups that will be willing to set up their small-scale dairy processing for 100-300 litres per day to cover their own local market demand. The matching grant under window II foresees an opportunity for dairy processing that is located far away from the processors and have identified local market demand with providing employment opportunities for youth and women in particular. The CIGs will be established with consideration of their experience in the sector, identification of their uniqueness; they will be trained and capacitated in managing the farm as a business. They will get support to be linked to the market.

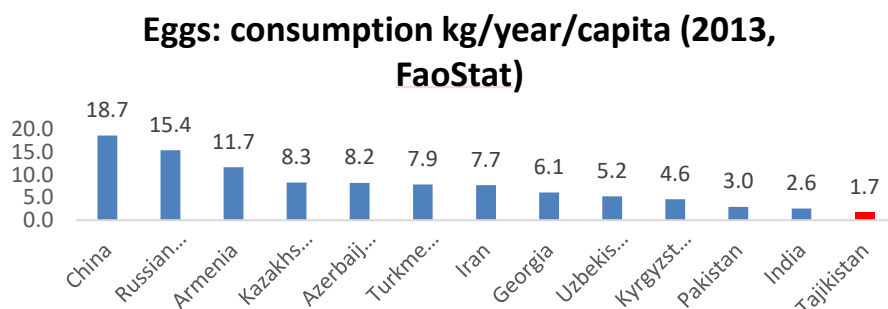
E. Processing equipment dairy

34. Small-scale dairy processing equipment is intended for the processing of 100-300 litre milk per day into production of the main types of dairy products: 1. pasteurized milk, 2. kefir, 3. classic sour cream, 3. tvorog, 4. kaymak. The equipment could include Self-priming pump, filter, centrifugal pump, storage tanks, pasteurization plant, separate, cream container, packaging equipment, milk testing equipment, mini dairy processing plant equipment costing around USD 25000-30 000.

III. Current situation of the poultry and egg sector in Tajikistan

35. After the end of the Soviet Union, output of eggs and poultry meat collapsed in Tajikistan. Despite a rebound after the Civil war, egg production remains 25% lower than in former Soviet Union and egg production per capita 50% lower. The situation is improving for broilers with developing industrial production facilities in Yavan, Khujand, Gulistan, Muminabad soon in Danghara. According to TajStat, out of 5.052 million poultry birds in 2016, 26% were owned by corporate farms, 67% by households and 7% by Dekhan farmers. Corporate farms are much more productive and provide for 51% of eggs, against 46% for households and 2% for Dekhan farms.
36. In the last decade, productivity for eggs has substantially increased and with new support from government increasing, there are very big productivity gaps between Sughd, where productivity has reached quite high levels, and RRP and Khatlon, where new productivity gains could be easily reached. According to FaoStat, yields in Tajikistan remain much lower than in most close-by countries. But improvements in RRP and Khatlon could give Tajikistan a chance to be closer to advanced countries.

37. Consumption per capita of meat (poultry and other) and eggs have followed a similar trend as output. Current levels remain much lower than in former Soviet Union despite a 20-year rebound. According to Faostat, Tajiks eat only 3.25 kg of poultry per year, ten times less than in Iran and six times less than in Kazakhstan where consumption of poultry goes to 18.6kg. Tajikistan, as well as Uzbekistan, have not yet experienced the poultry consumption boom of other countries in the region such as Azerbaijan or Kazakhstan. The same is even more striking for eggs for which Tajiks eat ten times less than Chinese and three times less than Uzbeksxiii.



38. After a strong rebound at the beginning of the century, Tajik consumption of eggs per capita has stagnated around 1.7 kg per year according to TajStat. Even though consumption of poultry remains very low, it is much higher than current local production. According to ITC, there has been a net contraction of volumes of imports between 2014 and 2016, reflecting the link between household income, remittances and consumption. Frozen legs (okorohki) make for 86% of total imports of poultry. There is virtually no import of healthier fresh products. Despite also extremely low consumption levels, production of eggs also remains much lower than consumption. And based on TajStat statistics, net imports of eggs account for 43% of local consumption. Another key component in the poultry food equation in Tajikistan is the import of sausages, mainly from chicken meat. Due to the emergence of local processing factories, which before used imported poultry by-products, their imports have contracted from USD 9.5 million in 2008 to USD 3.2 million in 2015. Due to import substitution in sausages and to a lesser extent in eggs, and to the impact of the Russian crisis on poultry and egg consumption, there has been a contraction of net imports of poultry products estimated by ITC from USD 45 million in 2016 to USD 35 million in 2017.

A. Poultry value chain

39. The Government of Tajikistan has recently decided to make poultry meat and egg a key sector in its strategy of economic diversification. There is a growing demand in poultry consumption due to increase in remittance income. The aim is first to substitute imports but also to eventually export to neighbouring countries such as Afghanistan. To achieve this aim, Government of Tajikistan has put in place in February 2016 specific tax exemptions: poultry farms and producers of mixed fodders are now exempted from paying value added tax (VAT), income tax, road tax and real estate tax for a period of six years. Meanwhile, Government has taken stronger control of imports by banning the entrance of products and by-products of dubious quality as part of a national strategy of improved Food Safety. At macro-economic level, results have already been visible with an industrial growth of more than 20% in 2017 allowing for an impressive GDP growth of 7.1%. Tajik producers of poultry are expected to benefit from vibrant domestic demand in the future, in particular for fresh poultry meat whose local availability is small, and from low cost for feed, which makes up for nearly 70% of poultry and egg costs worldwide.
40. Tajik promotion strategy for poultry meat will work only if it is based on a holistic approach of the value chain, from input providers to the requirements of high quality by the final consumers which would force producers to adhere to strict Food safety standards. The example of countries in the European Union, the United States, and Turkey shows that the contractual farm model linking large integrating groups for inputs and processing with contracted family farmers can be extremely effective economically and environmentally. Tajikistan is still in the bottom

league in terms of yields and production efficiency. And there are few producers of broilers for which massive reconstruction work is needed.

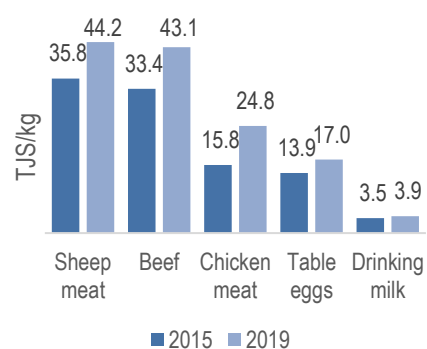
Perspective of indicators of the Poultry Development Program for 2018-2022.

No	Items	Measure unit	2018	2019	2020	2021	2022
1	Number of hens	thousand head	6249,3	6509	6864	7392	7920
2	Including egg direction	thousand head	2693,2	3207	3491,2	3913,6	4336
3	Production of eggs	million pieces	694,4	1457,5	1578,9	1700,3	1828
4	Eggs from 1 head	pieces	240	276	287	288	289
5	Production of meat	ton	565	37700	45230	49000	64080
6	Selling hens	ton	1310	2148	2265	2439	2614
7	Purchase 1-day chicken, total	thousand head	181	203,5	221	274,5	280
	Egg direction	thousand head	70	71,5	77	82,5	88
	Meat direction	thousand head	101	132	144	192	192
8	Production of chickens from laying hens	thousand head	-	20632	23672	25568,6	32673
	Egg chickens	thousand head		5481	5655	5913,6	6336
	Meat chickens	thousand head		15151	18017	19655	26343
9	Requirement for mixed feeders	thousand head	230,93	325,85	355,40	385,32	442,56
	Egg chickens	thousand head	226,1	237,3	250,3	269,6	289,1
	Meat chickens	thousand head	2,83	88,55	104,90	115,52	153,46
10	Processing of chicken meat	ton	350	23374	26043	30380	39730

B. Future prospects: towards a consumption boom of poultry and eggs in Tajikistan

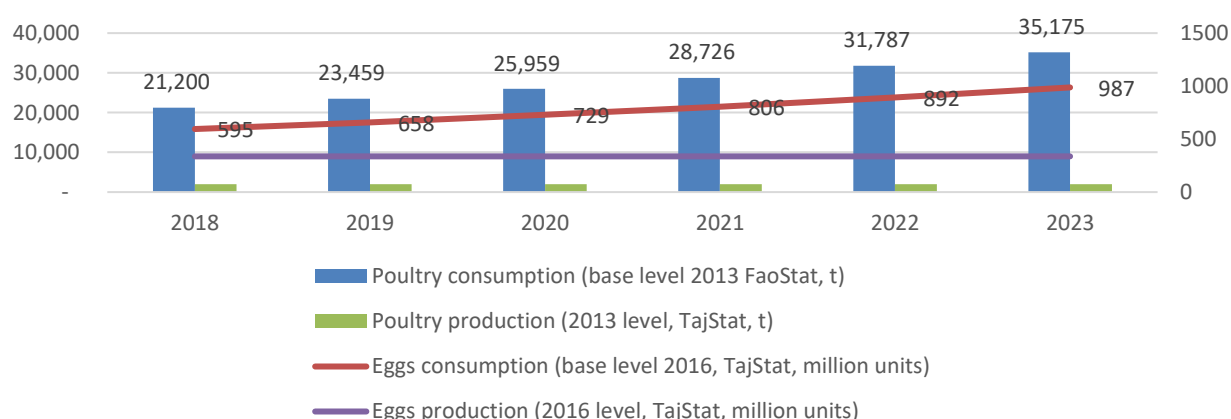
41. The still very low levels of meat and egg consumption in Tajikistan which reflect the fact that it's GDP per capita remains the lowest among former Soviet Union countries. Consumption of poultry is also hampered by relatively high prices compared with other meat: currently frozen poultry costs 37 TJS/kg (filets 38 TJS and legs 36 TJS), against 74 TJS for fresh beef and 85TS sheep, while in global markets poultry costs half of beef and one-third of sheep.
42. Consumption of livestock products is closely linked to incomes. In the last decade, the engine of growth in Tajikistan has been remittances from Russia. They have drastically contracted in 2015-2016 before strongly rebounding in 2017. From 2005 till 2013, household income in USD equivalent was multiplied four times. Despite recent devaluations it remains twice as high as in 2005. At the beginning of the coming decade (2020-2025), we can expect a slow-down in consumption of red meat, stability in consumption of dairy and increased consumption of poultry. However, as the economy recovers from the pandemic and continues to grow, all animal products will feature strong, steady growth. The current recommended norms of the Ministry of Health of Tajikistan prescribe 115 kg of dairy per person per year, 40.8 kg of meat and meat products (all meat types) and 180 pieces of eggs.
43. Between 2015 and 2019, chicken meat prices went up by 57%, beef - by 29%, mutton by 23% and table egg by 22%. Drinking milk had the lowest growth in consumer prices (11%). As consumer prices rise, sources of proteins will shift towards cheaper options like poultry and dairy^{xiv}.

