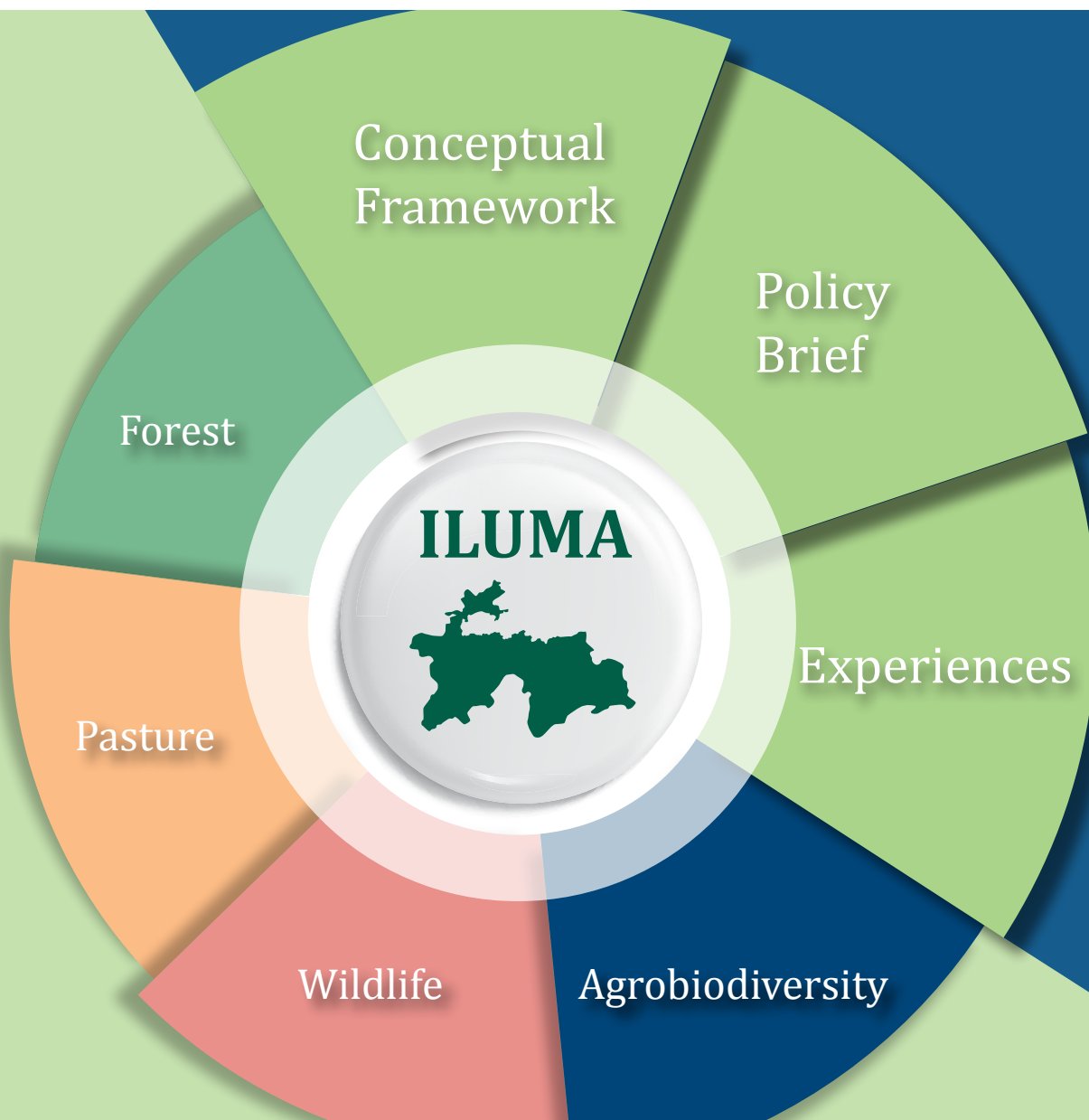


# Agriculture in Tajikistan for Integrative Land Use Management Approaches (ILUMA)



# Agriculture

Enhancing biodiversity and preserving ecosystem-services in agrarian landscapes

## 1. What is this land use practice about?

In Tajikistan, as in other countries, the present use of resources is not sustainable, characterised as it is by uncontrolled logging for firewood and construction timber, overgrazing of pastureland and woodland, soil erosion and monocultures. These excesses prevent the rejuvenation and regeneration of natural vegetation, reduce the growth of wild plants and animals, and degrade agricultural land. At the same time, agricultural production is becoming increasingly intensive, including increased use of fertilisers and pesticides. The rapid growth of the agricultural sector has had negative impacts on ecosystems and biodiversity. These land use practices assist farmers to implement the land use practices described for promoting sustainable agriculture. These practices aim specifically at enhancing biodiversity and conserving ecosystem-service. Rejuvenating native species and diversifying cultivations, along with implementing relatively simple land use management techniques, support farmers in increasing their yields, diversifying their diet and, whenever possible, increasing their economic opportunities.

Biodiversity in agriculture provides a multitude of ecosystem services, vital for environmental sustainability and human well-being, that are currently under threat due to overuse, mismanagement and climate change. The natural capital of agricultural landscapes is a source of food, fibre, firewood, fodder and provides additional ecosystems services such as nutrient cycling, soil fertility, water conservation, and pollination. The richness of genetic diversity in agricultural landscapes guarantees better adaptation to changing conditions such as severe droughts, variability of precipitation and other weather extremes. Adaptation to climate change is gaining urgency globally and in this regard conservation and sustainable use of biodiversity and ecosystems services play a key role in addressing the challenges and alleviating threats posed by climate change. The livelihood and food security of many citizens, particularly rural communities depend heavily on the biodiversity of agricultural landscapes, be it subsistence farming or income-earning from the cultivation of cash crops, livestock breeding or agro-forestry.









