

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

CHAPTER III: PASTURE MANAGEMENT AND ANIMAL HUSBANDRY

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List of acronyms

AI	Artificial Insemination
CC	Carrying Capacity
CC	Climate Change
CF	Community Facilitator
CsCAP	Climate Sensitive Community Action Plan
DWG	Daily Weight Gain
ECTAP	Enhanced Competitiveness of Tajik Agribusiness Project
FFS	Farmers Field School
GHG	GreenHouse Gaz
GLEAM	Global Livestock Emissions assessment Model
GIZ	German Agency for International Cooperation
IMT	International Master Trainer
LPDP	Livestock and Pasture Development Project
LSIPT	Livestock Sector Investment Policy Toolkit
MoA	Ministry of Agriculture
MCC	Milk Collecting Center
MCP	Milk Collecting Point
MT	Master Trainer
NIP	National Investment Plan
NMT	National Master Trainer
OIE	World Animal Health Organization
PA	Productive Alliance
PC	Pasture Commission
PL	Pasture Law
PMT	Pasture Meliorative Trust
PMP	Pasture Management Plan
PMU	Project management Unit
PUA	Pasture Users Association
PUG	Pasture Users Group
PUU	Pasture Users Union
SEABAI	State Enterprise for Breeding and Artificial Insemination
SECD	State Enterprise for Capacity Development
SU	Sheep Unit
TAAS	Tajik Academy of Agricultural Science
TAU	Tajik Agrarian University
VO	Village Organization
WB	World Bank

Chapter III: Pasture Management and Animal Husbandry

I. Institutional context

A. Policy and legal frameworks

- The main specific strategic framework for the livestock sub-sector sector is the Comprehensive Tajikistan Livestock Industry Development Program (2018-22). The Pasture Law (PL) is another document of major importance for the Livestock sector. It was initially adopted in 2013 and amended in 2019. The PL has laid the institutional foundations for community-based pasture management systems, with Pasture Users Unions (PUUs) as the cornerstone of this system. The adoption of this law has led to significant progress in terms of pasture management, but some shortcomings remain in particular in terms of implementation framework (decrees and orders) which is incomplete. On top of this, the PL does not address the issue of pastureland tenure which remains a major constraint for pasture development and for upscaling of the PUU system.
- The “Pasture Development Programme for Tajikistan” (2016-2020) remains under implementation although it is supposed to be outdated. It aims at supporting the rolling out of the institutional mechanisms institutionalized by the PL (PUUs, Pasture Commissions, Pasture Management Plans). It is mostly implemented through projects.
- Another important thematic strategy for the sector and relevant for the project is the national breeding strategy (2018-22). This strategy puts emphasis on the dissemination of improved exotic genetic material, through AI and distribution of bulls. Conservation of indigenous species is considered only for sheep.

B. Public institutions in charge of livestock

- Food Security Committee: The State Committee for Food Security, placed directly under the authority of the Government, was created in 2017. The main responsibilities of the Committee are related to animal health and food safety (see working paper on animal health), as well as control and regulation of animal breeding. Animal husbandry and pasture management are under the responsibility of the Ministry of Agriculture (MoA). The main specialized implementing agencies under MoA for the livestock subsector are the Pasture Meliorative Trust (PMT) and the State Enterprise for animal breeding, genetic improvement, artificial insemination, and trade of improved breeds of animals.
- Pasture Meliorative Trust (PMT): Initially, the PMT was in charge of monitoring movements of stock to summer pastures. With the adoption of the Pasture Law, its mandate was expanded to include the monitoring of the application of the law. PMT has 83 staff in total, including 24 at Central level. The PMT has branches in all Oblasts, all staffed with pasture management specialists (11 in Sughd, 14 in Khatlon and 7 in DRS). The PMT has received significant support from IFAD under LPDP I and II, as well as from GIZ and CARITAS. This has significantly contributed to expanding its capacities.
- The “State Enterprise for animal breeding, genetic improvement, artificial insemination, and trade of improved breeds of animals” is a specialized agency of the Ministry of Agriculture of Tajikistan, in charge of implementation of breeding and AI. The institution has an AI laboratory to process semen, as well as regional branches where semen is stored is distributed. There are regional branches in all regions, but none of them is equipped with liquid nitrogen production machines, and the liquid nitrogen needs to be brought from Dushanbe which is an important constraint to distribution of semen, especially in Khatlon. In addition to the regional branches, 110 AI centers are established throughout the country, staffed with around 250 AI technicians in total. Although it houses the biggest cattle population, Khatlon is the region with the lowest number of AI technicians (55 against 80 in Sughd and 115 in DRS). As of now, the State Enterprise delivers around 45,000 AI per year, mostly for dekhani farmers and farm enterprises, and almost none for household farms. In the most remote areas where access to AI services is challenging, off farm mating stations with improved bulls are established by the State Enterprise.

- The control of breeding and AI, in particular its sanitary aspects are under the responsibility of the Food Security Committee and is therefore not a responsibility of MoA.
- Regarding policy formulation, sector policies remain the responsibility of the MoA. However, formulation of specific sub-sectoral strategies and regulatory frameworks (e.g. breeding strategy, veterinary legislation) falls under the responsibility of the respective implementing agencies (Food Security Committee, PMT, SE for AI and breeding).

II. Sector Performance: Animal husbandry

A. Livestock production systems

- Household extensive cattle system: This is the most common model as 93% of cattle are owned by household farms; the household smallholder system is by far the dominant system, both in terms of number of farms and animals. Since household farms only own small household plots, cultivated in priority with crops, the main resource base for their animals is the collective pasture. The usual size of household cattle herds is around 2 to 5 heads of cattle, mostly of local breed. The system is dual purpose (dairy and beef). Animals graze on the collective pasture allocated to the community, usually in collective herds. There is lack of fodder in particular for winter feeding. The productivity of these systems is low, with milk productivity ranging between 500 and 700 liters per cow per year, and an inter-calving interval of 18 months or more. Males are sold for beef at around 3 years. This system is mostly found in mountainous areas especially in Eastern Khatlon, GBAO, and Sughd.
- Smallholder dairy intensified system: This is an emerging sub-system that can be observed both in household farms and small dekhans. Compared with the dominant household system, it is more intensive, more integrated with crops, with more fodder cultivation, and thus less dependent on pasture. Grazing still takes place in collective herds, but some animals are also kept at home in partial zero grazing mode. Animals are crossed with improved breeds, and their feed is complemented with crop residues, cultivated fodder and concentrates. The productivity is higher than in the previous system (1,000 liters per lactation).
- Large scale dairy intensified systems: Under this system animals are owned by dekhans, agriculture enterprises or dairy factories¹. They are concentrated around consumption basins. Animals are of improved breeds and the productivity of animals is usually in the range of 3,000 to 5,000 liters per lactation. The feeding system is often based on irrigated fodder (alfalfa and corn).
- Beef production systems: there are no specialized beef systems in the Country. Animals used for meat production originate from the dual-purpose or dairy systems. Most of the fattening takes place in households. This is a pasture based system in which animals are usually slaughtered at 2.5 to 3 years at a liveweight of 300/400 kg. There are only a few specialized fatteners/feedlots in the country, but because of the increasing demand for good quality carcasses from the urban market, their number is slowly increasing.
- Small ruminant systems: This is a common system as 82% of small ruminants are kept by households and raised in pasture based extensive systems similar to the extensive cattle system (animals are often kept together). The remaining 18% animals are kept in large flocks (several hundred of heads) that usually do seasonal transhumance, both horizontal (from one region to the other) and vertical (from lowland areas to mountains in summer). Lamb fattening is a common practice in rural households and is often undertaken by women.

B. Livestock inventories

- Livestock inventories suddenly plummeted after the fall of the Soviet Union, and started rising again at the household level. The table below shows the changes in inventories at national level by species, between 1991, 2013 and 2019.

¹ Same as above.

Table 1: Number of animals per species and evolution 1991-2019 (,000 heads)

Specie	1991 inventory	2013 inventory	2019 inventory	% change 1991-2019
Cattle (all)	1,390.7	2,099.1	2,361.9	+70%
Cattle - cows	585.9	1,076.3	1,227.2	+109%
% cows/cattle	42%		51%	
Sheep and goats	3,354.9	4,923.6	5,686.3	+69%
Horses	52.6	76.9	81.3	+55%
Donkeys	63.3	174	136	+115%
Yak	15.1	25.5	27.2	+80%
Sheep units	10,963,4	16,801,1	18,718,3	+71%

Sources: Agency on Statistics under the President of Tajikistan. "Agriculture of Tajikistan". 2020 & Tajikistan in figures. 2020

- Cattle represent 65% of Livestock population in terms of Sheep Units (SU2) and thus the largest share of herbivores; the total livestock population has increased by 71% over the 1991-2019 period, and by 11% over the last 6 years (1.6% per year in average). The pasture availability has remained stable during this period and this implies that the pressure over feed resources has increased by a similar ratio.
- The total ruminants (cattle and small ruminants) population in the 21 Districts targeted by the project is distributed as follows:

Districts	Cattle		Sheep & goats	Sheep Units (ruminants)
	Total cattle	including cows		
RRS				
Rudaki	71 649	33 874	114 893	473 138
Gissar	72 570	42 397	123 392	486 242
Shahrinav	27 978	13 902	48 032	187 922
Sub-total RRS	172 197	90 173	286 317	1 147 302
Khatlon Region				
Kulyab city	27 674	20465	48670	187 040
Hamadoni	35 652	22218	65020	243 280
Khovaling	24 868	10101	35599	159 939
Temurmalik	34 351	12984	101796	273 551
Vose	46 816	24511	97526	331 606
Baljuvan	25 911	12322	47784	177 339
Dangara	70 830	32407	406508	760 658
Farkhor	55 380	23745	117252	394 152
Sh. Shohin	29 341	15997	75401	222 106
Kushoniyon	69 352	38942	78513	425 273
Huroson	36 934	12107	85300	269 970
A.Jomi	41 691	19406	68560	277 015
J.Balkhi	56 483	31762	112298	394 713
Panj	42 892	24839	92906	307 366
Vakhsh	47 986	23160	164646	404 576
Yavan	97 778	50260	183277	672 167

² Sheep Units is the most common method used in Tajikistan to evaluate total livestock populations. 1 sheep/goat = 1 Sheep Unit; 1 cow = 0.2 Sheep Unit

Sub-total Khatlon	743 939	375 226	1 781 056	5 500 751
Sughd Region				
Mastchoh	55 050	28425	146773	422 023
Zafarobod	32 944	20158	66438	231 158
Sub-total Sughd	87 994	48 583	213 211	653 181
TOTAL	1 004 130	513 982	2 280 584	7 301 234

- The 21 Districts covered by CASP+ house 1.004 million heads of cattle, and 2.28 million heads of sheep, which represents 57% of the total ruminant population in the Country.
- Considering that the total number of villages in 21 Districts stands at 1,523 as per MoA estimation, the average number of livestock heads per village is 659 heads of cattle, 337 adult cows, and 1,497 heads of small ruminants.

C. Productivity of livestock

- Productivity of livestock is extremely low; this is due to a combination of factors, which cannot be ranked by order of importance but include (i) poor feeding (ii) low genetic potential, (iii) inadequate herd/flock management, and (iv) unfavorable animal health status.
- Milk productivity is estimated (FAOSTAT 2018) at 814 kg per cow per year. This is the lowest figure in the region as shown in the table below:

Table 2: Milk yield per cow per year (kg)

Tajikistan	Kyrgyzstan	Kazakhstan	Uzbekistan
814	1,987	2,340	2,050

Source: FAOSTAT 2018

- Reproductive performance is of critical importance both for milk and meat production. Cows should ideally produce one calf per year. In reality, the productivity stands at 0.64 calf per cow per year (Tajstat 2019), which means that the calving interval is around 560 days. This indicates major infertility issues that may be due to several factors including underfeeding, inadequate reproductive management (early entry in reproduction for heifers, poor heat detection, poor AI success rate, etc), as well as reproductive diseases.
- This poor reproductive performance has a major direct impact not only on carrying capacity and overutilization of pasture, but also on the water footprint and GHG emissions, since around 40% of adult cows utilizing the pasture resource base are actually unproductive. This proportion could easily be reduced to 20 to 25% with proper herd management.
- Beef productivity (cattle): Male young cattle produced in the dominant extensive dual-purpose systems are sold at 30-36 months, which is quite late, and their Daily Weight Gain (DWG) usually ranges between 250 to 300 g/day only, which is also very low even for a grass based system. This is mostly due to poor genetics, feeding, and sanitary status (parasitic infestations).
- The long finishing period of males has also a direct impact on pasture overutilization, as well as carbon emissions. Because of their slow growth, males are kept 3 years on average before sale, and a large proportion of animals in herds are thus males. If these animals were fattened in a more intensive manner, their proportion in herds could be reduced by half as well as their impact on pasture, and their carbon emissions.
- Productivity of small ruminants' systems: sheep and goats systems are also characterized by a low level of productivity ranging from 0.62 to 0.89 lamb/female/year (WB 2004). Their DWG stands around 70g/d (WB 2004), which is below standard, and has an influence on the slaughtering age : males are sold at the age of 1.5 years on average, at a liveweight of 30kg. As for cattle, this has major consequences on pasture stocking rate, since a large proportion of flocks is made of unproductive animals (empty/dry females, and males over 1 year).
- In conclusion, all productivity parameters show poor technical performance of livestock systems in the country, that can be explained by diverse factors including breeding, feeding and health, and limited technical skills of livestock owners. This poor productivity leads to farmers accumulating more animals to compensate.