Figure– Consumer Prices of Animal Products in Tajikistan 2015-2019



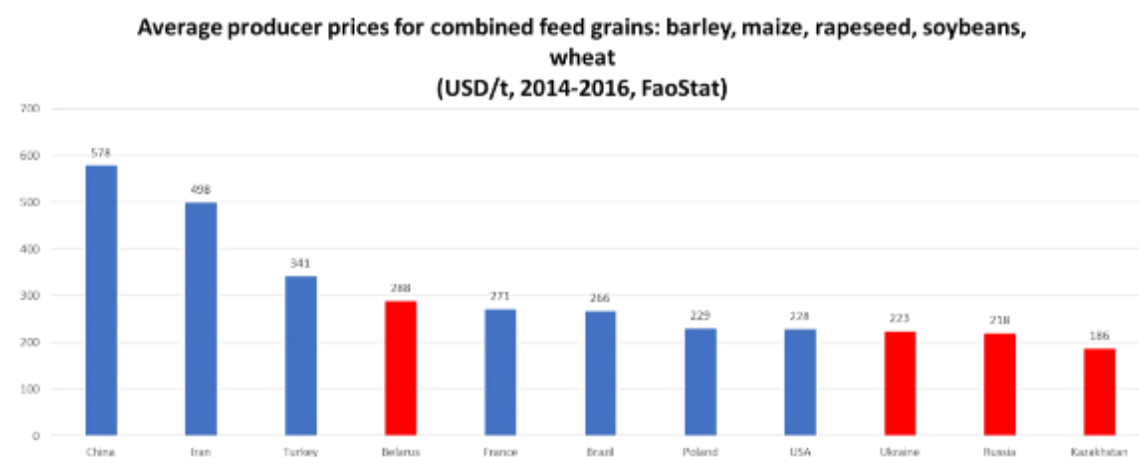
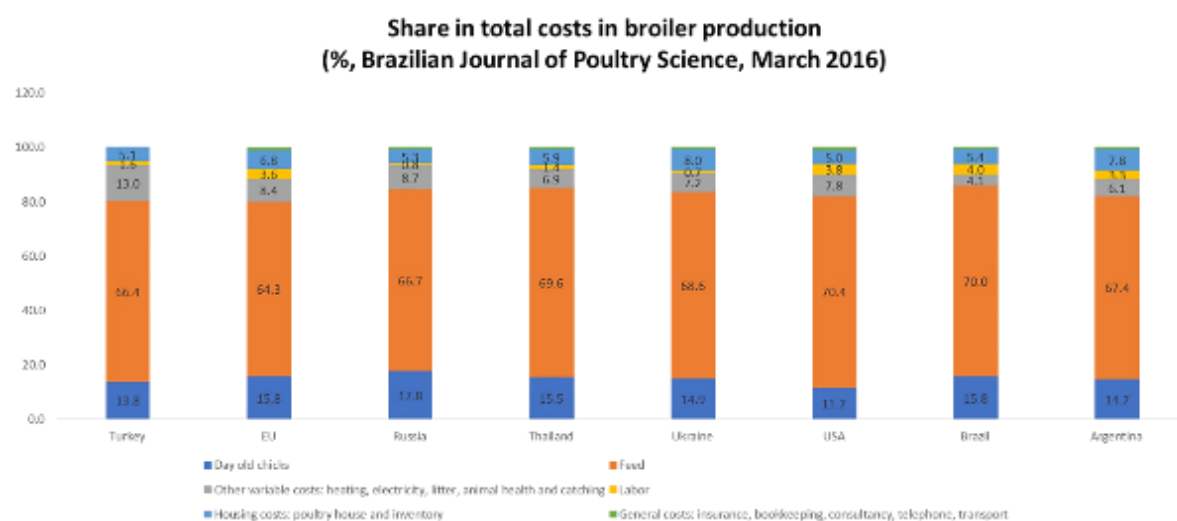
44. Faced with a massive contraction of inflows from Russia after 2014, Tajikistan has managed to adapt and promote economic diversification thanks in particular to Chinese investment in industry, whose growth rate is currently over 20% per year. Mining and energy generation are particularly dynamic. Beginning in 2019, the Roghun dam, which eventually should be the tallest in the world, will generate large volumes of hydroelectricity. The future of Tajikistan is also linked to gigantic Chinese Silk Road investments in infrastructure (the USD 200 billion One Belt One Road OBOR programme) which improve the connectivity of Tajikistan and reduce its current very high international transport costs. Friendly relationship with Uzbekistan will help Tajikistan become a regional hub, in particular for transit and export of energy, therefore it is expected GDP growth to remain steady.
45. Based on these factors, local demand for poultry is expected to reach 35,175 t by 2023, and demand for eggs 1 billion units. To stabilize imports at the current already high levels, Tajikistan will need to produce nearly 14,000 t more poultry than today and 400 million eggs more. According to the Ministry of Agriculture of the Republic of Tajikistan last year poultry farms produced 983 million eggs. However, he stressed, in order to fully meet the needs of the population, it is necessary to produce 1.6 billion eggs per yearxv.

Forecast levels of consumption of poultry and eggs and current production levels (TajStat, FaoStat estimates)

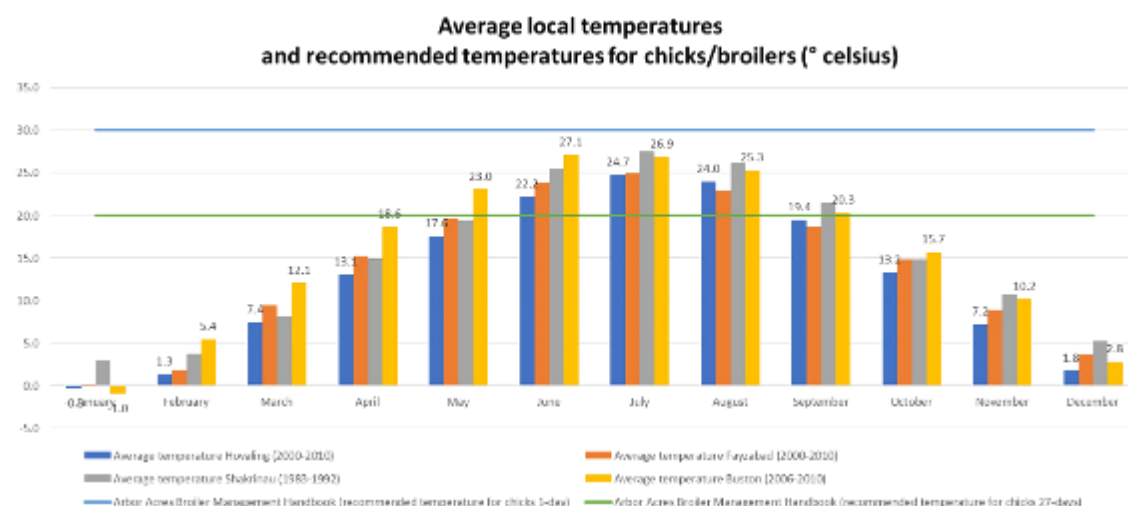


C. Can Tajikistan achieve these results in a sustainable way?

46. Tajikistan has committed to a very low level of tariff protection in WTO contrary to Turkey and members of the Euroasian Customs Union whose production costs are much higher than in Ukraine and in the Americas. It must therefore try to achieve low production costs for broilers and egg production beyond trade “control” measures which can only be temporary. Feed makes up usually at least two-third of the costs of broiler production, followed by genetics. Labour costs for which Tajikistan has comparative advantages makes up 4% of total costs.
47. As of today, Tajikistan sources most of its bird genetics from Russia and Uzbekistan. Its costs of genetics will probably remain on the higher side. The Americas and Ukraine have clear comparative advantages in terms of costs of feed. Producer prices at farm level for combined feed grains, on average, are already much lower in Kazakhstan, Russia and Ukraine than in the Americas, the European Union, Turkey, Iran and China. This means that these countries and their immediate neighbours have potentially a huge comparative advantage for poultry production. Decrease of transit costs through Uzbekistan will push for a strong decline in local grain prices, including for protein grains such as soybeans for which there is also potential for local production. As there is no import tariff and VAT on these inputs from CIS countries, Tajikistan could become quite competitive for the feed component of the poultry and egg sector.



48. Other variable costs including heating or cooling play a big role in countries such as Turkey (extreme temperatures and high cost of electricity) or Russia. Contrary to other CIS countries, average external temperatures of Tajikistan are largely in the optimal 30°-20° bracket for poultry production, especially in mountainous areas which are better protected against heat waves.