It is important to note that smallholder farmers in Tajikistan mainly depend upon the production of their land and are not entitled to subsidies in exchange for promoting biodiversity. Thus, the implementation of the following approaches should imply an increase in or at least maintenance of the same level of productivity currently attractive to the farmers.











## 2. Cornerstones of the Sustainable Pasture Management










The most important 'cornerstones' regarding the land use practice 'biodiversity and agriculture', are the following:








- Biodiversity enhancing and ecosystem-services conserving agricultural practices
- Governance




## Cornerstone 1: Biodiversity enhancing and ecosystem-services conserving agricultural practices

GIZ Experience for Implementation	Sustainably managed irrigated annual crops	
Key Elements of the Experience	Guiding principles and the way how they are related to ILUMA dimensions	
Conservation of <b>traditional and local varieties</b> of annual crops, which are usually better adapted to the local climate conditions.		Support local varieties that are especially well adapted to the current climate and have the highest potential to be resistant to expected climatic changes.
		Document knowledge on traditional and local varieties of annual crops for the region of implementation and beyond and make the knowledge available on macro, meso, and micro level.
		Enable local organisations to store and exchange high-quality seeds of different varieties. Facilitate the collaboration between local seedbanks with national level seed banks.
Promotion of <b>mixed and associated crops</b> that allow for harvesting a variety of different products during the seasons of the year.		Ensure that the crops are well suited to the local diet and people know how to process them.
		Support local NGOs and agricultural extension services so that they have enough knowledge on newly introduced crops. Support local institutions in the seed exchange of newly introduced crops to encourage further dissemination.
Due to a large number of livestock, <b>fencing</b> often becomes necessary. Especially, if the cultivated fields are located close to roads or livestock corridors, fencing is essential.		As fencing is often pricy and hard to afford for local farmers, provide access to affordable fencing material, set up a financing mechanism, or provide simple machinery to build mesh wire locally.
		Promote the plantation of fast-growing trees and bushes along a mesh wire fence, so that once the fence is due to be replaced, the natural, living fence can take its place and function.
<b>Diversification of crops</b> and practice of <b>crop rotation</b> will increase soil fertility and contribute to a nutritional diet.		Encourage farmers to diversify their crops to maintain an optimal soil nutrient balance and to increase nutrition security.