D. Genetics and breeding

- Cattle breeds: The local cow breed in all Tajik regions is the result of diverse and successive crossbreeding between local indigenous breeds and Russian breeds during the soviet era; the absence of selection, and the high level of inbreeding has led to a deterioration of the genetic potential of this “breed”. However, conservation of indigenous breeds is not an issue anymore for cattle since all genuine indigenous breeds have already been absorbed by imported breeds.
- Breeding strategies are based on crossbreeding and importation of exotic genetic material. However, there is no differentiation between production systems in the choice of breeds for crossbreeding, and some breeds are used on production systems that they are not adapted for: the use of Friesian type (Holstein, Russian Black and White) in household systems for instance is not in line with the dual-purpose nature and the mobility of these systems, for which these breeds are not adapted at all. The crossbreeding also reduces the resilience of livestock systems to climate change and should be avoided. The swiss breed, which is also used for crossbreeding, is much more adapted to household systems, especially in mountainous areas, because of its faculty to withstand temporary feed deficit, its ability to walk, and its capacity to produce good quality carcasses.

E. Herd management

- One of the reasons that explains the poor reproductive performance of livestock is herd management: heifers kept in collective herds are served too early, which heavily compromises their growth and their future reproductive health. Heat detection is also a major issue in smallholder herds, especially in winter where animals are tethered and are not in presence of bulls. These shortcomings are mostly due to the low capacities of farmers to implement more up-to-date husbandry practices. Most of them have never received any training or advisory services on livestock management, and the pastoral tradition and indigenous knowledge has been lost in the profound changes that the rural society underwent in the last decades.

F. Manure and fertility

- Availability of firewood is a major issue in rural areas, and dried cow dungs is thus used for cooking and heating. This leads to losses of soil fertility, and high carbon emissions compared to a system where manure would be used for fertilization. Cotton is also used for firewood, which increases its comparative advantage in comparison to other crops including fodder crops that cannot be used for providing fuel.

G. Quality and hygiene

- Milk sanitary quality is an issue, both for the industry and in terms of food safety and public health. Milking hygiene and milk handling is not satisfactory, in the absence of any regulations and incentives, and the prevalence of clinical and sub clinical mastitis is extremely high. Inadequate milking and milk handling practices at farm level may be due to poor knowledge, lack of appropriate equipment as well as inadequate on-farm infrastructures. According to the dairy industry operators, antibiotic residues is so far not a major issue.

H. Animal Identification

- Tajikistan is one of the few remaining countries in the region without any operational Livestock Identification and Traceability System (LITS), which is a major constraint for disease control, for breeding, control of livestock movements and theft, but also for pasture management (issuance of grazing permits and payment of grazing fees would require individual animal identification).

III. Sector Performance: Pasture management and fodder production

A. Overall pasture situation

- The pasture management systems that had been setup by the USSR regime have not been replaced by any formal pasture governance system, and the maintenance of pasture infrastructures (particularly in summer pasture or for accessing these pasture) is not ensured anymore. In the meantime, livestock inventories have increased significantly and consistently.

The combination of these two-phenomenon has resulted in an increased pressure on pasture located around settlements, and in lower utilization of distant and summer pastures.

- The problem has now taken the shape of a vicious circle: increased inventories lead to more degradation, that affects the productivity of pasture and livestock, compensated by further stock accumulation, and further degradation. The total pasture area stands at around 3.8 million hectares. Of these, 72% are registered as summer pasture, the rest as winter pasture. Another classification of these 3.8 M ha of pastures which further confounds their management is that, 2,818,000 or 72% are considered as agricultural land (Tajstat, 2019), 28% 1,090,000 as forests (Land and Geodesy Dept, 2019), less than 1 % or 20,000 ha (Committee for Environmental Protection, 2019) as protected areas.
- In terms of regional distribution, Khatlon is by far the region with the largest pasture domain, with around 30% of national total, followed by RRS (28%) and Sughd (19%); the remaining 23% is in GBAO.
- All information sources concur that pasture degradation is at an advanced stage: 85% of pastureland are subject to erosion (ADB 2004), and 4% of pastureland are destroyed (UNDP 2010) and cannot be rehabilitated. This is mostly caused by overgrazing since 89% of summer pasture and 97% of winter pasture can be considered as overgrazed (UNEP 2011). However, in recent years, around 100,000 ha of pastures have been improved (through pasture rotation or infrastructures).
- One of the aggravating factors for degradation of pasture located around human settlement is winter grazing: because of the low availability of conserved fodder (hay) for stall feeding during winter, animals are grazed also in winter, when pasture are at their most vulnerable stage (no vegetative growth, waterlogged soils).
- Overstocking and overgrazing is occurring mostly in collective pasture used by household farms. Accumulation of livestock by large farmers doesn't appear to be the root cause of pasture degradation as often pointed, since more than 90% of animals are owned by small household farms. Because household farms are also the main provider of migrant workers, the linkage between remittances and accumulation of animals is likely, as it is often the case in central Asia.
- Out of the 2,8 M ha of pasture classified as agricultural land, 37% are allocated to dekhan farmers. The rest is shared by agricultural enterprises (32%), state farms (16%), individual farms (3%) and other users (12%). The Household farms do not enjoy any primary usage rights on pasture and can also use pasture in collective way if the community is able to secure secondary usage rights from dekhan farmers, Districts or Leskhoses.

B. Comparison of animal inventories with pasture carrying capacity.

- In order to quantify the magnitude of the overgrazing phenomenon, it is useful to compare the actual stocking rate of pasture to the Carrying Capacity (CC). The results below are extracted from the National Agricultural Investment Plan developed in 2020 with the support of FAO.
- According to the NIP, the actual carrying capacity at national level stands at 1,391,990 Livestock Units (LSU), whereby the actual inventory amounts to 2,858,600 LSU. This means that, to adjust the stocking rate to the carrying capacity, inventories should roughly be divided by 2.3
- This target could be considered as unrealistic; however, the analysis of herd structures show that the number of unproductive animals is close to 50%: dry cows represent around 2/3 of total cow population because of long calving intervals and short duration of lactations, and males are kept as long as 3 years, when they could be sold as yearlings if there was a market for this type of animals, or at around two years if more intensive fattening itineraries were used. Therefore, proper herd management systems ,particularly reproductive one, could reduce the number of animals.

C. Fodder and feed production

- USSR had established an elaborate organization for procuring and distributing feed and fodder in different republics, based on local comparative advantages. Today, livestock farmers have

³ The comparison of carrying capacity with actual stocking rates disaggregated per District will be conducted during project design

to rely on available local feed resources, but these are insufficient both in terms of quantity and quality.

- A total of 99,181 ha is cultivated for fodder production throughout the country: this represents 2% of total agricultural land, and 7% of total crops. The main fodder crops are annual grasses (60%) and corn for silage (18%). Most of the cultivated fodder crops are found in Dekhan farms and agriculture enterprises. 99% of fodder produced in the country is in the form of hay. In total, 616,000 tons of cereals are used for animal feeding, which represents 50% of the national production of cereals (1,277,000 t). The annual production of cotton seeds amounts to 210,000 tons (FAOSTAT); However, it is difficult to know how much of this is used as feed, as whole seeds, or as cake/meal after oil extraction. The contribution of cotton to the overall feed supply is however significant.
- The comparison between feeding needs and supply at national level has also been undertaken in the scope of the NIP. This analysis leads to the conclusion that only 55% of feeding needs are covered. Pasturelands supply 68% of the feeding needs, cereal grain provides 18% while straw provides 8%. Fodder crops only represent 4% of the feed supply, and 2% of the needs. This is thus an aspect where investment's efforts should be focused.
- Fodder conservation and utilization for the stall-feeding period is limited by (i) the availability of hay fields and fodder crops, especially for household farmers who have very small plots cultivated with food crops in priority (ii) limited skills on fodder harvesting, conservation and quality management (iii) availability of infrastructures, and (iv) availability of equipment (hay and silage harvesting equipment). This is particularly true in household farms, where hay is often harvested manually, stored in unprotected stacks outside the barn, leading to losses and spoilage. The insufficient fodder conservation for the stall-feeding period has an impact on seasonality of production, which is a major issue for the dairy industry.
- Summer pasture and mobility: During the soviet era, an elaborate system had been established to manage summer pasture, including by constructing roads, shepherd shelters, water infrastructures, and organizing transfer of animals by trucks on long distances, including across republics. This system does not exist anymore, infrastructures are not maintained properly, and access to summer pasture has thus become difficult, especially for smaller herds. The livestock mobility, which is an efficient risk reduction and resilience mechanism, has thus decreased, and is now limited to larger herds and flocks.
- Transit herds: transhumance routes used by large herds and flocks during transhumance to access summer pasture often crosses territories of rural villages, which generates competition over pasture and water resources and conflicts. PMT is mandated to organize these transhumance routes by demarcating them and establishing resting stations where animals and shepherds can stop for the night. This has significantly reduced the conflicts related to transit herds according to PMT, but further investments are still needed, in particular in Khatlon region.

D. Pasture governance

- Pasture Users associations (PUUs): PUUs are the building blocks of the mechanism established in the Country in the last decade to delegate management of pasture to local communities and break the vicious circle of pasture degradation. PUUs were officially established by the 2013 PL. The PUU system is a mechanism of community-based governance of pasture, where the pasture users, organized in groups, become collectively responsible of the management of pasture. There are around 430 active PUUs in the country (out of around 3,000 villages in total). Most of them (383) were established by LPDP 1 and 2 in Khatlon.
- Pasture Users Unions (PUAs): PUA's role as per the Pasture Law is to establish the list of pasture users, participate in pasture commission, submit requests for allocation of pastureland, provide assistance to PUAs, and participate in the management of pasture that spread over several PUUs areas. Existing PUAs are mostly located in Khatlon, and were established with the support of LPDP I and II, but their functionality is not yet optimal and should be reinforced. There is no national umbrella organization of PUUs/PUAs (as it is for instance the case in Kyrgyzstan), but there could be a role to play for such an organization, especially in terms of policy participation and lobbying.
- Pasture commissions (PCs): PCs are placed under the leadership of District local Governments. Their membership is composed of local authorities, PUUs and PUAs representatives, and pasture specialists from regional PMT branches. Their role is crucial and consists in (i)

delineating pasture (ii) regulating pasture management, including solving problems & conflicts related to pasture (iii) calculating pasture capacity and preparation of PMP (iv) and monitoring of pasture. In reality, the existing PCs are confronted by a lack of means and are mostly active on conflicts resolution and approval of PMPs, which is an important contribution.

- Pasture Management Plans (PMPs): the PMP, together with the PUU, is a key feature of the PL, and according to the law, it is mandatory for each PUU to have a PMP. A PMP normally comprises of the followings: (i) a pasture map, (ii) a carrying capacity and stocking rate calculation, (iii) a plan for rehabilitation of infrastructures, and (iv) a pasture rotation plan. Some PMP also include an animal health plan, which is useful in order to plan and coordinate the control of diseases and avoid cross contamination among collective herds and flocks. A PMP normally has a 5-year duration.

E. Pastureland tenure

- All types of pasture are the public property of the Government of Tajikistan. Pasturelands are defined as farming land as per the 2004 Land Code. PUUs can apply to obtain either a land certificate (as primary user) or a lease (as secondary user) on pastureland. Obtaining a land certificate is possible for a PUU only if the land has not been allocated yet to a dekhan farmer, which is usually not the case. Obtaining a lease from a dekhan farmer who holds a land certificate is thus often the only solution for the PUU to get formal usage rights on pastureland. This has to be negotiated case by case and depends on the willingness of the dekhan, and does not provide a long-term guarantee for the PUU. For pastureland classified as forests and managed by the State Forest Agency, the only possible arrangement is for the PUU to obtain a lease agreement from the Agency, which is usually not a problem including for land not classified as pasture by the Forest Agency.

IV. Past and Ongoing Development Projects/Programs / Govt plans

A. Lessons Learned:⁴ pasture management.

- So far, only a handful of projects have dedicated significant efforts to pasture management and generated interesting lessons which are outlined below.
- Livestock and Pasture Development Project (LPDP) I and II: These two projects were financed by IFAD and implemented by the Ministry of Agriculture. LPDP I was completed in 2018 and LPDP II is still on-going; both were implemented in Khatlon. LPDP I was the first project to roll out the concept of PUU, that had been institutionally introduced through the first version of the pasture Law (2013). The main lessons generated under LPDP I and II regarding pasture management and in particular roll out of PUUs and PMPs are as follows:
- The creation of PUUs has been very well accepted by communities, probably because it was addressing an acute problem (pasture overutilization), but also because of the very concrete incentives associated with PUUs (grants for equipment and infrastructure);
- All PUUs have been able to develop PMPs which are being implemented and enforced, including in particular the pasture rotation plans, and pasture protection;
- Implementation of PMP have a real impact on pasture productivity (+15 % in average) and on degradation;
- Sustainability of PUUs is a delicate issue that requires attention and exit preparation. However, naturally without an on-going system of support or incentives to continue to perform some key functions these will not sustain beyond the project life.
- EU Watershed Management Project: ACTED, which was one of the implementing agency of this project, has supported the creation of around 20 PUUs, but instead of establishing them at village level as under LPDP, they were established at watershed level; the main lessons from this experience were as follows:

⁴ Ex-IFAD CN template: from previous IFAD's experience in the country and region, as well as those from similar projects financed by the Government or other development partners, that are to influence and inform the design of the project. Lessons learned should be derived from analytical work, supervision of ongoing projects, implementation challenges (e.g. start-up delays), best practices of development partners and local entities, and learning from project completion reports and independent evaluations

- Establishing PUUs at watershed level is more relevant from an ecological point of view to address management of natural resources, However, it is not always convenient from an administrative and sociological point of view (mobilization of communities is not as easy as at village level);
- Movements of transit herds should be controlled and regulated as they interfere in the management of pasture at local level;
- Pasture commission need to be operationalized and play their role in terms of regulation, including regarding transit herds.
- But the most important lesson generated by both projects, and confirmed by multiple other sources, is that introduction of efficient and sustainable pasture management systems is necessary to combat pasture degradation. However, it is also not sufficient, since it doesn't solve the problem of increasing inventories.