49. With the commissioning of Roghun, availability and prices for electricity will be optimal, including in winter time.
50. Taking into account all these factors, and the already proven technical capacity of some Tajik businessmen in the egg sector, Tajikistan could potentially become and remain competitive in poultry and egg production. The domestic market will be the first natural target for local producers. Tajikistan could also become eventually a key provider of fresh poultry products to neighbour countries such as Afghanistan (import tariff of 5%) and Western China.
51. Modern poultry industry globally is more and more characterized by vertical integration whereby a single company (the "integrator") owns the facilities and controls the breeding, hatching and processing of broilers, but contracts with private poultry farmers for the raising of the chicks. The integrator owns the birds and provides feed, medication and other supplies. The grower, often a family farmer, owns the chicken house and provides litter, labour and utilities. In the US, 60% of poultry production was already under contract farming at the turn of the century, with integrators Pilgrim's Pride Corp. or Tyson Foods, Perdue and Sanderson Farms making up for more than 50% of poultry production. The model of integrators/contract farmers has largely and successfully been replicated in the European Union and in Turkey, often with cooperatives as integrators. Apart from its capacity to transfer technology, inputs and know-how in a very effective way, the model of integrators/contract farmers can effectively reduce the share of the informal economy in a highly food safety sensitive sector.
52. Within the framework of the CASP + design several broiler producers have been approached such as Pokiza processor of poultry meat to sausages with 3000 selling points for their fresh poultry meat, Yavan broiler producer Behamto, Parandaparvari Mastchoh-egg producer. Pokiza has registered their interest to work together with the project's CIGs. Currently they are working directly with smallholders who have the capacity of caring for at least 1000 chicks to be grown into broilers within 40-45 days. The processor recognizes there is potential for more production and with working with smallholders they do see the benefit of both growing better chicks and involving communities in income generation activities.
53. The company provides their meat-breed chicks, inputs, quality check and training. The farmer who plans to work with the aggregator needs to undergo 40- day training in the breeding farm of the aggregator where they practically take care of the chicks from the first day until the delivery to the slaughter house and learn all the aspects of broiler breeding. In the model used, the aggregator provides training free of charge for the benefit to the farmer. The aggregator deducts the cost of chicks, inputs and pays the rest in cash to the farmer. The aggregator so far has also organized delivery of the broiler to the slaughter house. 1000 chicks within 45 days give 2.5 tons of white meat. Considering the cost of feed per chick, price of chick, cost of quality monitoring checks the farmer can receive 10 000-12 000 TJS per 2.5 tons of meat every 45 days.
54. The Aggregator makes a contract with a farmer depositing their asset (land, barn, means of transport, small scale agriculture equipment) as collateral for ensuring the farmer takes the business seriously and does not neglect and sell the feed or chicks to somebody else or utilize feed for their household consumption. Based on the experience in the field they had to bring this into the contract since there were cases the family members mismanaged the feed and sold it to cover family issues such as wedding or taking family member to a hospital, therefore collateral is important part for the smallholder to use their own resources and treat the inputs provided by the aggregator as the basis for successful broiler production. Aggregator has raised concern that there are not many smallholders who have proper room for growing the broiler. The breeder/farmer would need to have a space of 100-300 square meters which must be dry, clean, draft-free location, possibility to keep the room warm, have temperature regulator, provide water, monitor feeding, get the right bedding, provide transition housing and follow the instruction on the broiler breeding to ensure quality. The investment cost of the modernization of the barn can vary depending on materials and the condition of the barn. The broiler house needs to have proper lightning, ventilation, feeder, drinkers, heater in winter. The maximum costs for establishing equipment for the broiler room is estimated between 2.5 USD per chick in total 2500 USD per 1000 chicks for 100 square meters.
55. The project can support in establishing community interest groups that prefer to build or

modernise their barns into potential broiler raising rooms. The project can facilitate linkages to the aggregator that already has experience in working with smallholders and has established meat selling points. The processor also has sausage factory which also requires poultry meat for processing. The main technical requirement the processor has toward the farmer is that they receive full training and strictly follow technological process to ensure the quality of the final product. This is ensured through quality checks and monitoring visits every two weeks to the sites they work with. Meetings during the design process confirmed the processor interest in working in DRS districts. The slaughter house of the processor is located in the outskirts of Dushanbe and potentially they are looking to work with smallholders that are within a radius of 60km from the capital.

IV. Value chain opportunities

56. For the targeted district a short analysis of the growth potential and climate risks was undertaken. Based on the issues raised during the stakeholder meetings in relation with agriculture practices, climate related concerns, a number of models were proposed for the Community Interest Groups under window I and window II. A summary of issues associated with agriculture production and climate risks were discussed with stakeholders and several potential models were presented to address the concerns. The issues identified included the following;
57. Climate change effects the agriculture production and current available seeds do not give proper yields, not adaptive to current climate situation in the district
 - Drought does not allow to plant in some areas of the district, example orchards and planting land
 - Low level of water in river for irrigation
 - Lack of water in village for land irrigation
 - Lack of seasonal vegetables and high price for tomatoes and cucumbers and green vegetables during winter
 - Spoilage and waste of vegetables because of absence of storages or processing
 - Rehabilitation of orchard (most are 50 years old and productivity is very low)
 - Land erosion and need to rehabilitate forest with rosehip bushes
 - Extreme heat that spoils their fruits and vegetables, all fruits and vegetables ripen at the same time and loss of harvest takes place due to lack of processing, storage
 - Lack of agriculture equipment, most work is done manually by men and women
 - Lack of high -quality seeds
58. Waste of fruits due to lack of equipment for drying or processing of fruits
 - Due to lack of rain and water forests dying out
59. Lack of land
 - Lack of feed in winter

A. Summary of Solutions provided by stakeholders:

- Provide drip irrigation
- Provide knowledge and means, trainings to start poultry breeding
- Make small agriculture equipment available
- Provide dairy processing equipment (sour cream, kaymak, yogurt, cheese)
- Provide vegetable and fruit processing equipment and packaging equipment
- Provide confectionary equipment to start bakery business utilizing their milk and fruits
- Provide technical knowledge and consultation and advisory for access to market and business skills (branding, certification, mobile cold logistic equipment to reach other markets)

- Provision of greenhouse to set up early tomato and cucumber production to take advantage of high prices seasonal vegetables
- Provision of modern average size cold storages energy saving technology
- Mini processing equipment for butter, dairy
- Drying fruit & vegetable facility and processing workshops
- Improved technology of canning for warm climate
- Provide technology of drying onion and carrots and other vegetables (packaging)
- Provision of modern average size cold storages energy saving technology
- Beekeeping
- Set up feed processing workshop (maize milling machine, equipment to prepare mix fodder for small and big cattle and poultry)
- Oil processing plant (flax, sesame, sunflower)

#	Oblast	District	Potential value chains	Opportunities	What they need	Risks	Company	Scope of activity
1	Khatlon	Kulob	early tomatoes and cucumber, wheat, cotton, apricot, pear, persimmon	there is 1 ha greenhouse where possible to teach smallholders about tomatoes and cucumber, greens, grow seedlings for vegetables	greenhouses, quality seeds, establishing proper linkages to market, sales of agri products, phytosanitary services, cooling transporting truck for fruits and vegetables	not availability of materials and if its not delivered on time, risk of losing harvest, bad seeds can bring more root disease, bacterial diseases, withering, hail destroys fruits, low continental location	LLC dairy factory	Dairy
							LLC Saman	Egg production
2	Khatlon	Sh. Shohin	high hills, potatoes, apple pear, mulberry, walnuts is developed by itself, very well developed dairy production since there is good grass available	to increase nurseries for apples, pear, potato seeds to be sold to Kulob, for now it is brought from Pamir	reconstruction of seed storages for potatoes until sales time, quality seeds, for nursery quality breeding materials and seedlings for apple, pear, walnut that give yield earlier-semi intensive with early yielding, phytosanitary services, cooling transporting truck for fruits and vegetables	Continental climate, fast freezing at evenings- to foresee warming in evenings, against hail- to provide anti hail nets for nurseries, and seeds, nurseries are brought from Pamir, risk for cattle breeding- lack of land for grazing	LLC Hazor Ispand	Processing of mulberry and natural herbs, production of almond oil
3	Khatlon	Vose	cotton, persimmon, sanjid, unabi for medicinal herbs, small cattle they have grazing space	salt production for animals and humans to iodize, the biggest salt reserve in the world	increase veterinary services, packaging and iodizing salt processing equipment for animals and human consumption, phytosanitary services, cooling transporting truck for fruits and vegetables	too hot and risk of disease spreading for animals and insects spread very fast		

#	Oblast	District	Potential value chains	Opportunities	What they need	Risks	Company	Scope of activity
4	Khatlon	Baljuvon-unhills, arable lands	potatoes, apples, pears orchards, walnuts, little and big cattle production, horse production	wheat, sesame, flax, watermelon	quality seeds, seedlings for orchards, develop veterinary services, phytosanitary services, cooling transporting truck for fruits and vegetables	early spring- fast freezing, draught, locust		
5	Khatlon	Farkhor- low land	cattle breeding, vegetable breeding, tomatoes, cucumber, carrots, onion	there is water in river but the water needs to be brought to the lands, plum, apricot orchards, possible to grow sesame, flax, sunflower, fodder beet	to dry process, package plums, apricots, peach, phytosanitary services, cooling transporting truck for fruits and vegetables	too rainy in spring might be flooding, becomes too hot very fast in May, need to plant very early	LLC D element	Egg production
							LLC Shukrona	Dairy products
6	Khatlon	Dangara	cotton, vegetables, pumpkin, watermelon, melon, corn, sunflower, apricot-10 000 ha of apricot, cattle breeding big and small and horses- lots of pastures	processing of fruits, sales for fresh fruits and vegetables, fodder beet, sugar beet	quality seeds, organic mineral fertilizers, market linkages, processing equipment, chemicals, agro fertilizers, phytosanitary services, cooling transporting truck for fruits and vegetables	draught for the pastures	LLC Shiri Danghara	Production of dairy products
7	Khatlon	Hamadoni-bordery region	vegetables, apricot, grapes, pumpkin, watermelon, melon, onion	there is a lot of water via rivers, possible to establish greenhouses, grow tomato and cucumbers- its not getting to cold in winter	quality seeds, quality agro chemicals, disease management, phytosanitary services, cooling transporting truck for fruits and vegetables	too hot , need to manage diseases, need to manage planting on time according to the calendar	LLC Sayod 2010	Poultry-breeding
8	Khatlon	Khovaling	cattle breeding, apple and pear orchard, potato growing	have lots of pastures	quality breed of animals, phytosanitary services, cooling transporting truck for fruits and vegetables	disease management for animals, possible to get cold very fast to have measures to protect crops		

#	Oblast	District	Potential value chains	Opportunities	What they need	Risks	Company	Scope of activity
9	Khatlon	Temurmalik-arable land no water	cereals, legumes, pulses, cattle breeding since they have wide pastures	possible to improve breeds for animals, process milk, establish apricot orchards for irrigated lands	to organize MCC to sell to processors or process their own milk, phytosanitary services, cooling transporting truck for fruits and vegetables	draught, animal diseases management since vet sanitary needs to be on high quality, too hot		
10	Khatlon	Panj	lemon, cotton, vegetables- onion, carrots, tomato and cucumber, pumpkin, watermelon, melon, cattle breeding	good quality soil, organize logistics for selling to markets,	quality seeds, high breed animals, quality lemon seedlings, agro chemicals, phytosanitary services, cooling transporting truck for fruits and vegetables	sometimes get too cold in spring, if seeds are low quality there might be loss of harvest that was planted in fall, do seeding and planting on time for this climatic zone	D/F Panj	processing of agricultural products
							CJSC Caroi Kamar	cotton fiber processing and oil production
11	Khatlon	Yovon	cotton, orchard for apricot, grapes, peach, vegetables, cattle breeding	fodder beet, lucern corn, sunflower as a crop rotation and feed for animals, have potential for MCC to collect milk,	establish MCC, veterinary services, market linkages, quality seeds and agro chemicals, phytosanitary services, cooling transporting truck for fruits and vegetables	land erosion is on very high level because of underground water, soft soil	Commercial cooperative Mirzoi Nuri Abob	Horticulture, and fruit and vegetable processing.
							LLC Shiri Sorbon	Dairy production
							LLC Broiler producer Behamto»	Chicken meat production
12	Khatlon	A.Jomi	early apple orchards, grapes, plums, cotton, vegetables, cattle breeding, tomatoes and cucumber also	increase orchard locations, intensive orchard, increase intensive orchard nurseries, processing fruits to juice	quality seeds, agro chemicals, better breed for animals, vet services, phytosanitary services, market linkages for selling produce, phytosanitary	land erosion is on very high level because of underground water due to not properly	Commercial cooperative Odinakhon	Production of natural oils

#	Oblast	District	Potential value chains	Opportunities	What they need	Risks	Company	Scope of activity
			seasonal greenhouses		services, cooling transporting truck for fruits and vegetables	following agricultural works		
13	Khatlon	A. Balkhi	Lemon, cotton, peach, cattle breeding, early tomato and cucumber in greenhouses lemon nurseries, onion, carrot	process of fruits, grapes, tomato processing, greenhouses sales, processing of carrot to juice to further sell in and out of country	quality seeds, lemon seedlings, processing equipment, cold trucks for logistics, agrochemicals, phytosanitary services, vet services, cooling transporting truck for fruits and vegetables	springs are too cold and end of spring fast heat,		
14	Khatlon	Kushoniyon	apricot, strawberry, tomato and cucumber, lemon, grapes	expand lemon and vegetables, expand apricot orchards	processing of apricot in particular drying, linkages to market, quality seeds and seedlings, agro chemicals, phytosanitary , cooling transporting truck for fruits and vegetables	disease management, proper seeds	Productive cooperative Behbudi	Production and processing of fruits and vegetables
							Commercial cooperative Bakht	Horticulture and apricot production
							LLC Kahramon	Processing of dried fruits
15	Khatlon	Vakhsh	strawberry, lemon, apricot, tomato, cucumber, cotton, other vegetables, peanut	packaging, processing	quality seeds, seedling material for strawberry- high breed varieties, cooling transporting truck for fruits and vegetables	F1 first generation of seeds,		
16	Khatlon	Khuroson	apricot orchard, grapes, plums, cattle breeding	cattle breeding, expanding orchards for plum, apricots, drying of fruits	processing equipment for drying, packaging, and selling, high breed insemination, cooling transporting truck for fruits and vegetables	weather gets cold very fast and get warm very fast, utilize chemicals to delay flowering	LLC Saodat	Dairy production
17	DRS	Gisar	orchards apple, grapes, pear, vegetables- potatoes, onion, early	wide pastures, improved varieties of nurseries for apples and pear, develop	marketing, sales, transporting cooling trucks, quality seeds, quality seedlings, cooling	gets colds fast, hail, many rains at the same time, manage channels during rain	Dairy processor	LLC Azamat, PI Rukhsor

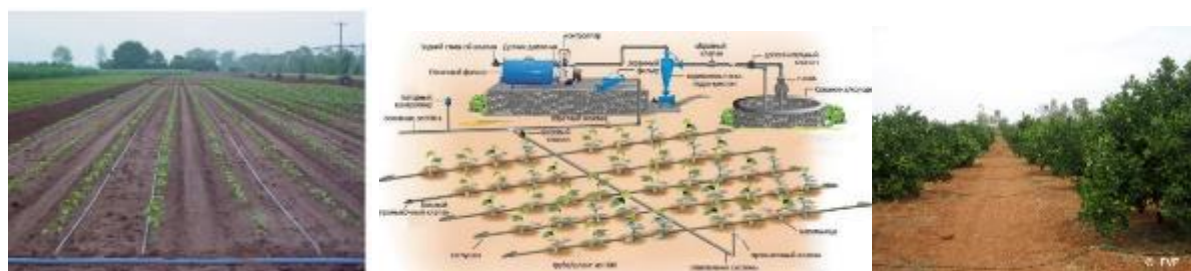
#	Oblast	District	Potential value chains	Opportunities	What they need	Risks	Company	Scope of activity
			tomatoes and cucumbers, big cattle, small cattle	nurseries for intensive orchards	transporting truck for fruits and vegetables			
18	DRS	Rudaki- unhill and valley part	valley- cattle, vegetables, melon, uphill's- orchards grapes, apple, strawberry and pear- greenhouses yeah long	transporting , summer pastures, winter pastures, access to Dushanbe market, improve breed	organize sales of melon and watermelon due to heavy transportation, quality seeds, vet services improve, phytosanitary services, cooling transporting truck for fruits and vegetables	if bad quality seed comes they can loose their harvest, too cold in spring- need to use chemicals to delay flowering		
19	DRS	Shahrinav	lemon, grapes, apple and pear, cherries, cattle breeding-dairy, strawberry, vegetables, peanut	processing of milk, processing of strawberry- packaging, cold storage for grapes, apples	seedling for strawberry, quality seed for vegetables, market linkages, phytosanitary, cooling transporting truck for fruits and vegetables	hail, gets cold very fast	Cheese maker	PI Saidova
20	Sugd	Zafarobod	vegetables, cotton, dairy, tomatoes, cucumber, potatoes, apple and pear, watermelon, melon, peanut	apple and pear cold storage	quality seeds, agro chemicals, better breed for animals, vet services, phytosanitary services, market linkages for selling produce, cooling transporting truck for fruits and vegetables	hail, gets cold very fast- later freezing	Goat cheese maker	LLC Jahida
21	Sugd	Mastchoh	cotton, vegetables, almond, potatoes, peanut, cattle breeding, dairy, peanut	processing of fruits and vegetables, dairy	quality seeds, agrochemicals, vet services, fodder base, AI, phytosanitary services, cooling transporting truck for fruits and vegetables	late freezing, hail	Cheese maker	PI NISO

B. Summary list of value chain opportunities for targeted districts

60. The CIG models for window I include honey beehives, climate resilient crop production, post-harvest storage, local hydroponic fodder, small scale oil processing, greenhouses, nurseries, drip irrigation.
61. The CIG models for window II include small scale dairy, broiler production barn, feeder, greenhouse large scale production, fruit and nut orchard, solar dryer, oil processing as business, cold storage, and small scale processing of agriculture products.

Window 1 models	Window 2 models
drip irrigation	small scale dairy
nurseries	broiler production barn, feeder
greenhouse	cold storage
local hydroponic fodder	solar dryer
small scale oil processing	fruit and nut orchards
Honey-beehives	Hydroponic feed production in groups
post-harvest storage	oil processing as a business
climate resilient crop production/ more timely operation	small-scale processing of agriculture products

(i) Drip irrigation for vegetable and horticulture:



MAIN COMPONENTS OF DRIP SYSTEMS

62. At present, the basic equipment of the drip irrigation system consists of:
 - Source of water supply;
 - Fertilizer preparation and application unit;
 - Filter stations;
 - Main pipelines;
 - Pressure regulators;
 - Distribution pipelines;
 - Connecting fittings;
 - Locking fittings.
63. For 1 ha the cost depending on the crop varies from 1500 to 3000 USD. Drip irrigation offers the following specific advantages:
 - Proven water savings
 - Improved crop yields
 - More efficient use of fertilizers

- Used to administer pesticides, improving resistance against pests
- Reduced weed growth
- Energy savings from less pumping and reduced labour costs
- Suitable for marginal lands and those with lower water quality
- Maintained soil quality and improved land productivity as a result.

(ii) Nurseries:

64. Seedling production is one of the key steps in scaling up or domestication of any species. Each step has to be properly planned and implemented. The way seedlings are handled and managed in a nursery contributes to their survival rate after planting and their subsequent growth performance. Improving seedling quality correlates positively to their survival, growth and productivity. Seedling quality is governed by the genetic make-up of the parent trees and the physical growth of the seedlings. Several types of nurseries exist: individual or private, community or group, central or research, commercial and training nursery.
65. Nursery practices must be consistent, and the various techniques closely integrated. If one element in the chain is lacking there will be a negative impact on seedling quality. Good quality seedlings cannot be produced without care and tending. Nursery plants need to be protected from extremes of environmental conditions until they are strong enough to withstand them. To ensure high quality of seedlings and to provide more opportunities (income, technology transfer), local people are encouraged to establish small-scale community nurseries.
66. Success of any orchard mainly depends upon the availability of right type plant material. Initial planting material is the basic requirement on which the final crop depends both in quality and quantity. In case, any mistake made during initial years, cannot be rectified and income of the orchardist. Non-availability of genuine seeds and elite planting material is one of the major constraints in obtaining expected productivity in fruits. The planting material must be from consistently high yielding mother plants raised in scientific way and free from major pest and diseases.
67. Tajikistan has a big area of traditional apple and pear orchards in mountainous areas. The traditional orchards are not well maintained during the last 25 years and the productivity and quality of fruit is not good to export the fruits. Consequently, traditional orchards have a low gross margin. Intensive orchards can increase yield, quality and efficiency of production. Currently only 200 ha of intensive orchard apple and pear are established in Tajikistan during the last 10 years. There is a limited amount of high quality seedlings for intensive apple and pear orchards available. Another obstacle is the high investment needs for establishing intensive orchards.
68. Sugd area is a traditional area for apricot growing. Apricot intensive orchards have been spread quicker than intensive apple & pear orchards due to the fact that there are established a lot of new fruit orchards (apricot, cherry, peach) in a new area namely in Kathlon area. After the adoption of Freedom for Farmer Act, cotton fields have been transformed into fruit orchards. However, the quality is not very good as the farmers did not have enough experiences establishing the right orchards as well as the farmers had limited access to high quality seedlings.
69. A condition for establishing intensive orchards is first of all access to finance and high quality seedlings of the selected varieties.. Support for the establishment of nurseries are proposed under the project which can potentially be taken up by households through the CIG:

Establishment of nurseries

- a. to grow vegetative rootstocks,
- b. to establish "mother resource orchard" for producing shoots and
- c. to grow seedlings for intensive orchards establishment



No	1. Description	70. Measuring unit	71. quantity	72. Price in USD	73. Total in USD
1.	Vegetative stock (for setting up a breeding field for vegetative stock on an area of 0.10 hectares)	units	3000	1.5	4500
2.	Fertilized (before the production of seedlings in all fields - rootstock breeding fields and grafting fields)				
	Manure	t	50	17	850
	Nitrogen	kg	650	0.4	260
	Phosphorus	kg	550	0.61	335.5
	Potassium	kg	250	0.5	125
	Trace elements	l	6	22	132
3.	Sawdust	t	20	48	960
4.	Pesticide				
	Fungicides	l	2	22	44
	Insecticides	l	3	22	66
5.	Polyethylene film	m	200	0.5	100
6.	Cuttings for grafting	units	3000	0.08	240
	Fencing				400
	Total in USD				7612.5

74. The budget estimates shown in the table above can give a payback starting in the third year when the first seedlings are sold. Despite the fact that the life of the nursery is designed for 10 years, production will continue after 10 years under normal conditions. All the labour required can be covered by the CIG members.

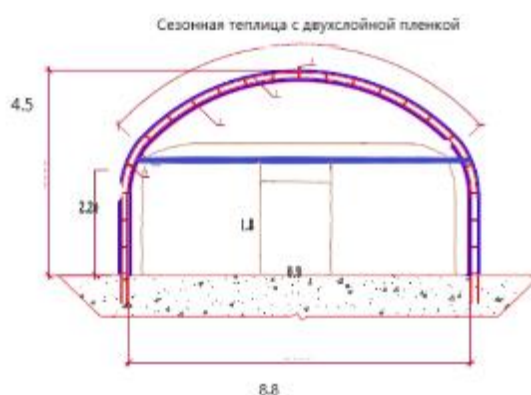
(iii) Prototype model with improved conditions for air circulation for seasonal greenhouse 10*30 for 0.03 ha.

75. Seasonal greenhouse allows growing eggplant in 40 days, paprika in 50-60 days, cabbage in 30 days, tomatoes 60-65 days, cucumber 20-25 days, white cabbage early ripened 50 days, leek 50 days, celery 50-60 days. All these vegetables are the major source of income for rural households and if given opportunity to grow them in greenhouses, vulnerable households will have an opportunity to broaden their market opportunities by growing them earlier in the seasonal greenhouses. The most important aspect of the greenhouse production is to train farmers in grading, sorting, packing in modern packages to make the products deliver safely and look more attractive to the retailers and markets. Trainings on greenhouse production by the service provider will include the production aspects and provision of knowledge on economic analysis, safety and quality standards and marketing.

SWOT analysis for early tomato/cucumber^{xvi}

Strengths <ul style="list-style-type: none"> - High production potential; - Geographic location: good soil, irrigation, cheap labour, abundance of solar days; - Good, unique taste - Farmers have certain knowledge and experience 	Weaknesses <ul style="list-style-type: none"> - Poor agro-technology and low yield; - Limited access to quality seeds; - Dependence on imported fertilizer and seeds; - Poor cooperation between VC actors; - Ad hoc channels of export; - Lack of value addition; - Limited access to financial resources
Opportunities <ul style="list-style-type: none"> - Possibility of increasing the area under tomato cultivation; - Improve quantity, quality through improving cooperation between small farmers - Introduce new technology 	Threats <ul style="list-style-type: none"> - High competition from neighbouring countries - Break out of pest/diseases - Climatic conditions (late frosts etc.)





Summary of cost items for seasonal greenhouse with improved conditions, 4.5 meter height for better air circulation

	Item	Unit	q-ty
1	Armature	meter	52
1.1	Disk	PC	2
1.2	Electric power	kw.	1
1.3	Electrode	PC	1
1.4	Work force		1
1.5	transportation expense		1
Sub -total			
2	Firm (frame)	PC	18
3	armature	meter	300
4	Pipes	meter	16
5	Film	sq.m	270
6	Thermix Film	kg	42
7	Wire	kg	30
Sub -total			
8	Seeds	PC	2000
9	Compost	kg	800
10	Mineral fertilizers	kg	50
11	Heating (coal)	kg	500
12	Labour	days	20
13	Drip irrigation		

to own land to keep bees. As bees can offer pollination services, they are welcome in urban as well as in different areas, cultivations, wild pastures or forests. They can be managed in virtually all climates where humans live and the sale of bee products is often a very good source of income, thus reducing poverty. However, beekeepers face many challenges in keeping bees alive; pests, parasites and diseases can cause colonies to be weak or die. A lost colony is not only a loss for the beekeeper but also a loss to the environment. Furthermore, unhealthy bees do not produce profits and are not adequate pollinators. Unhealthy bees might require treatments, which immediately means loss of income and possible pollution of products. Therefore, maintaining healthy bees is suggested instead of treating bees. Prevention of pests and diseases does not mean prophylactic treatment, but requires the adaptation of Good Beekeeping Practices, in order to avoid dissemination of infections, ensure good nutrition, use local and well adapted stock, avoid areas with pesticides and minimize the use of veterinary medicines.

No	Description	Amount	Total in USD
1	Family of bees (kit):	20	2918
-	Honeycomb	1	
-	Gas balloon	1	
-	Sugar (kg)	100	
-	Beekeeping uniforms (items)	1	
-	Chimney (item)	1	
-	Bee knife (items)	1	
-	Bee stamps (items)	1	
-	Precautions for bees (pcs.)	100	
-	Bee hive (items)	1	
-	Bee cord (kg)	0,5	
-	Medicine Bromite	10	
-	Medicine	10	
-			
	Total		2918

80. The average price of honey in the local market is from 70 to 90TJS. The beekeeper can start receiving income from the second year, from 20 families of bees 200 kg in average from the second year the farmer can make 14000 TJS with deduction of costs 4550 TJS in total 9450 TJS the second year. For the CIG with 10 members, it is recommended to increase the number of family of bees. The current calculation is done for the one third of the group.

(vii) Postharvest and Storage Management

81. Products should always be harvested, if possible, when they are free of moisture, or they should be immediately dried off after harvest. Proper ventilation and maintaining proper relative humidity during storage are essential to maintaining the highest possible postharvest quality. Because most of smallholders have to do agriculture labour manually they do not make it on time with harvest and most of the time fruits are picked after rain often have high levels of moisture and proper sorting, calibration is not maintained. The same applies to vegetables and

most of the time improper harvest and storing losses can account for 30% of the loss. Middlemen purchase in bulk and store the fruits and vegetables in bags and crates in slightly better conditions.



Current situation of small-scale farmers:
Primitive storage room of a farmer



Ventilation done by top opening roof window.



Bucket of water to keep the humidity



No crates all stored in bulk on the ground without pre selection, no sanitation-50-60% losses some seasons total loss due to cold.

Problems of natural stores:

1. Lack of isolation
2. Lack of air movement
3. Lack of sorting and bulk storage
4. Lack of postharvest technical advices
5. Lack of infrastructure
6. walls with cracks that let in insects

Possible solutions to improve the post-harvest:

1. Panel-Foam (PU) application to cover walls
2. Ventilation supply
3. Provision of proper container and packaging for storing example 8-20 kg crates
4. Provision of technical advice on sorting, pre selection, minimizing physical damage
6. Knowledge transfer to the farmers on grading and sizing
6. Technical advices, temperature and relative humidity management,



82. The cost of the post-harvest storage depends on the size and the needs for modernization of the existing space, panel foam costs 4.5 USD per square meter, insulation of floor with cement concrete 6 USD per square meter, and cost of plastic crates is 0.2 USD per crate. Ventilators costs from 300 to 500 USD depending on the capacity, hydrometer 25-30 USD. For modernization of space of 120 square meters there is a need for investing 3700 USD for modernization plus crates.
83. For example, with adoption of post-harvest storage the CIG under Window I get opportunity to store part of their harvest and sell at higher price, onion at harvest time costs 0.5 -1 TJS, within 3-4 month of storing, the price goes up to 2-2.5 TJS. Per each kg of stored agriculture product deducting the cost the CIG member will be able to generate additional 60-100% income. During the first year they will be able to return their investment of 10% in CIG membership in this case.

(i) Cold storage

84. Fruit and vegetables are a major source of income for rural households in mountainous Tajikistan. Fresh produce such as sweet cherries, onions and table grapes make up an important share of the country's agricultural exports. It is important that each farmer understands and applies grading and sorting produce, storing it properly and using modern packaging. With modernization of existing facilities into cold storages CIG will have opportunity to store their produce and sell later when the prices rise to generate additional income that is currently skimmed by middlemen. The traditional storage is 33 meters long, 7.30 meters wide and 10 meters high. Period of storing from October to January depending on when and where the group plan to sell their fruits. Technical characteristics and estimated budget for the modernization of the refrigeration room 250 tons of fruit (apples) is given below.

Needs	Estimated amount	Unit price	Total in USD
5cm insulation panel	10 m x 8 m x 4 m Height 144 m panel 5 mm	60 USD m2	9.000
1st floor isolation	5 cm and 80 m2	100 USD	8.000
1 ceiling isolation	5 cm panel 80 m2	40 USD	3.200
2 ventilators	30 cm radial 2	150 USD	300
Temperature and relative humidity meter	1 device can do both	385 USD	385
Plastic or wooden boxes for collection and handling	20 kg plastic boxes or large wooden boxes. 1,000 pieces	1.5 USD	1.500
Harvesting shears	10	40 USD	400
Insulated door	90-100 cm X 190-200 cm	500 USD X 2 doors	1000
pallets	100 x 120 wooden	100 X 3 USD	300
Air circulation fans, connection with time sensors	2 timer sensors will be connected to air circulation fans	2x1000 USD	2000
Total			26 085 USD
Coating of interior walls, ceilings and floors with 5 mm insulating panels. Depending on size and insulation material the price can be lower. It is possible to also insulate with high quality foam.			