B. Lessons Learned:⁵ livestock development

- Despite its significant contribution to the National Economy (30% of Gross Agricultural Product is generated by livestock), the livestock sub-sector has been supported only by a small number of donors and projects. The projects that have provided the most significant support on livestock in the last few years were LPDP I and II, which also worked on improving animal husbandry and health on top of pasture development, and ECTAP (Enhanced Competitiveness of Tajik Agribusiness Project), which supported livestock value chains. These projects have generated important lessons learned:
- There is strong demand and interest from smallholder farmers for techniques that contribute to intensify production systems, including in particular breeding, fodder production, and animal health.
- Development of fodder production in smallholder systems is limited by the availability of arable land. It is thus necessary to envisage fodder production techniques that do not entail existing crop production (catch crops, intercropping, agroforestry, valorization of crops by products).
- In order to implement AI campaigns with a large outreach but with limited logistical burden, heat synchronization is indicated especially for remote communities, rather than working exclusively on natural heat.
- The Farmer Field school approach has been implemented for Livestock by Oxfam in Khatlon, and several organizations, including FAO, on crops. These experiences have confirmed the relevance of the approach in the Tajik context, including for livestock related issues. One of the lessons generated by Oxfam was that opting for farmers as facilitators was preferable, in particular for sustainability purposes.

V. Good Practices

- Some good practices generated under similar projects in the region (Central Asia) or in developing countries with similar livestock development constraints (East Africa and Middle East) could guide the implementation of CASP+:
- Importation of live animals is the most rapid and effective method to improve the genetic potential of herds. But it is costly and too radical for smallholder farmers that are often not able to cater for the needs of these animals. Livestock importation strategies also often lead to elite capture. On the other hand, AI is cheap and progressive and is the best way to improve the genetic potential of smallholders' animals, both from an economic and technical point of view. However, its impact starts to be really effective after 3 or 4 years only.
- In order to generate incentives for investments in production intensification, it is of foremost importance to invest in parallel in market access, so that the incremental production can find an outlet and generate additional incomes that justify the investment. These efforts have to be initiated together with the first investments on production, even if the production has not started

⁵ from previous IFAD's experience in the country and region, as well as those from similar projects financed by the Government or other development partners, that are to influence and inform the design of the project. Lessons learned should be derived from analytical work, supervision of ongoing projects, implementation challenges (e.g. start-up delays), best practices of development partners and local entities, and learning from project completion reports and independent evaluations

increasing yet, and even if there is no return on investment during a few years. Otherwise, once intensification efforts will produce its impact, the value chain would not be ready to absorb the incremental production, and this could lead to more severe economic losses.

- The dairy hub model has proven to be a very effective way to provide at the same time access to market, access to services and inputs, and access to knowledge for smallholder farmers. Practically, a dairy hub generally consists of a milk collecting point where farmers can bring their milk, but also buy services (AI or animal health for instance), inputs (feed or fodder seeds) and receive technical advice or training. The cost of these services is generally paid by the farmer to the hub through deduction on milk sales. A hub can be managed either by a cooperative, or through a productive alliance (see below).
- In countries where social cohesion is not strong, or where the legal framework is not conducive to establish cooperatives, milk collective centers and dairy hubs can be managed under 4P arrangements or productive alliances. Under such arrangements, a private sector actor, usually a dairy processor, manages the MCC/hub on behalf of the group. This guarantees a better control of milk quality for the processor and alleviates the management burden for the group. This system can work even if the MCC belongs to the group, totally or partially: there are for instances many successful examples where the MCC premises belong to the group, while the milk cooler belongs to the processor, and where the overall management of the MCC is under the responsibility of the processor, in the framework of an agreement between the two parties.
- The formalization of dairy value chain, through the creation of milk collecting centers can have negative impacts on nutrition, and on gender equality: in the absence of formal market, as it is often the case in Tajik rural areas, the milk is mostly under the control of women, who process, market it, and use it for household consumption. If a formal cash-based market is created, for instance through the creation of MCCs, the milk often passes under the control of men, depriving women from a precious source of income. However, there are mechanisms to ensure that women are not excluded from the process and are effectively organized for the purpose. The implementation of nutrition campaign in parallel to market support has proven to be an effective way to reduce the negative effects on nutrition. Supporting small scale processing units managed by women can be a way to reduce their economic losses and create alternative market opportunities.

VI. Project description

A. Proposed investment: rationale and relevance

Rationale and strategic approach

- The main inter-connected problems related to pasture and animal husbandry to be addressed by the project are as follows:
- The low productivity of animals;
- The excessive numbers of herbivore animals (around twice the carrying capacity) compared to the available feed and fodder resources;
- The excessive pressure on the pasture resource base, leading to degradation;
- The impact of climate change on the pasture resource (more acute and prolonged summer drought episodes, reduced availability of water limiting animal movements)⁶
- Lack of governance system for pasture, leading to irrational management and utilization;
- This combination of problems takes the shape of a vicious circle: the pasture degradation leads to lower animal productivity, which is compensated by increased numbers, which exacerbates degradation.

Rationale and strategic approach to pasture management

- Interventions related to pasture management will aim primarily at reducing the intensity of the degradation process, considering that reversing it and restoring the full pasture potential will only be feasible in specific contexts.
- The project approach will consist in promoting sustainable pasture management practices, in particular pasture rotation and observation of carrying capacities and resting periods, through the development and implementation of pasture management plans (PMP). IFAD experience on development and implementation of PMP is extensive (10 years in Tajikistan, and similar in neighboring countries) and successful. Specifically, this experience has shown that the pasture management plan is the instrument with proven capacity to ensure respecting carrying capacity and resting periods, and thus avoid further pasture degradation.
- Considering that the level of degradation of pasture is higher for those located in the vicinity of settlements, and that distant pasture, in particular high altitude summer pasture, are often underutilized, the project will also aim at re-balancing their utilization through strategic investments such as access roads and bridges, rehabilitation of water sources, shepherd shelters and night livestock yards. Those investments and the utilization of distant pasture should be envisaged also in the context of Pasture Management plans, to ensure sustainable utilization of this resource and observation of carrying capacity and resting periods.
- PUUs will be the cornerstone of this approach, given the positive results they have generated in Khatlon under LPDP. They will be the custodian of the PMPs, will be responsible for their formulation and their implementation, and will be supported by the Pasture Management Trust and Pasture Commissions in these efforts.

Rationale and strategic approach on fodder and feed

- In order to reduce the dependency of livestock on pasture, and thus their degradation, the project will promote utilization of fodder, concentrate feed and by products. Specific efforts will be dedicated to fodder harvesting and conservation, for consumption during the winter stall-feeding period or during drought episodes in summer. This critical behavioral change should contribute to improve animal productivity, reduce the seasonality of production which is detrimental to the performance of the value chain, and improve resilience to climate hazards. It will also benefit pasture condition by reducing the magnitude of winter grazing, which is particularly detrimental to the pastures.

Rationale and strategic approach on livestock intensification

- Livestock intensification will have two purposes: improving the livestock-based livelihoods and generating incentives to induce a progressive process of reduction of inventories.

⁶ See SECAP's Appendix 4 'GIS and remote sensing climatic and environmental analysis (draft)' and SECAP's Appendix 5 'Climate Patterns & Trends atlas of Tajikistan'

- Livestock intensification will be based on the three usual pillars: breeding, feeding, and health. One aspect cannot go without the other (if one aspect is missing, it becomes a limiting factor for the others) and efforts will have to be simultaneous and coordinated.
- The breeding strategy deployed by the project will aim at improving the breed in an incremental manner, in order to cope with the progressively increasing capacity of farmers. The breeds used will be selected carefully among hardy mountain breeds to preserve the mobility of livestock, which is a key resilience factor, to preserve the heat and cold tolerance, and the dual purpose of the animal for both dairy and or beef.
- On animal health, the strategy will be two pronged: it will aim at supporting veterinary public health to reduce the risk of exposure to transmissible animal diseases, and at promoting access to private veterinary services at close proximity to reduce the impact of production diseases (parasites, mastitis, etc.). Climate sensitive diseases (diseases that emerge, re-emerge or are likely to emerge will receive particular attention.

Rationale and strategic approach on market access and value addition

- It is necessary to ensure that the incremental production generated by the intensification efforts finds its way to the market, at a fair price. Lack of market incentives would otherwise jeopardize all efforts on intensification and reduction of animal population. However, marketing of livestock and its products is generally not a problem. However, where required because of the special issues in Tajikistan with distances and scattered production, the strategy will aim both at improving the quantities marketed, and the added value on products. The project will thus support investments both in marketing facilities for unprocessed products (such as milk collecting centers) and value addition through processing units. The project will also support the establishment of productive alliances between groups of smallholder farmers, and private sector actors, to ensure consistent, reliable, equitable and profitable market access (component 3).

Rationale and strategic approach on institutional support

- The project will combine and implement in parallel activities in the field, with rural livestock keepers' communities, and institutional support.
- The purpose of the institutional support activities will be to ensure that the institutional, policy and regulatory context is conducive and supportive to the investments supported on the ground. Therefore, in the domain of livestock development, the institutional support component (component 1) will aim at addressing the following issues:
- Fostering a culture of integrated natural resources planning and management (pasture, forests, water, etc.) based on evidence, specifically facilitating the management of pasture and livestock resources in the broader frame of the ecosystem, as a climate adaptive measure.
- Build and strengthen the capacities of institutions providing support or services, including indirectly, to the livestock keeping communities.
- Formulation or review of policies, strategies and regulations that support the adoption of new practices at community level.
- Piloting and promotion of innovative institutional arrangement involving public and private sector actors, that allow rural communities to take an active part in the public life and in economic activities.
- As much as possible, institutional support activities will address the same topics as those addressed on the ground, and vice versa. For instance, if the project supports breeding efforts at community level, it will also provide support to the review of the breeding strategy, and to public and private actors in charge of providing breeding services.
- This parallel approach should generate synergies and improve effectiveness on both sides: lessons from the field will provide evidence for policy dialogue, while policy changes will generate incentives for transformative investments.

Priority value chains:

- The livestock value chains targeted as a priority under the project will be those (i) on which smallholder systems have an economic comparative advantage and can become competitive on the domestic market, (ii) have the potential to improve resilience to shocks, in particular to climate change, (iii) have a moderate or no impact on pasture degradation (iii) have low carbon emissions and/or high carbon sequestration capacity, (iv) have a potential for women and youth

inclusion and employment . According to these criteria, the following value chains and production systems will be targeted:

- For cattle, the focus will be on dairy, which has a development potential because of strong and increasing market demand and availability of pasture resource, and can be envisaged by poor households with few animals.
- The project will try to aim at maintaining the dual purpose of dairy systems, especially for remote areas that cannot easily access the organized milk market. For this purpose, the project will also support meat value chain, and will facilitate commercialization of improved young males (yearlings) born from AI, through productive alliance arrangements with fatteners and feedlots.
- Small ruminant systems will not be targeted under this subcomponent because of their limited potential for intensification.

Barriers that need to be addressed (social, gender, fiscal, regulatory, technological, financial, ecological, institutional, etc.)

- The main barriers that the project will need to address in order to deploy the above-mentioned strategy will be the following:
- Social aspect / reluctance to the concept of cooperatives: Tajikistan rural communities usually have strong social cohesion which is in favor of collective initiatives such as PUUs, Vos and even dairy cooperatives; however, like in many former soviet countries, the concept of cooperatives has been marred by past experience, and is not always well accepted by farmers. However, experience has shown that where ownership and management are clearly delineated and it is clearly established that farmers will get remunerated for their individual production the concept works well. The main strategy to address this constraint will be to facilitate productive alliances between farmers groups and dairy processors, whereby the group has limited responsibilities over the management of the MCC, which is delegated to the private sector actor. Each producer of milk gets duly paid for her produce in a timely manner.
- Regulatory aspects/ absence of legal status for marketing cooperatives: Only production cooperatives can be legally registered which is a serious limitation for establishing collective milk collective centers for which the cooperative status appears the appropriate. In order to address this constraint, legally registered Village Organizations will be used as the promoter of collective initiatives such as MCCs.
- Financial / lack of financial products: the poor state of the financial sector and the absence of affordable financial products is a major constraint for adding value to livestock production in downstream processing and marketing activities. The project will finance public and collective goods through the matching grant mechanism, and it is expected that private sector partners will participate and invest in production and processing activities which are part of their own business plan and marketing strategy for key products such as dairy, meat, poultry, etc.

Climate relevance of proposed interventions: GCF investment criteria

Impact potential

- Support to livestock keeping communities will improve both mitigation and adaptation to climate change: In terms of mitigation, it is expected that support to intensification of livestock production systems, through breeding, improved feeding and health, combined with policy and regulatory measures on regulation of livestock inventories, will lead to a stabilization of animal inventories which have been increasing at a rate of 2.6% over the 1991-2018 period, and 1.6% between 2013 and 2019:
- Improved herd management and reproductive health will increase the fertility of cows, which will result in decreasing the proportion of dry and empty unproductive adult cows, which currently represent almost half of the adult cattle female population and contribute to increase in GHG emissions;
- Support to marketing of young males (yearlings aged 9-12 months), instead of 2-3 years as it is the case now, through the promotion of productive alliances with feedlots, will reduce the average duration during which males are raised on community pasture, thus lowering their carbon footprint and impact on natural resources;
- Roll out of PMPs limiting pasture stocking rates to the actual carrying capacity will be a first level of disincentive to livestock accumulation;
- Intensification of production systems, and in particular the reduction in the proportion of unproductive animals, will lead to a reduction of the CO₂e per ton of protein produced;
- Through policy support, the project will also support efforts to establish quota systems or taxation schemes that discourage animal accumulation (adopting these kind of policy measures is already envisaged by the Government and these efforts will be supported by the Project);
- Stabilization of inventories will be compensated by an increased productivity per animal estimated at +8% over the project duration.
- Reduction of pasture degradation, pasture protection and restauration, will also increase their carbon sequestration potential. Based on LPDP experience, the average increase in pasture productivity caused by the implementation of PMPs stands at about + 15%. It is expected that the carbon sequestration potential of these pasture will increase by a similar factor;
- It is therefore expected that the moderate increase in CO₂ equivalent from animals will be offset by the CO₂e stored in the improved grasslands.
- In order to quantify more accurately the impact of project on emission associated with changes in livestock production systems, and the sequestration and offset induced by improved pasture management, the GLEAM-i model has been used twice during the project design process. Once at the stage of concept note formulation, and once at the final design stage, using more accurate data in particular on herd dynamics.
- In terms of adaptation, the project will support the transformation of livestock production systems into more climate resilient ones. The main adaptation outcomes that are expected will be as follows:
- Improvement of the cattle breeds will require utilization of improved exotic breeds. Selection of the local breed does not appear as a workable option considering the time it would require for improving its performance. In order to ensure that crossed animals will remain resilient enough to climate change, the breeds used for AI programs will need to be carefully selected: they will need to be hardy breeds, with a good ability to walk (in order to preserve mobility and capacity to use summer high altitude pasture, which is a resilience factor), and capacity to withstand temporary feed deficit (during winter, or summer). Several small hardy breeds originating from the Alps (including the original Swiss breed, already promoted by the State enterprise of Breeding and AI) have all these qualities.
- Fodder varieties promoted in demonstration fields and possibly FFS will be selected based on their resilience to climate change and drought in particular. This selection will be done by partnering research institutes to confirm their adaptation to local conditions and to climatic stress in particular.
- Utilization of fodder shrubs and trees in the scope of CsCAP will contribute to protect soils against erosion, but also to provide fodder during dry season.

- The promotion of fodder conservation techniques (hay, silage) for utilization during the stall-feeding period, but also in summer during drought episodes, will also reinforce the capacity of systems to withstand drought episodes that are becoming more frequent and intense.
- Investments in distant summer pasture such as access tracks, bridges, water points, animal shelters and shepherd housing will help in restoring transhumance practices, that have been almost abandoned during the last decades. Vertical transhumance (from plains to mountains) will enable herds and flocks to use pasture resource that are underused, and that are less subject to the negative effects of climate change, drought in particular.
- Diversification in livestock activities that are not dependent on pasture, and thus on climate, such as poultry, will reduce the vulnerability to climate shocks.

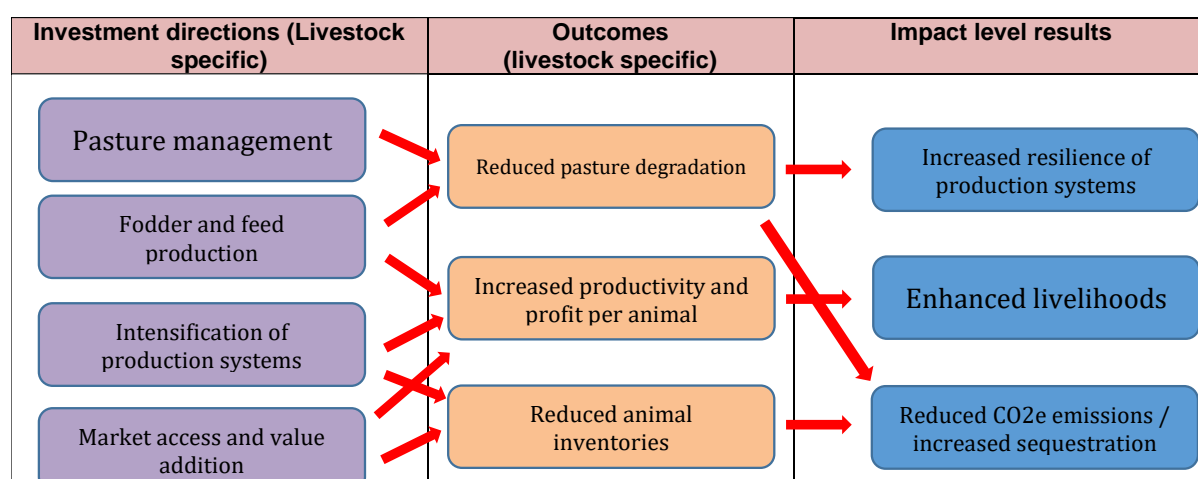
Paradigm shift potential:

- Up to now, large scale development programs, including those supported by IFAD, have mostly addressed livestock from the perspective of pasture management. These programs have been quite successful and have been able to establish efficient and sustainable pasture management mechanisms that reduce their degradation. But none of these programs have tackled the issue of increasing livestock population especially of low productive animals. However, without addressing this pivotal problem, all measures regarding pasture protection will have a limited impact.
- There is a general consensus in the country, from farmer level to decision makers at the national level, that reduction of livestock inventories can be achieved only if the combined implementation of the following sets of measures is deployed in parallel: (i) intensification of production systems, to enable farmers to produce more with less animals, (ii) diversification and support to economic activities that are not pasture dependent, and (iii) policy measures. Some pilot actions with limited scope have shown that the intensification pathway was feasible, but this has been done at a limited scale, and without parallel action on policy and regulatory environment.
- The entry point and main incentive for intensification under CASP+ will be breeding : there is a wide consensus in Tajikistan with significant experience from other countries which have embarked on a similar pathway such as Australia that improving breeds will be the most successful trigger for reducing herd size. The effect of crossbreeding will be both to improve productivity and to increase the value of animals, thus reducing the need for large numbers. Policy measures can also support these positive incentives to herd size reduction through policy dialogues and a series of measures have been proposed through the NIP and their adoption will be encouraged by the programme, through inclusive policy dialogue and policy formulation support:
 - Incentives to PUUs that are able control the size of populations on their communal pasture (in kind, in the form of communal investments).
 - Subsidies to individuals for (i) destocking, in case of drought, or (ii) to encourage farmers to sell cattle at a younger age than is currently the case (this policy measure is for instance in force in Kazakhstan)
 - Establishment of grazing permits mechanisms based on actual carrying capacity of pasture;
 - Establishment of a progressive and pro-poor system of animal taxation: taxation of stock should be based on number of heads of animal, in order to discourage livestock accumulation, but taxation rates should be increasing with the size of herds and flocks, in order not to penalize poor households that rely mostly on livestock for their livelihoods.
- This project will be the first large scale programme to propose such a paradigm shift in the country with a combination of the three types of measures. It is expected that the lessons and evidence generated will be replicated and scaled up and will lead to a nationwide transformation of the sector. The definition of a comprehensive approach leading to a sustainable number (negative growth until sustainability) is also an effort carried out in neighboring countries in Central Asia with similar geo-climatic and socio-economic characteristics (and the approach appraised with positive notes by the Green Climate Fund).⁷

B. Contribution to the project impact level results

⁷ <https://www.greenclimate.fund/project/fp116>.

- In order to reverse or at least slow down the pasture degradation process, The project will act on two main triggers: the resource (pasture, fodder and feed), and the user (livestock populations). Enhancing the feed resource by improving pasture management on the one hand, and increasing fodder production on the other, will reduce pasture degradation and improve resilience of the systems. Improving the productivity of animals and the access to market will firstly increase livestock-based livelihoods and reinforce resilience. But it will also induce a reduction of inventories, which will reduce pasture degradation and reduce carbon emissions. To be really effective and induce a significant reduction of animal populations, these incentives to intensification and reduction of herd size will be backed with policy measures such as taxation or quota measures that disincentivize accumulation.



Contribution to the project outcomes

Outcome 1: Strengthened institutional and regulatory systems for climate-responsive planning and development.

- The main contribution of livestock related activities to project outcome 1 will be achieved through:
- Strengthening the capacities of national institutions in charge of delivering public good services to the livestock sector, in particular in the domain of (i) Pasture management (Strengthening capacities Pasture Meliorative Trust to deliver technical backstopping to PUUs for the implementation of their PMP), (ii) AI and breeding (Increasing capacities of the State Enterprise for AI and Breeding to provide AI services to smallholder farmers), and (iii) feed and fodder (Supporting Research institutes to conduct adaptation tests on fodder varieties and alternative feeding strategies)
- Supporting higher and diploma level education institutions for the review of existing post graduate curricula for agronomists, pasture specialists, zootechnicians and veterinarians
- Supporting the formulation or review of national policies, strategies and regulations in the domains of pasture management (Pasture Law), and breeding (current breeding plan expires in 2022)
- Supporting policy dialogue for formulation of regulatory frameworks aiming at controlling the increase in livestock inventories (grazing permits, progressive pro-poor taxation systems, quotas)

Outcome 2: Improved management of land or forest areas contributing to emissions reductions

- The main contributions to outcome 2 will be achieved through:
- Establishing community-based pasture governance mechanisms (PUUs, PUAs and PCs)
- Developing and implementing PMP as part of CsCAPs
- Supporting investments in pasture restoration and management as part of the CsCAPs

Outcome 3: Strengthened adaptive capacity and reduced exposure to climate risks of smallholder production systems

- Disseminating technical innovations and building capacities of smallholder farmers on climate resilient production practices, with focus on fodder cultivation and conservation
- Improving the productive potential of herds through animal breeding (AI and off farm mating stations)
- Providing incentives for livestock intensification (and this reduction of inventories) through improved market access
- Providing opportunities for diversification of livelihoods through livestock related activities that have no or a lesser impact on pasture

Sustainable development potential:

- In addition to the environmental benefits, the project will have substantial economic benefits for the targeted populations. Investments and capacity building in breeding, animal health, feeding, will result in increased productivity and production. Support to diversification of livelihoods (poultry farming, fruits and vegetables) will generate additional sources of incomes, and market access will increase the sales and value of products.

Needs of the recipient:

- This programme will mostly support and finance public goods, and bring about a reduction of carbon emissions and increase capacity of carbon sequestration). The programme will respond to the capacity gaps that have been highlighted by public implementing agencies operating in the livestock and pasture domains, which prevent them from fully implementing their mandates: Pasture Management Trust for enforcement of the pasture Law and support to PUUs, State Enterprise for AI and breeding for implementation of national breeding plans, Land and Geodesy Department for pasture monitoring, academic Institutions for research and education on pasture management. The programme is also aligned to the national priorities for the sub-sector, in particular the implementation of the Pasture Development Programme for Tajikistan, the roll out of the pasture Law, and the implementation of the National Breeding Plan.

Country ownership

- The current programme has been designed in close consultation with the Government and in particular the Ministry of Agriculture and the Committee for environmental protection. Other stakeholders such as relevant public sector agencies, development partners, local communities, private sector actors, have also been consulted during the design missions.
- The paradigm shift proposed by the programme (support livestock intensification to reduce dependency on pasture) is fully in line with the recommendations and requests expressed by the Government, and reiterated at multiple occasions (supervision of ongoing IFAD funded projects, consultations in the scope of the formulation of the National agriculture Investment Plan). The Ministry of Agriculture has a dedicated Project Management Unit in charge of implementation of IFAD funded project. This PMU is experienced and well-staffed and has the capacity to implement project activities related to pasture management and livestock intensification.

C. Alignment and ownership

Adherence with relevant National Policies

- The project is fully aligned to the National (Agriculture) Investment Plan 2021-2030, which is currently being developed by the Ministry of Agriculture with the assistance of FAO. All the investments and policy options planned for under this project are also reflected in the NIP. The NIP itself is fully aligned to the Mid Term Development Programme (2016-20), and the Agriculture Reform Programme (2010-20), as well as the Comprehensive Livestock Industry Development Program (2018-22), which identifies breeding and pasture development as the top sector priorities. The project will also be a major contribution to the implementation of the "Pasture Development Programme for Tajikistan", which is the implementation framework for the Pasture Law. The breeding activities undertaken under this project will also be aligned and contribute to the 2018-22 breeding plan.

Adherence with Nationally Determined Contributions

- The implementation of the project will contribute to the attainment of the INDC targets as follows:

- As demonstrated by the GLEAM model (Annex 23), the project will contribute to a net cumulative incremental carbon balance of -2.95 million tones CO₂eq over 20 years compared to a situation without project. Cattle are responsible for 72% of this balance while sheep account for 22% and goats 6%. This will be achieved through:
- Reduced pasture degradation and increased carbon sequestration via systematic promotion of georeferenced pasture management plans.
- Through FFS, the project will support adoption of fodder production and conservation techniques, as well as supplementation of rations with concentrates, which will improve the digestibility of rations and reduce enteric fermentation.
- In addition, stimuli to the reduction of growth of livestock inventories resulting from a combination of incentives for intensification of livestock production systems and policy measures.