Note: Evaporator and cold storage compressor are optional. This can be removed.

(ii) Solar Dryer

85. High cost of electricity makes drying of fruits in electrical dryers for rural area farmers an expensive exercise. Primary cost of the dried fruits with electricity is much higher than what the market and consumers are ready to pay. On the other side drying in open air makes the quality of the product very low because with wind and dust other residues are mixed with fruits.



Benefits of a solar dryer:

- Higher temperatures, air movement and lower humidity increase the drying speed.
- The products are placed in the dryer and are therefore protected from dust, insects, birds and animals.
- Higher temperatures keep insects away, and higher drying rates reduce the risk of microbial growth.
- Higher drying rates also provide higher food throughput and less drying area (about one third).
- Dryers are waterproof, so food does not need to be moved when it rains.
- The dryer can be made from materials available in the local market and has a relatively low cost.

General needs and budget for a fruit dryer 10*30 for 5 tons of fruit dryer per one time.



a) Sandwich panel construction

- Wall system construction: 10 cm PIR (Polyurethane) filling material covered with metal plates
- The roof panel should have a 5 cm PIR (Polyurethane) infill material covered with metal plates.
- Doors should be 90x210 cm PIR (Polyurethane) filling material covered with metal plates.
- Length 7 m, width 4 m, container type, 2 rooms to include the processing area
- Each room must have a door that leads outside, as well as a passage connecting both rooms.
- Each room must have electrical outlets (4 in each), as well as 2 ready-made, assembled sinks

b) Construction of the drying tunnel, installation of the structure, polycarbonate coating materials and wooden shelves

86. The polycarbonate roof of the drying tunnel must have UV and IR additives with sheets of 2.10m x 6.00m. Each sheet must have adequate flexibility to bend during installation.
 - Polycarbonate sheets must have a 5 year warranty.
 - Galvanized stainless steel or aluminum ≥ 1.2 mm frame materials should be used for the

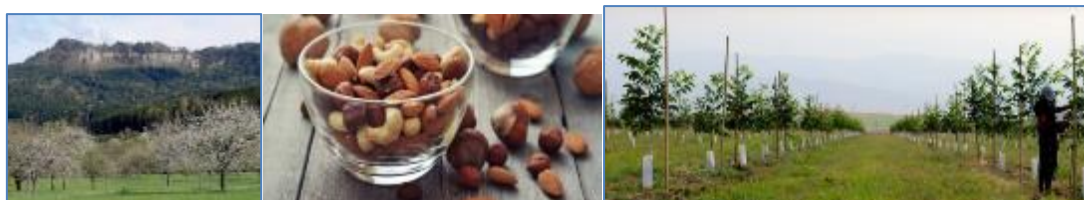
supporting structure.

- The drying tunnel must withstand strong winds of up to 10 km / h and must have a carrying capacity of 4 kg m² of snow.
- The tunnel should have 2 doorways with 90x2.10 cm from both entrances.
- 2 inner window for fresh air supply should be located 25 cm from the floor on the near sides of the doors with dimensions 80x50 mm.
- 3 fans for air extraction. DC fans should be located at the top of the door opposite the inner window doors. DC fans have the following specifications of 15W with a diameter of 30cm.

c) Work inside the drying tunnel

87. The floor of the drying tunnel should be covered with 20-25 cm of concrete. The drying tunnel must be painted black.
 - The 3rd level shelf must be installed inside the drying tunnel. Each shelf space should be about 50 cm. It has been suggested to use perforated plastic drying trays to ensure food safety and a fast drying process.
 - Drying racks should also be perforated to allow air circulation inside the pallets.
 - The shelves should be 7 m long and 1.80 m high. On both sides of the drying tunnel there should be 2 shelves measuring 90x45 cm.
88. In total the solar tunnel for drying fruits 30*10 can dry 5 tons of fruit or vegetable per once and can cost from 6000 to 8000 USD. The service provider is to deliver the training on establishment of the solar dryer, packaging, sorting and marketing of the final goods.
89. With adoption of solar dryer the fruits dried under the sun and road with residues and dust have the price of 0.5-3 TJS per kg and with adoption of drying in solar dryer and preserving better quality the market price of quality product is at 5-6TJS per kg, with adding value with small packaging and brand they have opportunity to sell at 10TJS per package of 300gr which increases possibility of getting income up to 90-150%. CIG member investing 20% can return their investment within the 1st year of utilizing the technology.

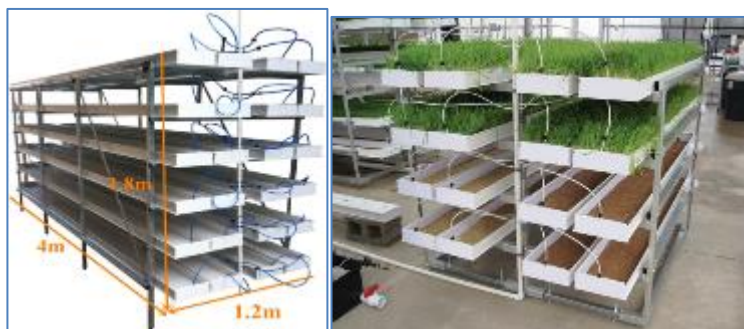
(iii) .Fruit and nut orchard



90. Planting multiple types of fruits that grow during different seasons of the year where small-scale farmers have time and opportunity to focus on quality can generate good income. Fruit and nut trees require patience and planning before any profit can be generated, but once established the orchards can produce for several decades before trees need replacing. Improved dwarf fruit trees can produce their first fruit in two years, with traditional varieties needing seven years to mature. In the long run orchards generate very stable income. To bring in income while the trees are growing, new orchards are using “agroforestry,” which uses double-cropping of walnut trees with pasture crops for harvesting or livestock grazing. Trees are planted in widely-spaced rows, at about 100 trees per acre, with other crops between the rows. In addition to pasture crops, high-value crops like raspberries or blueberries can be grown. Agroforestry can provide income four different ways. For the first few years, the only income is from the crop planted between the trees. As the trees become larger, they are thinned to about 30 trees per acre, with wood from the thinning being sold. After a few years, the trees begin to produce for harvesting. For trees like walnut, when the trees are mature or become too old they can be harvested for veneer logs, which bring thousands of dollars per log. As they are not as common as fruits and vegetables, fresh local nuts bring premium prices at local or regional farmer's markets, a roadside stand, direct from the tree (U-Pick), or in bulk to local retailers. An additional source of income is “value-added” nut products such as nut butters, candies and cookies which

can be produced during off-season. Many growers also sell nut tree seedlings and grafted varieties from their own orchards. This can be even more lucrative than selling nuts. Establishment of 1 ha of modern orchards costs 20-30,000 USD.

(iv) Hydroponic feed production in groups



91. There is potential for some CIGs to develop a group feed production business to sell to their own and neighboring communities. This would require a higher level of organization and investment depending on the size of the planned production. The cost of an automatic hydroponic fodder unit depends on the size and ranges from 600-3,000 USD.

Model	Daily Output	Dimension (L, W, H)	Beef Cattle	Dairy Cattle	Horses	Hogs	Chickens
1.5-4	25kg	1.5*1.2*1.2m	2 to 3	-	2 to 3	10 to 17	490 to 860
2-4	35kg	2*1.2*1.2m	3 to 5	-	3 to 4	15 to 24	682 to 1129
3-5	60kg	3*1.2*1.5m	6 to 9	1 to 2	5 to 6	25 to 42	1176 to 1935
4-6	100kg	4*1.2*1.8m	9 to 14	3 to 4	8 to 10	41 to 70	1960 to 3225

(v) Oil processing in groups

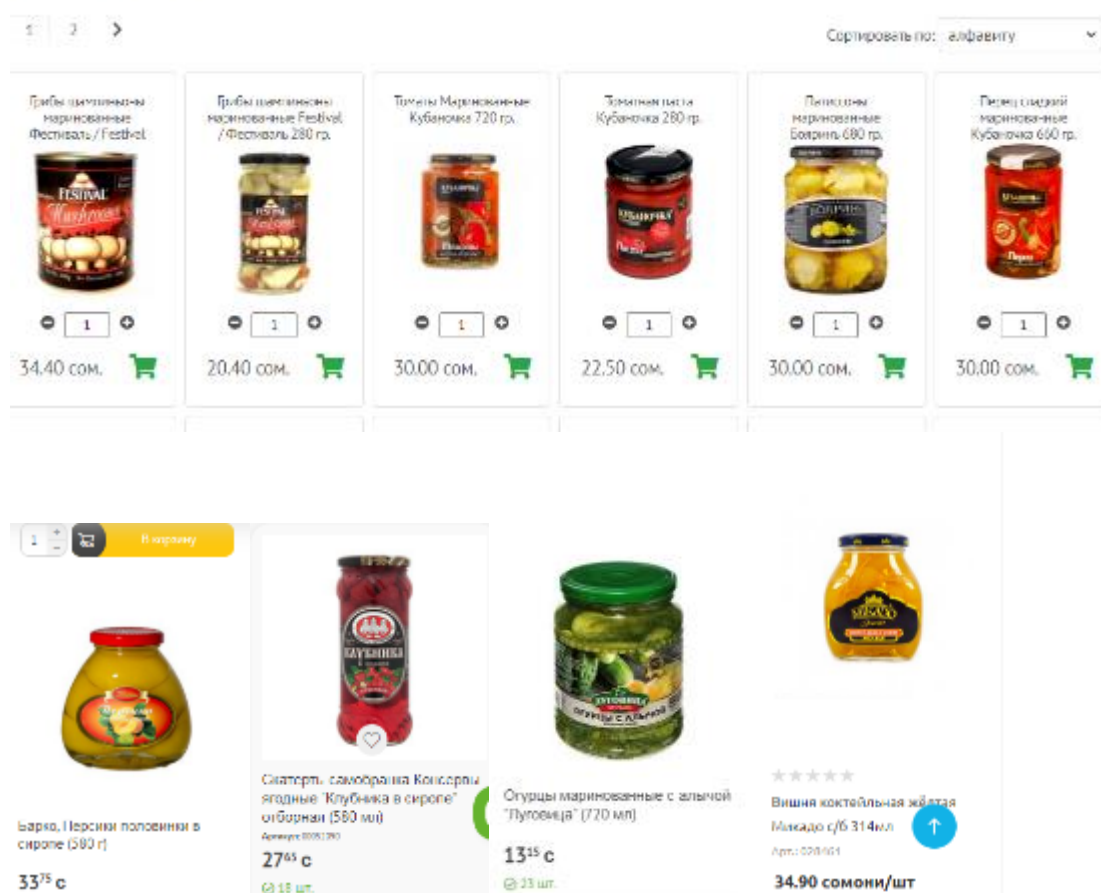
92. Similarly, some CIGs may want to develop a group oil-pressing business. This would require a larger scale equipment with a processing capacity of up to a ton per day and cost in the range of 5-8,000 USD.