D. Outputs

- The main outputs expected from livestock related activities, as well as their indicators and targets are presented in the table below:

Project outputs	Livestock & pasture specific outputs	Indicators	Targets
Component 1: Strengthening enabling conditions for transformative management climate adaptive management of natural resources			
Output 1.1: Capacities of relevant national institutions for climate-resilient natural resources management are strengthened	<ul style="list-style-type: none"> - Strengthened capacities of Pasture Meliorative Trust to roll out Pasture Law at community level and provide technical assistance to PUUs, PUAs and PCs - Climate change issues ed in university and training institutions curricula on pasture and livestock husbandry - climate sensitive technical innovations tested and validated by research institutes 	<ul style="list-style-type: none"> • Number of PMT regional Office refurbished 	1 (Kulob)
		<ul style="list-style-type: none"> • Number of staff seconded to PMT 	1
		<ul style="list-style-type: none"> • Number of training curricula revised to integrate module on CC 	2 (bachelor and master on pasture management)
		<ul style="list-style-type: none"> • Number of climate proof fodder varieties tested 	30
		<ul style="list-style-type: none"> • Number of research projects on climate resilient practices supported 	6
Output 1.2: Enabling environment for climate adaptive, inclusive and integrated management of pasture, forestry and livestock resources is enhanced	- Pasture regulatory frameworks are regularly updated and improved	<ul style="list-style-type: none"> • Enforcement texts (decrees or orders) of Pasture Law proposed and validated 	2
	- Thematic livestock strategic framework on breeding updated	<ul style="list-style-type: none"> • Number of thematic strategies reviewed 	1
	- Training on livestock policy tools	<ul style="list-style-type: none"> • Number of livestock policy tools on which 	2 (GLEAM-I and LS IPT)

		training is delivered	
Component 1: Investments in community capacity for adaption and resilience to climate change			
Output 2.1: 510 Climate-sensitive Community Action Plans (CsCAP) developed	- Pasture Users Unions or Pasture Users Groups established and strengthened	• Number of PUUs or PUGs	400
	- Pasture Users Associations established and strengthened	• Number of PUAs	21
	- Pasture Commissions established and strengthened	• Number of PCs	21
	- Formulation of PMPs	• Number of PMPs developed	400
	- Implementation of Pasture Management Plans	• Number of PMPs implemented and monitored	400
Component 3: Strengthening livelihoods for enhanced resilience through market-based approaches			
Output 3.1.: 40,000 smallholder livestock farmers receive AI, animal health and access to climate resilient innovations services to increase productivity of their livestock production systems.	- Training of youth in Artificial Insemination	- Number of youths trained	50
	- Organization of Artificial Insemination Campaigns	- Number of AI performed	100,000
	- Establishment of Off-Farm Mating stations	- Number of stations	300
	- Dissemination of climate resilient innovative technologies through demonstrations and exchange visits	- Number of demo plots	21
		- Number of field days organized	400
	- Development of FFS curricula and training of facilitators	- Number of FFS facilitators trained	40
	• Roll out of Farmers' Field Schools	• Number of FFS operational	80
		• Number of farmers trained in FFS	2,000
9 productive alliances between livestock producers groups and private aggregators established and operational by End of year 4	• Identification and assessment of market and business opportunities	• Number of feasibility studies/business plans	14 (12 for dairy, 2 for beef)
	• Provision of financing and technical support to the business partnerships for selected livestock commodities.	• Number of productive alliances established and supported	9 (8 for dairy, 1 for beef)

E. Activities

- Activities pertaining to pasture management and animal production fall under the three project components. Their detailed description is provided below under each relevant output and activity.

Activities implemented under Component 1: Strengthening public sector capacity for transformative climate-resilient management of natural resources

Output 1.1: Capacities of relevant national institutions for climate-resilient natural resources management are strengthened.

Activity 1.1.1: Capacity Development of public institutions on climate resilient ecosystem management.

Sub activity 1.1.1.1. Strengthen capacities of Pasture Meliorative Trust to roll out Pasture Law at community level and provide technical assistance to PUUs, PUAs and PCs

- The Pasture Meliorative Trust is the institution in charge of coordinating the implementation of the Pasture Law and the “Pasture Development programme for Tajikistan”. This mandate includes in particular the roll out of community-based Pasture Governance mechanisms (PUUs, PUAs, and PCs), and the training and technical backstopping to these institutions. Key aspects of the technical support provided by PMT to PUUs include the formulation, the updating and the monitoring of Pasture Management Plans. However, the PMT is currently not in position to fulfil this role and the main source of support for PUUs, PUAs and PCs are so far projects. It is of foremost importance, to ensure the sustainability of the system, that this role is entirely handed over to PMT (Therefore, under component 2, monitoring of PUUs will be entirely delegated to PMT, which was not the case under previous IFAD funded projects where this was done by the PMU).
- The support will comprise both technical and logistical assistance in order to enable PMT to deliver services as per its mandate to reach out to beneficiary communities in the project area. It will aim at reinforcing the operational capacities of both PMT headquarters, and its decentralized office in Khatlon region. Technical assistance will include secondment of staff (recruitment and secondment of two pasture specialist during 5 years – 1 based at PMT headquarters, one in the Kulob Regional Office). Logistical support will include the refurbishment and equipment of the Kulob regional office, and the provision of 2 vehicles for field missions. The focus on the Kulob (Khatlon) regional office is justified by the project concentration of activities in Khatlon (16 out of 21 Districts), as well as by the high concentration of livestock (5.5 M Sheep Units representing 74 % of the total ruminants' population in the project area) and presence of large pasture areas.

Activity 1.1.3. Enhance technical capacities of national livestock institutions to ensure efficient provision of public animal health and production services to smallholder farmers through efficient partnership between public and private institutions

Sub-activity 1.1.3.2. Improve the outreach of breeding services provided by State Enterprise for Animal Breeding and Artificial Insemination to areas and communities targeted by the Project

- The State Enterprise for Animal Breeding and Artificial Insemination is the national institution mandated to provide breeding services throughout the country, including through Artificial Insemination and distribution of improved breeding stock. However, considering its limited resources, these services are so far mostly benefitting dekhan farmers and agricultural enterprises, but hardly reach the household farmers located in remote areas.
- The project will support the Kulob regional Center through provision of additional equipment (laboratory equipment for semen production, AI kits for AI techs, liquid nitrogen production machine), in order to enable the State Enterprise to implement the large-scale insemination campaign envisaged under Component 3. The focus on Khatlon region is justified by the fact that 41% of the total adult cows are concentrated in this region, by the lower outreach of AI services in this region compared to Sughd and RRS, and by the inadequate operationality of the Kulob center (no operational laboratory, no liquid nitrogen production facility, all the liquid nitrogen needed in the region has to be transported from Dushanbe). The SEABAI is also in charge of developing the strategic framework for breeding and AI and will be supported in updating the breeding strategy under activity 1.2.2.

Activity 1.1.4: Build capacities of research and academia institutions on climate resilient ecosystem management (CEP)

Sub-activity 1.1.4.1. Integrate climate change issues in university and training institutions curricula.

- Training of pasture and livestock specialists is currently based on conventional curricula that do not provide any specific knowledge and skills on climate change related issues. However, having technical specialists trained on these aspects appears as a necessary condition to enable the country to address climate related challenges at policy level, but also at grassroots level in extension for instance. The main climate change issues related to livestock include control of climate sensitive diseases, climate resilient fodder and feed production, resistance of various species and breeds to climate hazards, and of course carbon emissions and sequestration.
- As per request of the Government, the project will provide technical assistance to Tajik Agrarian University, Tajik Academy of Agricultural Science to review of existing post graduate curricula for pasture specialist, zootechnicians and veterinarians, to streamline ecosystem management and climate change aspects in the tuition programs. On pasture specifically, the project will support TAU to support the development of new master's curriculum that the University intends to initiate, to complement the existing Bachelor's programme on Pasture Management developed with the support of IFAD/LPDP. The project will provide technical expertise for the development of the master's curriculum, but also financial support to cover the costs related to the international accreditation.
- In order to ensure that climate change related issues are also addressed in training curricula of livestock technicians at the diploma level, training of trainers providing teaching in these institutions will also be organized, based on the developed training module on CC.
- Sub-activity 1.1.4.3. Enable research institutes and the private sector to produce evidence on NRM and Climate Change for policy dialogue and climate sensitive technical innovations.
- The purpose of this sub activity will be to provide financial support to targeted research institutions active in the domain of agriculture and natural research management, namely Tajik Agrarian University and Tajik Academy of Agricultural Science to (i) develop climate sensitive technical innovations in the domain of livestock and pasture management, that will then be disseminated at community level in the scope of extension activities (demonstration plots and FFS under component 3), and to (ii) generate evidence and lessons learnt on climate smart practices for policy dialogue.
- On technical innovations, the focus will be on adaptation, testing and comparison in Tajik conditions of (i) existing climate smart technologies such as climate resistant fodder crops (including fodder trees) species and varieties, (ii) climate resilient livestock species and breeds, (iii) testing of water saving technologies, (iv) alternative feed sources (including industrial and crop by products), (v) carbon emission reduction and carbon sequestration technologies (biogas, alternative feed), (vi) innovative agricultural practices for fodder production integrated with other crops: intercropping, catch crops, agroforestry.
- The project will launch bi-yearly calls for proposals for research projects that are in line with the project strategy (criteria is included in the PIM). Every two years, 2 research projects will be supported (6 in total) and their implementation will not exceed 3 years.
- The maximum grant amount per research project will be USD 50,000 (40,000 USD on average). The grant will cover the cost of goods (inputs, equipment) and services, while the cost of scientific and technical follow up, evaluation, and documentation will be the contribution of the Research Institution.
- The research institutions will be encouraged to involve students in the reach work.
- The research institutions will also be encouraged to strengthen the partnerships and linkages with extension (in particular, the State Enterprise for Capacity development), through the activity 3.2.3. (Support adoption of climate resilient innovative technologies) that will support dissemination of technical innovations from research to grassroots level, through demonstration and extension. This is currently one major weak link of the research-extension model in the Country.

Output 1.2: Enabling environment for climate adaptive, inclusive and integrated management of pasture, forestry and livestock resources is enhanced

Activity 1.2.1: Promote an inclusive and integrated policy dialogue (CEP)

- Regular workshops involving all stakeholders (Relevant ministries and public agencies, stakeholders' organizations including PUAs and producers organizations, private sector representatives) will be held aiming at enhancing the mainstreaming of climate adaptive management practices of livestock base resources. Support to existing thematic Platforms (e.g. Pasture Working Group) through policy briefs and newsletters, will ensure a continuous update of all institutional stakeholders and also provide advocacy and lobbying opportunities for the adoption and enforcement of integrated measures. Furthermore, technical assistance facilitating the use of decision making/policy tools on climate change and livestock will be applied (e.g. GLEAM-i, LSPIT) and the status of the implementation of climate adaptive policies on the ground verified.
- The envisaged sub-activities include the following:

Sub-activity 1.2.1.2. Support on policy tools

- Two policy tools could play a significant role in guiding policies related to livestock and pasture management:
- **GLEAM-i** is an open, user-friendly and livestock specific tool designed to support governments, project planners, producers, industry and civil society organizations to calculate carbon emissions using Tier 2 methods. GLEAM-i can be used in the preparation of national inventories and in ex-ante project evaluation of the assessment of technical improvements in animal husbandry, feed and manure management. GLEAM-i allows the direct comparison between Baseline and Scenario conditions. GLEAM-i has been run at design stage (ex-ante) and should be run again at inception stage when targeted villages (including animal population and pasture size) will be known precisely to fine tune the baseline situation. It should be run again at mid-term and completion stage based on the indicator's identified. Beyond the project scope, it would be of great interest for the Government to assess carbon emissions at the national level in order to monitor the country achievement of NDCs and the potential impact of livestock and pasture policy measures on NDCs.
- **Livestock Sector Investment Policy Toolkit (LSIPT)** LSIPT is aimed at assisting government and development partners to: (i) evaluate and estimate actual and potential contributions of livestock to economic growth, poverty reduction, food security and nutrition, and the reduction of GHG emissions; (ii) conduct prospective analysis to optimize synergies and manage trade-offs between these areas; and (iii) improve policy setting and investment decisions. LSIPT can be used to develop Livestock Master Plans or more simply to cost and evaluate the impact of policy measures. To achieve this, the project will recruit a consultant who will provide training of selected staff of CEP, PMT, TAU, TAAS, and PMU on the utilization of the revised version (online) of the Livestock sector and Policy Toolkit. Two 10 days training sessions will be organized by CEP and MoA⁸ (via PMU) during Year 2 and year 4, with the same participants. The first 10 days training session will aim at enabling the participants to acquire the required skills to utilize LSIPT. Participants will be provided with some concrete examples of utilization of LSIPT, outputs and relevance for decision making (based on Ethiopia, Rwanda, India cases). They will then be taken through the different modules to understand the overall logic of the tool, the linkages between modules, and the functioning of each module. Practical simulation exercises based on existing data set will then be undertaken. During the period between the two training sessions, participants will collect the necessary data required to run the model at national level. The consultant will provide technical support to this remotely. During the second session, the participants will collectively run the LSIPT to model the National Livestock sector. This will be facilitated and technically supported by the consultant. At the end of the session, a stakeholder workshop with relevant decision makers will be organized to present the output of the model, including the investment scenarios that have emerged from the analysis.
- In order to enable national actors to utilize these policy tools, trainings facilitated by international experts will be organized, and participation of national experts in trainings organized by FAO at regional or global level will be facilitated and encouraged.

⁸ MoA is a project executing entity via the State Enterprise Project Management Unit (PMU).

Activity 1.2.2: Technical assistance for review of livestock related strategic and regulatory frameworks.

Sub-activity 1.2.2.1. Improvement of the Pasture Law

- The 2019 version of the pasture law addresses most of the gaps of the previous version (2013) related to rights of PUUs in the scope of the secondary user's lease agreements. However, it does not address the sensitive and critical aspects related to control of livestock inventories. The main entry point to address this issue from a policy and regulatory point of view would be to include in the law, provisions to enable PUUs to establish systems (grazing permits, quotas, etc.) that ensure that carrying capacities are observed and that stock accumulation is penalized. If these types of measures were framed in the Pasture Law and applied by all PUUs, the impact on animal inventories would be expected to be substantial.

Sub-activity 1.2.2.3. Review of the breeding strategy:

- Under this output and activity, the only sub-activity that is directly related to animal husbandry is the support to the review of the breeding strategy. The current breeding strategy (2018-2022) requires review in particular to address issues related conservation of indigenous genetic resources, and introduction of exotic breeds, that need to be navigated in the context of climate change, in order not to affect negatively the resilience of animals to climate shocks. Given that the project will support crossbreeding and introduction of exotic breeds, it is of foremost importance to frame this intervention and provide clear guidelines to mitigate the risks associated with this transformation.
- FAO has been involved in supporting the formulation of breeding strategies in various countries and has a clear comparative advantage on this topic. It will thus provide the required technical expertise. The project will also facilitate the organization of national consultations (2 consultations and 1 validation workshops) to ensure the inclusivity of the process.