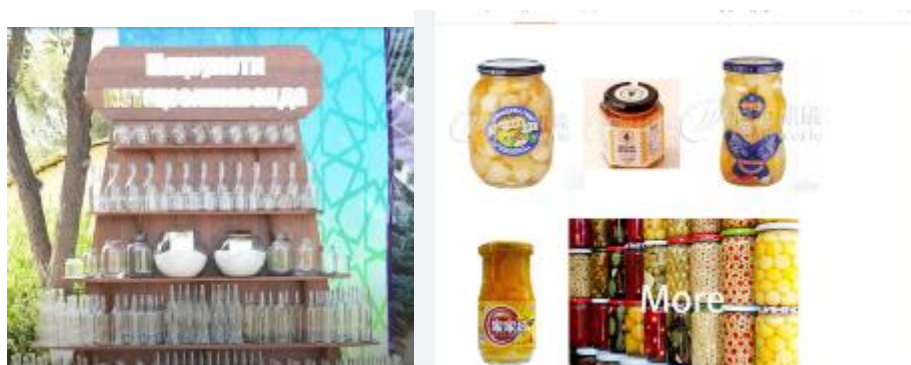
(vi) Small scale processing of agriculture products

93. Starting a small-scale processing operation provides new jobs for communities, requires only a small capital investment in equipment and supplies, and can result in a fast return on investment. When conditions are not suitable for storage or immediate marketing of fresh produce, processing reduces perishability. Currently local supermarkets provide variety of imported small jar canned products: mushrooms, tomatoes, Pattypan squash, pickled sweet pepper, cucumbers, red beans, salted onion Anzur and processed strawberry, apricot, figs, cherries etc. Local processing is available in big jars of 2 and 3 litres, however the current market demand is not for the more the better but for quality in small quantities. This mentality has yet to be transferred for the producers in the rural areas that the smaller packaging and better quality can attract the attention of customers in the shelves of the shops.

Овощная консервация



94. Since 2011 glass factories have been covering the local demand for glass jars mainly 1 liter to 3 liters. In J. Rasulov district of Sugd region new glass manufacturing enterprise is commencing to work that has capacity to make 80 types of glass products from 250 gr up to 3 litres. The European technology are used to equip the factory with cutting edge solutions. With this in mind the CIG will have opportunity to invest in processing equipment that will enable them to work through the year to produce canned fruit jams and syrups and canned vegetables during ripening seasons.



Small scale processing/ canning equipment for capacity of 100-500kg per day costs between 7500 USD to 30 000 USD with consideration of washing, pasteurizing and drying machines.



Pasteurization Machine



Drying Machine



Basket Washing Machine



Blanching and Steam Line

V. Output

95. 12,400 smallholders have strengthened climate resilient production practices and private sector market linkages.
96. This sub-component will facilitate two types of common interest groups (CIGs) to access support services to identify, analyze and adopt climate resilient production practices. The first group of 800 CIGs (identified through Activity 2.1.5) will focus on strengthening their capacity to adapt their production systems to become more resilient to changing climate conditions and in some cases identify opportunities to link to local markets. This support will increase access for CIGs to productive assets and services to increase agricultural productivity and diversification. A second set of market-linked CIGs (identified in sub-activity 3.3.1.2) will receive capacity building in farming as a business, entrepreneurial skills and business plan development, so they can link to profitable value chains (e.g. small-scale poultry, horticulture, processing, etc.).
97. Common interest group for Window I will be identified and established under Sub-Activity 2.1.2.6: Establishment of Common Interest Groups (CIGs). The service provider under component 2 hired by the PMU will identify and establish CIG under defined criteria. Households and smallholders who are focused in diversification and improvement of production and willing to continue their agriculture production with introduction of climate resilient practices will be grouped in groups of 10 with inclusion of youth and women. In total 1020 groups will be established in 400 villages in the first year of the project for this activity.

VI. Activities

Activity 3.3.1. Strengthening of CIGs capacity

Sub activity 3.3.1.1. Support to production/diversification CIGs

98. A service provider will be hired to build the capacity of the 1020 CIGs in the 400 communities identified in Activity 2.1.2.6 to be able to access Window 1 of the matching grant program. The service provider will deliver a ToT to train 24 District Officers, 76 officers from the MoA Agro department and the CASP+ Matching Grant Manager and two Matching Grant Officers. These District Officers and MoA staff will work alongside the service provider in implementing this activity. Once completed the CIG will be able to apply for funding under the MGF Window I below.
99. CASP+ will hire a service provider with good knowledge of the agriculture sector and climate resilient technologies, agribusiness environment and market opportunities (see ToRs in annex) to support the identified CIG in delivering of trainings in climate resilient crops production (introduction of seeds, agriculture practices), drip irrigation, nurseries, greenhouses, solar dryers, beehives, hydroponic fodder growing and small-scale processing of agriculture products, business plan writing, so groups are able to write business plans to apply for the Window 1 grants.
100. The service provider will be hired in the third quarter of the 2nd year.
101. Firstly the service provider will develop the curriculum and deliver TOT of the modules developed on the overall concept of climate resilient technologies with examples including the business plan writing to 12 District officers hired under component 3.3 and the Matching grant specialist and the 76 specialist of the agro departments under the Ministry of Agriculture in 21 districts.
102. The TOT trainings will take place in the 4th quarter of the second year of the project in the department of Agriculture of Khatlon region. District officers from Sughd and DRS will travel to Khatlon region to attend the TOT. Specialists of Agro departments of Sughd and DRS will receive practical training during the implementation of the project by Service provider in the first 100 villages while service provider will be delivering trainings to CIGs. PMU will ensure that each district officer and all the specialist of the agriculture department will receive training modules in soft and hard copies for further dissemination to the CIG.
103. The PMU will sign a memorandum of understanding in the beginning of 2nd year of the project

to identify the 76 specialists of the agriculture departments under the Ministry of Agriculture in 21 districts. The purpose of this MOU is to mobilize 3 experts of Agriculture departments in each district to participate these trainings and be capacitated with knowledge and skills to serve the communities they work in.

104. The service provider will deliver the trainings to the CIG in the first 100 villages together with district officers in the final quarter of the 2nd year. It is advised that PMU ensures that the service provider covers 3% villages in Sughd and DRS.
105. Capacitated district officers will continue training CIG in the remaining 300 villages. CIGs in 200 villages will be trained by the end of the 2nd year. 100 more will be trained by the end of the 3rd year. By the end of the 4th year all 1020 CIG will receive their trainings.
106. All 1020 CIGs under W I are to receive the business plan writing training, concept of the climate resilient technologies trainings, examples and opportunities for each CIG to help them make solid decision on the investment, for example if CIG in village A is interested in drip irrigation and crop cultivation they must be trained in both technologies. If CIG sees potential in taking advantage of growing early vegetables, they must receive training in greenhouses. The district officers must work closely with CIG in identification of potential and advise the CIG to invest their time and efforts in the most profitable agriculture production in their district considering their experience, agronomic climate zone and access to market.
107. District officers will work closely with CIGs under window 1 for review and revision of grant proposals to support the Grant Management Specialist in collecting, informing and selection of the grant proposals. Further they will support in implementation and monitoring of the sub projects.
108. The CIGs that received the training will be able to prepare and send their proposal under the MGF Window I via district officers to PMU head office for review.
109. The Window I typical investment (to be adjusted according to the needs of the CIG, in the scope of the CIG establishment undertaken under Activity 2.1.2.6.), as described above.

Sub activity 3.3.1.2. Provision of rooms and halls for meetings, trainings

MoA will provide space for meetings and trainings

Sub activity 3.3.1.3. Support to market-linked CIGs

110. A second service provider with experience in linking farmers to markets will be contracted to conduct a private sector scoping exercise to identify potential companies interested in linking to individuals and/or existing or new CIGs. During design a range of potential enterprises were met and identified as potential private sector partners (e.g. egg/broiler production, horticulture, fruit production and fruit drying) which will be further evaluated.
111. These CIGs will be supported to engage in their prioritized value chain through targeted capacity building on farming as a business, business planning, financial literacy, matching grant proposal writing, climate smart agriculture, productivity improvement, value addition and developing market linkages. Agreed arrangements linking CIGs to private sector business that are profitable, low risk, climate adapted market linkages will be funded through the MGP Window 2 below.
112. The PMU will hire second service provider at the end of the 2nd year. The service provider will mobilize their facilitators to conduct a private sector scoping exercise to identify potential companies interested in linking to existing or new CIGs. Furthermore 110 meetings will be organized in 110 villages to identify potential CIG among existing and or establish new ones for Window II matching grant. The criteria for the selection of the CIG are the following:
 - 70% of members of the CIG must have at least 1 to 3 years of experience in the production or processing of proposed investment.
 - All members of CIG combined must be able to pay 20 % of the matching grant cash

contribution.