Activities implemented under Component 2: Investments in community capacity for adaption and resilience to climate change

Output 2.1: By year 3, 400 Climate-sensitive Community Action Plans (CsCAP) developed

Activity 2.1.2: Establishing relevant local institutions.

Sub-Activity 2.1.2.3: Establishment and strengthening Pasture Users Unions or Pasture Users Groups

- PUUs are the backbone of the improved community-based pasture management governance framework that the Governments intends to roll out at Country level, and the project will support these efforts in the intervention area and provide lessons for the national level. As per the Pasture Law, Pasture Users Unions should be established at village/community level, and be officially registered; they can then apply to the local authority to be allocated some public pasture (e.g. those managed by the State Forestry Agency or under the State Land Reserve – managed by Districts) or negotiate with Dekhan Farmers to obtain a lease for pasture that were already allocated to private owners.
- In villages where there is no need for a formal PUU, for instance when there are no opportunities for leasing land from the Government or dekhani farmers, Pasture Union Groups established under Village Organizations can fit the purpose and be in charge, under the umbrella of the VO, to develop and manage the PMP. PUUs have then the obligation, as per the law, to develop a Pasture Management Plan and to submit it to the District Authority for approval. This plan would contain areas of investment identified by the community to make the households more resilient through proposals for infrastructure and equipment for crop production or village protection from climate shocks.
- The project will support the creation of PUUs or Pasture Union Groups (under Village Organizations) in all the 400 targeted communities. In communities where a PUU is pre-existing (established with the support of LPDP I or II, by PMT or by another project), the project will strengthen the existing PUU. It is expected that formal PUUs will be established in around 200 villages, and that PUGs under VO will be established in the remaining 200 villages.
- For newly established PUUs/ PUGs, the support will consist in:
 - Mobilizing the pasture users and raising awareness about the need to community-based governance system, and rights of obligations of a PUU/PUG

- Support to the creation of the PUU/PUG, including designation of executives and establishment of internal regulations.
- Legal support for the registration of the PUU/PUG and allocation of pastureland users' rights. This will consist in assisting the PUUs to obtain land lease certificates. The PUU will cover the cost of administrative procedures to obtain this certificate, as beneficiary contribution, and the CF will guide the PUU through the administrative process.
- These steps will be facilitated by the Community facilitator (local NGO) contracted by the project, together with the Pasture Management Trust (including regional staff of PMT).

Sub-Activity 2.1.2.4: Establishment and strengthening of PUA's.

- PUAs are "associations" of PUUs and should be established at District level as per the provisions of the Pasture Law. Their primary role is to address pasture related issues pertaining to a higher geographical level than the community/village, for instance for movement of animals across communities, including management of transit herds/flocks, and pasture infrastructures that benefit to several communities. Another important function of PUAs is to represent PUUs and advocate for their rights at District level, regions and central level, and represent them in Pasture Commissions.
- The creation of PUAs has been supported by LPDP I and II in their areas of intervention. This process only implies marginal efforts and costs but generates substantial benefits as it enables addressing issues that cannot be addressed at community level only but require a larger scope of intervention. The project will support the establishment of PUAs in the 21 targeted Districts. The process will be facilitated by the Community facilitator (local NGOs) also supporting PUUs, in partnership with the PMT. The support will consist of the following:
 - Raising awareness of PUUs on role and added value of PUAs;
 - Mobilization and selection of PUU members to be involved in PUAs;
 - Support to the creation of the PUA, including designation of executives and establishment of internal regulations;
 - Legal support for the registration of the PUA.

Sub-Activity 2.1.2.5: Establishment and strengthening of Pasture Commissions.

- Pasture Commissions (also called Commission on Pasture Use Regulation) are mandatory as per the Pasture Law and should be established at District Level. However, only a few Districts currently have PC, including in particular those covered by LPDP I and II. PC is important to ensure participation of communities in higher level decision making: Pasture Users are represented in PCs by the PUUs and/or the PUA. Supporting its creation involves marginal costs and mostly implies awareness raising and intermediation. This support will be provided by the same Community Facilitator as above, in collaboration with the PMT and District Authorities. The role of PC is key as it provides advice to District authorities for two important steps of the establishment of the pasture management mechanism:
 - The approval of pasture Management Plan;
 - The approval of pasture allocation requests submitted by PUUs and pasture granting;
 - Management of pasture use disputes.

Activity 2.1.3: CsCAP planning and design

- In order to ensure that an ecosystem management approach is followed, taking into account all the aspects of the natural resource base, the Pasture Management Plan will be considered as an integrated component of the CsCAP, together with the Forestry Management Plan. The CSCAP planning will involve the following steps and activities .

Sub-activity 2.1.3.1: CsCAP planning and design

- The formulation of the PMPs by the PUU or the PUG will be facilitated by the community facilitator with the technical support from the PMT regional office (the support from PMT to PMP planning will be covered under the specific budget line for monitoring of PMPs under 2.2.2.2 PMP monitoring). The following steps will be undertaken for the development of the Pasture Management Plan (in line with the provisions of the Pasture Law) including:
 - Training of PUU (or PUG) executives on formulation of PMP, and monitoring of pasture
 - Demarking pastureland and infrastructures
 - Calculation of carrying capacity.

- Development of pasture map and pasture rotation plan
- Planning/budgeting of pasture improvement and restoration investments (including demonstrations)
- Planning of pasture monitoring
- A list of eligible investments and criteria for eligibility under the PMP is provided below. An important criterion for eligibility will be the contribution to the reduction of climate vulnerability. The preliminary list of investments that could be eligible for financing and implementation under the PMPs is as follows:
 - Pasture restoration: pasture protection through fencing (permanent or mobile fences), reseeding and overseeding, fertilization, plantation of forage shrubs and trees;
 - Access to water for livestock: creation of water points in underutilized areas including remote and summer pasture (subject to impact studies in order to ensure that the creation of water point will not result in pasture degradation), improvement of existing water points to reduce pasture degradation and reduce sanitary risks, installation of water harvesting systems;
 - Pasture rotation (involving fencing or not);
 - Creation and management of hay making areas;
 - Pasture access: for pasture underutilized because of their remoteness and limited accessibility, access tracks and bridges may be rehabilitated or constructed;
 - Summer pasture infrastructures: in areas where mountain summer pasture are used for transhumance, if the risk of degradation is controlled (utilization of summer pasture should be envisaged only in the scope of PMP and carrying capacities should be observed strictly), some infrastructures aimed at facilitating access and living conditions of herds and people could be constructed or rehabilitated: shepherd cabins, night fences and shelters for animals, cattle crushes for treatments, water points.
- The total amount of pasture investments under the PMP should be at least 20% of the total amount of CsCAP Investments (excluding forestry investment).
- The amount allocated to each village to finance investments under the PMP will be calculated by MoA (via PMU) based on two criteria:
 - Village Population (coefficient: 0.5)
 - Pasture in terms of ha (coefficient 0.5)
- The average amount of investment per village will be USD 50,000 but may vary significantly depending on the village. A standard template for formulation, planning and budgeting of PMPs (including the template for the Pasture Rotation Plan and guidelines to calculate carrying capacities) will be developed (based on existing tools developed by LPDP) and availed to PUUs/PUGs to facilitate and standardize the process. After development by the Pasture Users, the PMP will be submitted for approval to the Pasture Commission and District Authorities, and to the PMU.

Output 2.2: By Year 7, 400 Climate-sensitive Community Action Plans (CsCAP) implemented in 21 districts benefitting at least 100,000 rural households

Activity 2.2.1: Implement Climate-sensitive Community Action Plans

- Once approved by the PC, the District and IFAD, the implementation of PMPs will start. It is expected that implementation will start in Year 3 for the most advanced communities (in particular those that already had a PUU and a PMP before), and in Year 5 for the last ones.

Village level investments:

- The implementation of the PMP follows the same approach as for the implementation of the CsCAP of which it will constitute a component. The infrastructures and equipment approved under the PMP will be procured and disbursed directly by the MoA⁹ (via PMU), as per the PMP implementation plan. The management of the PMP will be the responsibility of the PUU or the PUG. They will coordinate the implementation and planning of the various investments included

⁹ MoA is executing entity of the project via the State Enterprise Project Management Unit (PMU).

in the plan. PMT and MoA (via PMU) will provide regular technical backstopping to implementation of PMP (including pasture monitoring and adjustments on pasture rotation plan when needed).

Cross villages investments:

- Cross villages investments will also be supported under this activity, although they will not be included in the investment plans of PMPs, that are village specific. Each District will be allocated an amount for cross village pasture investments. This envelope will be based on the total area of pasture in each District and will amount to USD 25,000 in average. The allocation and management of this financing will be the responsibility of the District Pasture commission. In the limit of the allocated budget, the PC will submit a project proposal to the PMU, based on consultations held with the PUUs and VOs in the District. The proposal will be based on a standardized template provided by the project. These investments will not be part of the village PMPs and will follow a simplified procedure to be designed, screened and financed. The investment proposal will be screened and reviewed by PMU and PMT (especially when they are related to transhumance routes, since this aspect is under its responsibility), and forwarded to the Steering Committee for approval. As for village investments, the infrastructure or equipment will be procured directly by the PMU based on the PCs proposal.
- The eligible investments under this financing window will be as follows, considering that one preliminary compulsory criteria will be that Investments should benefit at least two villages:
 - Roads, animal tracks and bridges that improve transit of animals between villages
 - Roads, animal tracks and bridges that improve transit of animals between villages and summer pasture, and benefit to several villages
 - Water points for livestock, that benefit to several villages
 - Demarcation and signaling of transhumance routes, even if these routes are not used by beneficiary communities, but if transit herds affect communities, since the formalization of transhumance routes will benefit to the communities, by preserving their pasture resources. These transhumance routes should be approved by PMT, which has the mandate for defining their itineraries.
- Establishment of resting halts for transit herds on transhumance routes, as above, even if these routes are not used by beneficiary communities, but if transit herds affect communities, and for the same reasons. Resting transhumance halts should also be located in accordance with PMT plans.
- The monitoring of PMPs will be undertaken primarily by the PUU, with the support of the PMT and the PMU. The PUU will report to the PMU and PMT on implementation of the PMP on a bi-yearly basis. The monitoring of the PMP will include in particular the monitoring of pasture productivity and condition (including share of palatable species and vegetal biodiversity). PUUs will be capacitated by PMT to undertake this task: training, provision of methodological guidelines and tools (GPS, decameter, flora, registration forms). The pasture monitoring will be undertaken twice a year at fixed dates (once in spring, once in autumn). The data generated will be forwarded to the PMU and PMT and consolidated with remote sensing data through the remote sensing monitoring system developed under activity 1.1.4. Digital tools for pasture monitoring developed under this activity will be rolled out at PUU level and will progressively replace paper-based tools. This will facilitate data entry but also bottom-up submission of information, and top-down feedback. The consolidation of field data gathered and remote sensing data pertaining to each PUU will then be sent back to PUUs to enable them to use them for community awareness and decision making. Paper based recording templates that will be used before roll out of digital technologies will be developed by PMU and PMT, based on existing LPDP models.
- A specific budget line will also be allocated for monitoring of cross villages pasture investments. The monitoring of these investments will be a joint responsibility of PMU and PMT.

Activities implemented under Component 3: Strengthening livelihoods for enhanced resilience through market-based approaches

Output 3.1.: By end of Year 7, 105,600¹⁰ smallholder livestock farmers receive AI, animal health or training services to increase productivity of their livestock

- The rationale for this sub-component will be to increase the productivity of livestock production systems in order to encourage the reduction of herd size. The livestock productivity is currently weak and limited mostly by the poor genetic potential of animals, the poor animal status, and the inadequate animal husbandry practices, in particular the feeding and management of reproduction. It is expected that combined action on these three aspects, through provision of breeding services (AI and provision of improved bulls), animal health services, and building of farmers on animal husbandry will result in a significant improvement in productivity. Increasing animal productivity is critical given that as a result of growth in population and incomes and changes in lifestyles and dietary habits is likely to lead to increases in the total demand for animal products as is seen in most developing countries.¹¹ Increasing productivity is critical to the reduction of unproductive and low productivity animal inventories. Australia has reduced its herd size by increasing its productivity. Similarly, there are strategies which lead to increased milk production per cow to increase farm net profit and decrease the per-kilogram milk GHG emission by changing strategies of feeding and changing herd structure.¹²

Activity 3.1.1- Improving the genetic potential of smallholder farmers' livestock.

- One of the main triggers to promote the needed behavioral changes and support the reduction of herd size will be breeding. There is consensus both at grassroot and higher institutional levels, that having better quality and more productive animals is a necessary condition for farmers to keep less heads of livestock. There is a very strong demand from communities for support in improving animals with higher levels of productivity from both an economic and environmental perspective. Women who are mainly in charge of animals in the homestead are particularly interested in intensifying their dairy production systems and in getting better quality animals.
- The choice of breeds has a very direct influence on resilience of systems to climate shocks and climate change. It will thus be of foremost importance to carefully select the breeds disseminated under this activity, in order not to jeopardize the resilience and the mobility of the systems. Only hardy breeds, that can withstand short periods of feed deficit, extreme heat and cold, and long distances on hooves will be considered. Among these breeds, those with dual purpose potential that also improve the quality of carcasses will be prioritized. Several mountain breeds originating from the Alps would perfectly fit the purpose, while Friesian Holstein and other highly specialized dairy breeds should be avoided, except in irrigated plain systems.

Sub-activity 3.1.1.1. Training of youth in Artificial Insemination

- There are currently around 250 trained AI technicians in the Country, located in 107 AI centers. However, this number is not sufficient to provide AI services to remote communities and in particular household farmers that will be the target group for this activity. The project will partner with TAU and the State Enterprise for AI and breeding to train 50 additional young technicians, from the beneficiary communities. The trained technicians will be selected from among FFS facilitators and private veterinarians. This will provide them with a supplementary source of incomes. In order to train them, 2 Training sessions of 10 days (5 days theoretical, 5 days practical) will be organized in Year 1 and year 2. All graduated technicians will be equipped with an AI kit (Liquid Nitrogen portable container, AI catheter and consumables such as gloves and tubes).

Sub-activity 3.1.1.2. Organization of Artificial Insemination Campaigns

- The economic modelling performed in the scope of this design (see annex on Cost Benefit analysis of AI campaign, showing a Cost Benefit ratio of 19 over 10 years) has shown that this activity could generate a significant return on investment, and impact on productivity. This will

¹⁰ 105,600 unique AH beneficiaries (264 villages x 400 people), same beneficiaries receive (i) AI services (20,000 once per year for 5 years, (ii) bull mating services (20,000 once per year for 5 years) and training via FFS (12,500).

¹¹ <http://www.fao.org/3/y4252e/y4252e07.htm>

¹² [Optimizing productivity, herd structure, environmental performance, and profitability of dairy cattle herds Author links open overlay panelD.LiangV.E.Cabrera](#)

also meet the very high demand of beneficiary communities for these services, which are so far only available for dekhan farmers and agricultural enterprises. 20,000 AI will be performed every year in household farms. All the 510 targeted villages will benefit from the AI campaign every year. AI will be implemented on batches of around 40 animals per village, synchronized beforehand to come on heat at the same time. Heat synchronization will facilitate logistics and follow up, especially for remote villages. However, whenever this is possible from a logistical point of view, AI will also be performed on natural heats in order to reduce costs and improve the success rate. This activity will be implemented by the SE for AI and breeding, through its regional offices in the three targeted regions. The regional office in Kulob which will be responsible for most of these AI will be strengthened under Component 1.

Sub-activity 3.1.1.3. Establishment of Off-Farm Mating stations

- In addition to AI, off farm mating stations will be installed in selected targeted communities (1 station/village in the 300 villages with the highest cattle population or with difficult access to AI services) to complement AI campaigns for those of the farmers who do not believe in AI, as well as for the cows that do not respond well to synchronization or have infertility issues. The stations will be endowed with one bull which will have to be renewed after two years because of the excessive weight of older bulls, not compatible with the local cow's format.
- The bulls will be managed by Village Organizations and placed in private farms in the scope of a PPP contracts, which will allow the private farmer to use the bull for its own cows and will also set the obligations and conditions for providing mating services to the community; this model has been tested successfully under LPDP. Mating fees paid by users will cater both for the maintenance costs of the bull, and its renewal after two years, which will ensure the sustainability of the system. With 300 active bulls, it is expected that the number of services will be similar to the number of AI (around 20,000 services per year). This activity will be sub-contracted to the SE for AI and breeding which is the national institution mandated for establishing such mechanisms.¹³

Activity: 3.1.3: Support adoption of climate resilient innovative technologies

- The productivity and resilience to climate change of traditional livestock production systems is limited by the poor capacities of farmers on animal husbandry, in particular related to fodder cultivation, fodder conservation and stall feeding, and the availability of and awareness on technical innovations that could improve productivity, resilience to climate change, and reduce environmental impact. The project will support the dissemination of these technical innovations and their adoption by smallholder farmers through a combination of demonstrations and hands on training activities including FFS. The main climate resilient technologies that will be disseminated through this activity will be:
 - New varieties and species of drought and heat resistant fodder¹⁴
 - Affordable and simple fodder conservation techniques, in order to reduce seasonality of production and dependence on pasture in winter
 - Composting and manure management
 - Husbandry of alternative livestock species, not or less dependent of pasture resources, and resilient to climate change: poultry, small ruminants, yaks
 - access of animals to protection of heat, water availability, to reduce climate stress
 - Prevention and management of animal diseases (control of mastitis and parasitic diseases, implementation of basic biosecurity measures)
 - Reproductive management (detection of heats¹⁵, management of calving and calf care¹⁶, drying off management)

¹³ Activities related to animal health implemented under this component are described in details in the animal health working paper.

¹⁴ E.g. saxaul, kochia prostrata, agropyron for dry land areas of Khatlon region

¹⁵ In order to reduce the intercalving interval, which is too long and has a direct impact on the proportion of dry and empty cows in herds, hence on productivity and carbon emissions per unit of output.

¹⁶ Calf mortality is high in household systems and mostly due to respiratory diseases and diarrhea that can be prevented through better calving and calf management.

- In communities where the project will support marketing and processing of milk under Sub-component 3.2 (specifically, within the support to the 8 productive alliances between livestock producers' groups and private dairy processors), a strong focus will be put on milk hygiene and milk quality/safety management, including control of mastitis, in particular through FFS.

Sub-activity 3.1.3.1: promotion of technical climate smart innovations through demonstrations and exchange visits

Sub-activity 3.1.3.2. Promotion of technical climate smart innovations through roll-out demonstrations and exchange visits

- Under this sub-activity, climate resilient technologies and innovations that have been tested, adapted and validated by research institutions under Component 1, as well as other selected innovations that had already been tested before and do not require further testing, will be demonstrated in the field to enable farmers to acknowledge their benefits and feasibility, and select those that will be further popularized and tested in real farm conditions through FFS. The project will establish 21 demo plots (1/District) in partnership with the State Enterprise for Capacity Development which already has some demonstration sites in the field in the project area through an MoU.

3.1.3.3. Organization of Exchange visits to promote the use of technical climate smart innovations

- In order to allow farmers to access to these demonstrations, field days will be organized and facilitated by FAO in collaboration with the State Enterprise for Capacity Development. Each village will benefit from one exchange visit (group of 20 farmers) during the project duration. The main focus of the demo plots will be on fodder cultivation and management. Improved varieties of fodder adapted to the local ecosystem and previously successfully tested will be established on the plot and will be harvested during field days, in the presence of visiting farmers from beneficiary communities. At this occasion, harvesting and conservation techniques such as manual or mechanized hay baling, improved hay conservation methods to prevent degradation of fodder during winter, small scale silage making will be demonstrated.

Sub-activity 3.1.3.4: Development of FFS curricula and training of facilitators

- This sub-activity will aim at training the Master Trainers and developing the training curriculum. It will be the first step of the establishment of the Farmers Field Schools. It will follow the conventional approach followed to establish FFS, developed by FAO and successfully implemented within the framework of several IFAD funded projects. It will be implemented and financed by FAO who has several years' experience in rolling out FFS in Tajikistan and has been promoting this approach throughout the world for the last two decades. This activity will build on existing capacities and past experiences in the establishment of FFS in Tajikistan, including in the Livestock sector. It will also build on other successful experiences in establishing and running L-FFS, including those documented in the scope of the stock-taking exercise on Livestock Farmer Schools (L-FFS) that was being undertaken by IFAD at the date of the design mission.
- An international Master Trainer (IMT) will be mobilized by FAO to (i) train 3 National Master Trainers (NMT). These NMT will be recruited in priority among those already trained and present in the Country; in this case their training will mostly be a refresher, (ii) develop the curriculum for FFS, together with the NMTs and technical staff from the Ministry of Agriculture. For this purpose, the FAO IMT will conduct 2 missions in the Country during the first year of implementation. Training workshops for the training of NMT and Write shops for the formulation of the curricula will also be organized and facilitated by the IMT. Once the curriculum will be ready and NMT trained, they will train the 40 facilitators needed to run the 80 schools. In addition, 2 training sessions with 20 participants each will be organized for this purpose. It will be facilitated by the 3 NMT (2 per session).

Sub-activity 3.1.3.5: Roll out of Farmers' Field Schools

- A total of 80 FFS will be established in the villages that are engaged in dairy value chain activities under 3.2. The main focus of the FFS will be on dairy production and the participants will be the members of the group involved in the productive alliance.
- Each FFS will be active during 3 years and will train one cohort of 25 participants (2,000 beneficiaries in total); at least 50% of the FFS participants will be women since they are often the ones responsible for taking care of the dairy animals (stall feeding, cleaning, milking, milk marketing). At least 25% of participants should be youth. Each FFS group will meet once a week, for a hands-on training session of half a day that will take place on one of the participants' farm. Participant's welcoming the group on their farm will rotate in order to promote exchange of ideas.
- As required by the FFS methodology, thematic topics will be selected by participants according to their needs and priorities. Since FFS groups composed of participants to dairy productive alliances, fodder production and conservation will be the first entry point, in order to increase milk supply and reduce seasonality, and milk quality (milking hygiene, mastitis management, handling of milk, etc.) the second one, in order to comply with the quality requirements of the aggregator.
- This activity will be implemented by the State Enterprise for Capacity Development which has already been involved in FFS together with FAO. Through its IMT, FAO will provide quality assurance and regular (annual mission) technical and methodological backstopping.
- Through the SECD, the project will support the creation and the operations of the 80 FFS. The project will cover the salaries and transport costs of the NMT to supervise the schools (around 27 schools per NMT, 1 visit per month), the fees of the 40 facilitators. The facilitators will all be equipped with a bicycle. In order to enable each FFS to test and operate hands on training on selected climate sensitive technologies, startup capital will be allocated to each school to purchase the necessary equipment and inputs required by the technology (e.g. fodder seeds, tools for cultivation, hay baling boxes or silage bags, feed, milking hygiene equipment).
- After one or two years of operations, farmers facilitators will be recruited among the participants. Their role will be to assist the main facilitator, provide individual coaching to the other FFS members, and take over the facilitation role after the 3 years cycle if the group wishes to remain active. Training members will not be the only purpose of establishing FFS. It is expected that FFS groups may also in some cases provide the basis for other collective initiatives such as saving and credit groups, marketing groups, solidarity and collective safety net mechanisms. This spill over effect of FFS on community organization has been observed in many IFAD funded projects. Some FFS groups, especially women groups, that were initially established for a limited duration and a specific purpose expanded their scope of work. It is expected that this will also happen under CASP+ FFS and this will be encouraged by FFS facilitators.

Sub Component 3.2: Business partnerships between smallholder producer groups and private sector actors are established.

Output 3.2. : By end of year 4, 9 productive alliances¹⁷ between livestock producers' groups and private aggregators established and operational .

- The purpose of this sub-component will be to facilitate business partnerships between groups of small holder livestock farmers on the one hand, and private sector actors, in particular aggregators and processors on the other hand, to enable mutually beneficial business partnerships on selected livestock value chains (dairy and beef). These partnerships (Productive Alliances¹⁸) have been visualized as arrangements that provide a measure of assurance on prices and quality aspects. This will enable both partners to properly plan their production, processing, procurement, supplies, as well as marketing s.

A Productive Alliance involves three core agents: a group of smallholder producers, one or more buyers, and the public sector. These three agents are connected through a business proposition, or "business plan", which describes the capital and service needs of the producers and proposes improvements that would allow them to upgrade their production capacities and skills to strengthen their linkage with the market, i.e. the buyer(s). The implementation of such a business plan through a sub-project is typically supported through three core inputs and/or activities directed towards the producers' needs: productive investments, technical assistance, and business development. These core inputs are financed through public grants provided by the project, which are matched by the beneficiary producers and in some cases also by the buyer(s)

- Benefits for the producers will include secure and predictable market and prices, but also access to services since the PA arrangements can include, when feasible, provision of inputs by the aggregator to the producers. These services could in particular include provision of technical assistance to producers, in order to make sure that the commodities produced fit the requirements of the aggregator and the market, in terms of quality, regularity of supply, and quantity. They could also include provision of inputs and TA in order to improve the productivity and reduce the seasonality of production. Supported VC and business arrangements should contribute to strengthen climate resilience and reduce environmental degradation. They should also be focused on and benefit to resource poor household, have low level of risk, and be profitable for both parties.

Activity 3.2.1 Identification of market and business opportunities

- CASP+ will hire a service provider with good knowledge of the private sector actors and business operators to support the identification of business opportunities and linkages that could be initiated, facilitated and financially supported under Activity 3.2.2. The identification process will involve (i) the identification of existing or groups of primary producers that have a potential for producing commodities for market but face difficulties in accessing the market in the current context (no or limited access to aggregators, poor pricing), (ii) the identification of aggregators and processors interested in increasing their supply through sourcing of commodities from smallholder farmers, (iii) the specifications of commodities required by the market/aggregators (quality, quantity, calendar) and (iv) the modalities of the business arrangements that could be established, including the type of services and inputs that could be provided by the aggregators to address the constraints faced by producers. A range of possible value chain and business models with the potential to build climate resilience and

¹⁷ 8 for dairy, 8 for poultry, 1 for beef

¹⁸ A Productive Alliance involves three core agents: a group of smallholder producers, one or more buyers, and the public sector. These three agents are connected through a business proposition, or "business plan", which describes the capital and services needs of the producers and proposes improvements that would allow them to upgrade their production capacities and skills to strengthen their linkage with the market, i.e. the buyer(s). The implementation of such a business plan through a subproject is typically supported through three core inputs and/or activities directed towards the producers' needs: productive investments, technical assistance, and business development. These core inputs are financed through public grants provided by the project, which are matched by the beneficiary producers and in some cases also by the buyer(s). See "Linking Farmers to Markets through Productive Alliances : An Assessment of the World Bank Experience in Latin America" - <http://hdl.handle.net/10986/25752>

benefit the priority target groups these are (i) milk collection centers (fixed or mobile) and (ii) marketing of quality yearlings for beef production. The process of identification will entail the following sub-activities:

Sub-activity 3.2.1.1. Kick off of the identification and assessment of market and business opportunities

Sub-activity 3.2.1.2. Rolling out of the identification and assessment of market and business opportunities

- The project will organize and facilitate consultation meetings for pre-selected value chains gathering potential Productive Alliance partners (Producers groups and business operators). A meeting will be organized per District and per Value Chain (dairy and beef), during Y1 and Y2 for dairy, and Y4 and Y5 for beef. The facilitation of these meetings and mobilization of private sector actors will be entrusted to a service provider with good knowledge of the private sector actors and business operators. The output of this sub-activity will be the identification, financing and implementation of possible PA arrangements. (see sub-activity 3.2.1.2.)