- Solid plan to establish registered production organization within 3 years after receiving the grant. (if any member already has registered dehkan farm that is sufficient).
 - 20% of the group must have entrepreneur skills and ability plan, take risks and strong leadership skills.
113. The identification process will have to have set of questions on production, sales plans, ability of farmers to see the potential and identifying their own needs for adding value to the production, long term thinking: for example , the farmers must be able to know where they will get the supply of vegetables in case they plan to set up the cold storage. How long they plan to keep the vegetables, when they plan to sell?. Where is possible market to obtain the clients for storing the fruits and vegetables, do they understand what is the capacity of the storage and how they are going to fill it, where is the market to possibly sell the stored products, if not sold what is the plan B?.
114. The selection process will consist of survey and discussion form to make people think what they have, what are the opportunities, how they see they can take advantage of the opportunity and what they have from their side and what they need from the project side. The process must make the potential CIG to think and plan.
115. Window II CIG groups are to have 20 people per group. The purpose is to collect the cash contribution and further manage the processing – group members will need to be assigned roles to further develop and strengthen their group as an organization:
- 4 people provide and ensure production of raw materials, they can produce themselves, or if not find and link other groups for the constant supply of raw materials (organize its transport, delivery to processing equipment)
 - 4 people ensure proper processing, technological process to be done according to international standard which entails a lot of learning, ensuring certification is obtained
 - 4 people figure out branding and packaging (where to purchase in bulk branding material), identify the market demand for smaller or bigger packaging and test in the market
 - 4 people will have to figure out where to sell, distribution, logistics, finding new markets (delivery, sales, advertising, marketing)
 - 4 people can do overall management, accounting, solve legal issues; think strategically how to grow every 12-24 month, find investors and etc.
116. The service provider will train the CIG in long term thinking and planning, ability to see the entire market picture- market players and identify where are the gaps to fill in the market for the CIG and take advantage of utilizing CIG strength (production, proximity to the market, climate, etc.).
117. The Service provider will develop curriculum that covers modules on farming as a business, business planning, financial literacy, matching grant proposal writing, climate smart agriculture, productivity improvement, value addition and developing market linkages.
118. The service provider will deliver the trainings to the CIG themselves in 110 villages by the end of the second year. The work of the service provider will be valued volume based. All the CIG undergone the training will need to receive soft and hard copies of the training modules.
119. CIGs Grant applications will need to have a solid business plan. District officers will work closely with the service provider and attend the trainings to ensure understanding of grant projects during the implementation. District officers will work closely with CIGs under window II for review and revision of grant proposals to support the Grant Management Specialist in collecting, informing and selection of the grant proposals. Further they will support in implementation and monitoring of the sub projects for all 110 CIG under window II.
120. The CIGs that received the training will be able to prepare and send their proposal under the MGF Window II via district officers to PMU head office for review.

121. The Window II typical investment (to be adjusted according to the needs of the CIG, in the scope of the CIG establishment undertaken under the current activity by the service provider.),
122. District officers would need to work very closely with CIG to identify their strength and market opportunities, weaknesses and threats to help make decision on grant investment. CIG would need to demonstrate in their business plan, personal resources both intellectual and material such as education, years of experience in the sector as a producer, seller or supplier, trend analysis, business model, clear sales goals and development strategy. They need to clearly define what makes the CIG unique for applying for the particular grant investment and what are their advantages. It is a must that all 20 members of the CIG participate in business plan writing starting from brainstorming to defining who will do what.

Sub-activity 3.3.1.4. Capacity building on climate smart resilient technologies for Window 1 and 2 beneficiaries.

123. The District Officers will provide two years of support to CIG grant beneficiaries to ensure success in implementation. Initial support will be provided once the grant is awarded, so grantees are prepared for start-up. Set-up/installation support will be provided. Where needed follow-up trainings on climate resilient technologies, equipment, productive assets and technical assistance will be provided by the service provider hired in 3.3.1.1.
124. The service providers hired under sub activity 3.3.1.1 and 3.3.1.2 will tailor the training materials to the investments beneficiaries selected under Window 1 and Window 2 and deliver targeted training support them right after they receive their grant. For the first 100 villages, the service provider will work along with the district officers and officers from the MOA to support implementation. Further the district officers and Agriculture department specialists will continue delivering the support for remaining 300 villages without support of the service provider up to two years after the implementation of the investment sub projects.
125. Moreover technical expertise can be mobilized on case by case basis for window I and window II up to 800 individual visits to CIG for beneficiaries until the end of the 5th year of the project.
126. District officers supporting and monitoring the implementation can request for individual visit consultations, prior to that they would need to analyze the situation and have outline of issues that need to be find solutions during the visits. After the visits the district officers working with CIG need to ensure implementation of the solution to ensure the CIG works smoothly.
127. This technical assistance is foreseen to support local community to run the facilities and use the equipment. The technical expertise is not only limited to equipment but can be given to improve sales strategy and marketing and business development advising to the CIG.

Activity 3.3.2. Management of the CIGs matching grant program

128. A Matching Grant Facility (MGF) will be established and administered by the PMU. A MGF Manager will be hired by the PMU. Two MGF officers will also be hired to run the MGF Window 1 (livelihood diversification for vulnerable households) and Window 2 (commercialisation and agribusiness development). The District Officers and the officers from the MoA Agro department trained above will provide implementation support to individuals and CIGs throughout the matching grant process. It is expected that a total of 12,000 households will access 1020 Window 1 grants and 2,200 households will access 110 Window 2 grants.
129. Window 1 will be for grants of up to 8,000 USD. These grants will be for, e.g. small-scale processing equipment, local storage infrastructure, community-based seed production, inputs and service provision, drip irrigation, greenhouses, nurseries, shelterbelt establishment, riverbank stability, access to renewable energy. Farmers accessing Window 1 will match the grant with a 10 percent cash contribution.
130. Window 2 will be for CIG grants of up to 30 000 USD. These grants will be for larger scale investments, e.g., processing equipment, storage infrastructure, greenhouses, solar drying equipment. Window 2 beneficiaries will match the grant with a 20 percent cash contribution.

Sub-activity 3.3.2.1. Matching grant manual developed

131. The MGF team will hire a consultant to help them develop the MGF Implementation Manual. This will detail all activities from launch of the call, to review, award and implementation support.

3.3.2.2: Involvement of specialists from agricultural departments for matching grants implementation *MOA extension agents and specialists are available*

Sub-activity 3.3.2.3. Launch of the MGF

Sub-activity 3.3.2.4. Launch of the MGF Window 2

132. The PMU will publish through government channels and online the announcement of the matching grant program and organize a communication campaign with mobilization of district officers and agro department experts in the target Districts. Proposals will first be vetted by the District Officers and where needed discussed and revised with the applicant. Proposals that pass this first review will be sent to the PMU. The PMU will establish a MGF Review Committee to review proposals. This will consist of the MGF manager, PMU Project Director, PMU M&E, MoA representative(s).

VII. Timeframe

Definition of timing and responsibilities are defined in Annex 21, PIM.

VIII. Expected Results

Expected results and indicators are presented in Section E of the Funding Proposal, and reported in Annex 21, PIM.

IX. Implementation Arrangements needed

Implementation arrangements for these activities are defined in Annex 21, PIM.

X. Exit strategy and sustainability

133. The main issues regarding sustainability that will need to be considered from the project start are as follows:
 - Support to CIGs and multiplication: Under LPDP I and II, the support provided to CIG was channelled through the PMU. This has concerns on the continuity of this support, considering that project support lasts only during the project duration. In order to address this issue from the very beginning, the project will train 63 Agriculture Department specialists in regions in different technologies to support CIG in their activities. This will ensure the knowledge and skills for sub project implementation under Window I and II will remain in districts which can support communities after the project. Whereas Agriculture Department Specialists will be involved from the beginning in training the CIG in matching grant sub project implementations and can advise on multiplication of technologies based on experience in the field to other communities. Experience of other projects demonstrates that technologies that generate additional income are multiplied by communities rather fast.

XI. Conclusion

134. It is recognized that agricultural diversification helps achieve food security and improved human

nutrition and increased rural employment, adoption of climate resilient agriculture practices; it can also impact favourably on soil fertility and pest incidence. The CIG will choose from the diversification activities such as: productions of honey, rosehips, climate resilient crop production/timely operation, post-harvest storage, local hydroponics, small-scale oil processing, greenhouse, nursery, drip irrigation under Window I, small scale dairy processing, larger scale greenhouse for vegetable production, fruit and nut orchards, solar dryer for drying fruits and vegetables, oil processing as a business, cold storage under Window II.

135. Practical work in the field with CASP, LPDP I and LPDP II is a proof that communities and private sector are actively and willingly participating in pasture restoration. More than 173 CIG were established for crop production under LPDP II and 190 CIG are functioning under CASP, the model of CIG was chosen based on these field facts. The communities who are not part of these projects met in Khatlon, Sughd during the stakeholder meetings for CASP + design raised climate related issues such as draught, lack of land for cultivation of vegetables, loss of fruits and vegetables due to lack of storage or processing, need to replant forests and other, therefore diversification activities were proposed to meet their demand in climate resilient practices.
136. Relevant targeted communities will be mobilized to take part in CIG for diversification of their activities. They will choose from models proposed considering their production capacities and market linkages under window I, for window II CIG who are advanced and have relative experience in production will be given opportunity to invest in value addition, with condition of procuring raw materials from project area to have impact on their livelihood generating income for their communities. Currently high interest rates in the banks (2.1% per month which is 25% per year) do not allow the communities procure and invest in climate resilient diversification activities at large scale especially to most vulnerable and poor whose monthly consumption are calculated at TJS 230 according to Tajjstat and with 10% of their own investment under Window I adoption is possible. For window II the CIG members will come with their investment of 20% and the target is middle class to get incentive to adopt climate resilient practices. These investments generating income, creating labour and jobs for families, especially youth and women and most importantly multiplying adoption of climate resilient agriculture practices.

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^v Special Report - 2020 FAO/WFP CFSAM to the Republic of Tajikistan

^{vi} Prospects for an inclusive development of the poultry meat and egg value-chains in Tajikistan 2018

^{vii} Prospects for an inclusive development of the poultry meat and egg value-chains in Tajikistan 2018

^{viii} Gaining Efficiencies. Feeding People. Protecting Environment" Dairy and meat industries development

^{ix} "Gaining Efficiencies. Feeding People. Protecting Environment" Dairy and meat industries development WP

^x Gaining Efficiencies. Feeding People. Protecting Environment" Dairy and meat industries development WP

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