Sub-activity 3.2.1.3. Feasibility studies of proposed business arrangements including Productive Alliances.

- A feasibility study and business plan (addressing technical, economic and market aspects) of the proposed PA will be undertaken by a specialized service provider recruited through a Call for Proposal. It is expected that 14 feasibility studies and business plans (12 for dairy, 2 for beef) will be developed through this sub-activity.

Activity 3.2.2. Provision of financing and technical support to the business partnerships for selected livestock commodities.

- Under this activity, technical and financial support will be provided to facilitate the setup and the implementation of the productive alliances: 8 for dairy and 1 for beef

Sub-activity 3.2.2.1. Financing of business arrangements including Productive Alliances.

- The feasibility studies and business plans of the proposed productive alliances will be submitted to the PMU for approval. Once approved, the PMU will provide co-financing through direct procurement and provision of needed equipment and goods.
- The Matching grants provided by the project will be subject to the above conditions:
 - Project co-financing should not exceed 70% of the total investment.
 - Project co-financing should not exceed USD 50,000 per Business Plan (USD 30,000 in average)
 - The contribution of the beneficiary group should amount to at least 10% of the total project cost. This contribution could be provided in kind (land for construction of the infrastructure, local material, local labour).
 - The contribution of the private sector partner should be at least 10% of the total; it could be in kind (e.g. provision of a cooler or milk cans for the MCC)
- For each of the contemplated PA model, a proposed detailed description with costs and financing modalities is provided below:

Milk Collecting Center – dairy hub model, under PA arrangement:

- The typical investment (to be adjusted according to the specificities of the context, in the scope of the feasibility study undertaken under 3.2.1.2.) will consist in a milk collecting center, described below :
 - MCC premises comprising one cooler room (around 25 sq meters), an office, a small laboratory (6 sq meters), and a milk reception room (15 sq meters). All floors will be tiled as well as walls up to a height of 1.2 meters minimum.
 - Connection to the power grid, if possible in 3 phases
 - Connection to the piped water
 - A sewage soak pit
 - A milk cooler of 1,500 liters capacity: three or single phase depending on power source

- Milk cans for primary collection (5 to 10 liters)
- Milk cans for secondary collection (50 liters, contribution of aggregator)
- Basic laboratory equipment: alcohol guns, lactodensimeters, California Mastitis Tests (contribution of aggregator)
- Furniture for lab and office
- Equipment and clothes for personnel
- The total cost of such investment stands between USD 40,000 and 50,000 USD (if it is equipped with a cooler and cans made in Eastern Europe or South Asia). Such equipment can be managed by two persons: one milk operator, and one accountant (in charge of recoding deliveries and organizing payments). The beneficiary/recipient of the investment will be the farmers groups involved in the PA. The land will be provided by the village authorities. The property of the investment will fall with the Local Government, which will delegate usage rights to the participating VOs (10 per MCC on average). However, through the PA contract, the farmers group will delegate the management of the Milk Collecting Center to the private sector actor (processor) who has better management capacities and will thus be able to be in full control of milk quality aspects (most important criteria for processing), by undertaking the testing of milk at reception and ensuring that conservation is done properly.
- Through the hub system, when feasible, the private actor will also provide services and inputs (that are deducted from the milk sales) to the farmers: AI, veterinary care, feed, equipment, fodder seeds. These services and inputs will contribute to increase the productivity, and reduce the seasonality of production, which is of benefit to both parties.
- It is expected that such an MCC will require the participation of 250 milk producers, bringing an average of 4,5 liters per day on average at the beginning (3 in year 1, 6 in year 6). These 250 producers will typically come from 5 to 10 villages.
- In each village participating in the mechanism, a dairy FFS will be established. Training on milk quality and hygiene, which is of foremost importance for the processor, will be provided in the scope of the FFS, but with the active participation of the processor if it is willing to participate, which is assumed to be the case for most aggregators. The dairy processors (in Dushanbe and Kulob) that have been approached during the design and have shown strong interest for this system. Ensuring that the quantity and quality of milk that they require is available is a sufficient incentive for them to take part in the arrangement, and no direct financing for their participation in the system will be required.
- The exact number of such MCCs that will be established will be determined through the studies, but from the feedback received from dairy processors during the design mission, it is expected that 3 to 4 could be established.

Mobile milk collecting system, with Milk Collecting Points (MCP) under PA arrangement

- This system will be an innovative alternative to the conventional fixed MCC system, that has proved its adequacy in many other contexts, but could not fit the purpose in areas where small villages are far from each other, which may hamper the primary collection from farm to MCC, and have negative consequences on milk quality, as well as on quantities collected. This system is already used in the Country by some dairy processors, but the innovation in the CASP+ context will be that all equipment will be owned by the beneficiary group: The system will consist of the following elements:
 - One mobile insulated and refrigerated milk cooler, of 500 to 1,000 liters capacity, fitted on a small flat-bed truck (payload 1.5 to 2.5 tons). The truck needs to be imported and the tank with cooling system can be manufactured and fitted in Tajikistan.
 - 10 (in average) basic Milk Collecting Points (MCPs) : they will consist in a concrete slab covered with a roof, connected to piped water
 - Milk cans for primary collection (5 to 10 liters)
 - Basic laboratory equipment: alcohol guns, lactodensimeters, California Mastitis Tests (contribution of aggregator)
 - Equipment and clothes for personnel
- Every morning, the truck will pass by all MCPs at predetermined times and will collect the milk directly from farmers at MCP, after testing. It will then directly head to the factory for delivery and washing. The driver of the truck, who will also handle milk collection and testing, will be co-selected by the community and the aggregator, and then trained by the processor. Two

management options will be envisaged depending of capacities of both parties: management of the system by the group or, (preferred option) delegation of management to the processor, while the property of the equipment will remain with the beneficiary group. It is expected that 4 to 5 units of this type could be established.

Production of quality yearling – Productive alliance arrangement

- Starting from year 3, offspring from the AI campaign will be available for the beef market. If breeds used for AI are appropriately chosen (dual purpose breeds), the males produced will have better quality carcasses and a much higher value for beef production than the local breeds. They will also have a potential to grow faster and will be ready for sale as yearlings to fatteners at the age of 7 to 10 months. This change of practice will considerably reduce the number of animals in herds, using communal pastures. The environmental impact and carbon footprint will thus be decreased. In order to valorize this market potential and support this change, a productive alliance between cattle farmers and one or several aggregators (feedlots) will be facilitated. This PA will involve a production cluster of around 50 villages and 500 producers, selected among the beneficiaries of AI and dairy FFS. It is expected that around 1,000 young bulls will be marketed through this arrangement after 3 years of operations. The main investment needed to facilitate this PA arrangement will be collective and will consist of 5 cattle crushes equipped with a weigh scale and a loading dock. Each loading center will serve 10 villages on average.

Sub-activity 3.2.1.2. Technical and business assistance to Productive Alliances in the dairy and beef value chains.

- The implementation of the dairy and beef productive alliances will require strengthening of business and technical capacities of producers. The first area on which the producers involved in the PA will require technical support will be to improve the productivity of their animals, reduce the seasonality through fodder production and conservation, for dairy to improve the quality of milk through better hygiene at farm and milk parlor level, and for beef to produce quality yearlings fitting the demand from feed lots. For this purpose, a specific FFS will be established for all groups involved in dairy and beef PA (see activity 3.1.3). When the aggregator is in a position to provide this technical assistance, for instance milk processors for provision on training on milk hygiene, or in more general manner to ensure that the characteristics of the commodity produced meets the standards required by the market. In addition to the training, regular business and technical coaching will be provided to the group, through the District Agro-Department, which will be contracted specifically for this purpose.

VII. Timeframe

For the timeframe of the activities, refer to Annex 21, PIM.

VIII. Implementation modalities / arrangements

- All activities related to livestock and pasture management fall under the mandate of the Ministry of Agriculture and will be implemented under its technical leadership.
- The MoA Project Management Unit has managed LPDP projects as well as CASP I, including in particular support to pasture management and PUUs, but also some activities related to livestock intensification and value chain. They have qualified and experienced staff, and well tested implementation mechanisms. It will thus be the most adequate option for the implementation of the livestock and pasture related activities.
- The PMU will need to be staffed with specialists in charge of the various livestock and pasture activities:
 - One pasture specialist
 - One livestock specialist (zootechnician or veterinarian), covering both animal production and animal health activities
 - One market/value chain specialist, with experience in the dairy sector
- Some activities will also be implemented by implementation partners in particular:
 - Support to PUUs and development of Pasture Management Plans will be implemented by local NGOs (as it was the case under LPDP), working in partnership with the Pasture Management Trust
 - AI campaigns will be implemented by the State Enterprise for AI and Breeding
 - Research on fodder will be undertaken by TAU and TAAS
 - Demonstrations including organization of field days will be implemented by the State Enterprise for Capacity Development
 - FFS will be implemented jointly by FAO (training of facilitators, development of training curricula) in partnership with the SE for Capacity Development (day to day implementation) Support to Productive Alliances including identification of market opportunities and feasibility studies will be implemented by a specialized service provider with good knowledge of the private sector actors and business operators
- MoUs will be established with these implementing partners during the inception phase of the project.

IX. Risks and Mitigation measures

- The main risks identified for livestock and pasture related activities, and the related mitigation measures, are as follows:

Risk	Likelihood/ impact and Mitigation measures
Climate change impact on livestock production and productivity (technical)	Likelihood: High Impact: Medium
Rapid escalation of climate change impacts on temperatures, extreme rain and snow and drought episodes, affecting: <ul style="list-style-type: none"> - Pasture productivity - Animal performance - Access to altitude pastureland - Animal health (emergence of diseases) - Water availability 	<ul style="list-style-type: none"> • Pasture Management Plans • Focus on climate resilient breeds in breeding strategy • Research and dissemination of climate resilient fodder varieties • Support to fodder conservation (mechanization) • Support to water infrastructures
Emergence or re-emergence of animal disease	<ul style="list-style-type: none"> • Support to animal disease surveillance • Support to formulation of contingency plans for priority diseases
Negative perception of livestock by general public (technical)	Likelihood: Low Impact: Low/Medium

Risk	Likelihood/ impact and Mitigation measures
Negative perception of livestock by general public, decision makers and implementing partners (seen as source of environmental degradation rather than source of livelihoods)	<ul style="list-style-type: none"> • Support to climate smart and virtuous models only • Monitoring of environmental impact • Awareness and generation of evidences on benefits of climate smart intensification
Low viability of livestock value chains (economic)	Likelihood: Medium Impact: Medium
Low appetite of private sector actors for working with household farmers, that could affect the feasibility of productive alliances	<ul style="list-style-type: none"> • Strong capacity support to smallholder groups: technical, business, compliance • Focus on niche markets and short value chains
Incapacity of financial institutions to provide saving and risk reduction (insurance) products leading to livestock accumulation despite intensification measures	<ul style="list-style-type: none"> • Lobbying and advocacy with Government and other donors to support financial sector
Increased competitiveness of imported products on livestock products	<ul style="list-style-type: none"> • Support to intensification and reduction of production costs • Focus on niche markets and short value chains
Limited control of herd size growth (institutional / technical)	Likelihood: High Impact: Medium/High
Support to intensification not sufficiently incentivizing to lead to significant destocking and reduction of herds size	<ul style="list-style-type: none"> • Inclusion of targets for herd growth control in CSCAPs • Georeferenced monitoring of the CSCAPs implementation • Support to policy formulation to develop policy options that discourage livestock accumulation (taxes, quotas)
Commitment and interest of PUUs for the implementation of the plans and limited sustainability	<ul style="list-style-type: none"> • Establishment of Operations and Maintenance plans associated to the community investments in the CSCAPs • Accompaniment from the project to the integrated management of resources and mutual accountability of local institutions responsible to manage NR.
Poor advancement of privatization of veterinary and livestock services	Likelihood: Medium Impact: Medium
Poor advancement of privatization of veterinary and livestock (AI) services, affecting delivery of both AI and animal health services	<ul style="list-style-type: none"> • Support to policy reforms in line with OIE recommendations • Partnership with OIE
Inadequate definition of mandates of government agencies	Likelihood: High Impact: Medium
Insufficient definition and potential duplication of mandate of Government agencies in the field of pasture monitoring, breeding, fodder production	<ul style="list-style-type: none"> • Support to policy dialogue, through stakeholders' platforms • Institutional support to State agencies

X. Exit strategy and sustainability¹⁹

- The main issues regarding sustainability that will need to be considered from the project start are as follows:

¹⁹ Focus on Paradigm shift potential and Sustainable development potential investment criteria.

- **Support to PUUs:** Under LPDP I and II, most of the support provided to PUUs was channelled through the PMU. This raises questions on the continuity of this support, considering that PUU may require a lighter institutional support after 4 to 5 years of project duration. In order to address this issue from the very beginning, the project will channel support to PUUs through regional branches of the PMT from the project start. This will require to support the capacities of PMT in this regard, including by seconding some staff, but will be a more durable solution since support to PUUs is the core mandate of the PMT.
- **Durability of FFS:** Farmer Field Schools can be envisaged as a temporary setup that disappears after project closure. However, in other livestock FFS supported by IFAD, the FFS groups that are the most committed and solid are supported to graduate to common interest groups as a first step, then into more economically oriented groups. These groups could be involved in any collective activities in the domains of saving and credit, production (e.g. silage or hay production), or marketing groups (milk or poultry).
- **The durability and sustainability of collective mechanisms** such as the dairy MCCs will require particular attention: their sustainability depends on a multitude of economic, sociologic, technical and technologic, and regulatory factors that often cannot be handled by farmers groups. Therefore, it is critical to plan for sustainable mechanisms for the management of the MCCs. The system envisaged, whereby a private sector partner ensures both the marketing of the products, and the management of the MCC, including in particular the sanitary and financial management aspects which are the most delicate, offers the best sustainability guarantees. This model has been successfully tested in many similar contexts.

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