GIZ Experience of Implementation	Adapted rain-fed annual crops	
Key Elements of the Experience	Guiding principles and the way how they are related to ILUMA dimensions	
Conservation of <b>traditional and local varieties</b> of annual crops, which are usually better adapted to the local climate conditions.		Support local varieties that are especially well adapted to rain-fed areas, for Tajikistan this means crops that grow in spring and fall season. Ensure the planting area is covered during the hot and dry summer months to avoid soil degradation.
		Document knowledge on traditional and local varieties of annual crops. Make the knowledge on traditional and local varieties available on macro, meso and micro levels.
		Enable local organisations to store and exchange high-quality seeds of different varieties. Facilitate the collaboration between local seedbanks with national level seed banks.
Promotion of <b>mixed and associated crops</b> that allow for harvesting a variety of different products during the seasons of the year.		Ensure an especially suitable mix of crops on rain-fed areas that keep soil moisture high while stabilising the soil during heavy rain events.
		Support local NGOs and agricultural extension services so that they have enough knowledge on newly introduced crops. Support local institutions in the seed exchange of newly introduced crops to encourage further dissemination.
Due to a large number of livestock, <b>fencing</b> often becomes necessary. Especially, if the cultivated fields are located close to roads or livestock corridors, fencing is essential.		As fencing is often pricy and hard to afford for local farmers, provide access to affordable fencing material, set up a financing mechanism, or provide simple machinery to build mesh wire locally.
		Promote the plantation of fast-growing trees and bushes along a mesh wire fence, so that once the fence is due to be replaced, the natural, living fence can take its place and function.
<b>Water conservation measures</b> such as water harvesting through contour trenches, conservation ponds, harvesting of snowmelt during winter can prolong the cultivation period on a rain-fed area, consequently, significantly contribute to the output.		Train farmers in using simple water conservation measures.
		Provide access to local material for constructing trenches, ponds, or similar water retention facilities.
		Consider local structures around water management that are already in place in most villages. Investigate the possibilities of empowering women in villages through water management, e.g. by women holding an official function.



<b>GIZ Experience for Implementation</b>	<p><b>Diversified Orchard Management and Agroforestry</b>  Diversified tree species reduce the risk of massive pest and disease outbreaks and ensure a healthy soil structure with an adequate balance of nutrients. Furthermore, the different flowering periods for tree species provide nectar for pollinators over a longer period and hence offer benefits for beekeepers.</p> <p><b>Reference material:</b>  Documentation of biodiversity enhancing land use methods: <a href="#">K-Link</a> / <a href="#">Website</a></p>	
<b>Key Elements of the Experience</b>	<b>Guiding principles and the way how they are related to ILUMA dimensions</b>	
<b>Conservation of traditional, local varieties</b> of fruit trees, which are normally better adapted to the local climate conditions.		Support local varieties that are especially well adapted to the current climate and have the highest potential to be resistant to expected climatic changes. Ensure to plant trees that flower at different times, so that there is always nectar for important pollinators in the orchard.
		Document knowledge on traditional and local varieties of fruit tree species. Make the knowledge on traditional and local varieties available on macro, meso and micro levels.
		Enable local organisations to store and exchange high-quality seeds of different varieties. Facilitate the collaboration between local seedbanks with national level seed banks.
<b>Association of fruit trees with vegetables</b> , herbs and fodder plants offers pollen and nectar to pollinators and other beneficial insects over much of the vegetation period.		Encourage farmers to plant vegetables, herbs or fodder plants among their orchard to make use of the multitude of benefits, such as the provision of the shade of fruit trees, increased number of pollinators, etc..
		Train farmers in associating fruit trees with vegetables, herbs and / or fodder crops.
		Ensure that local NGOs and agricultural extension services can support farmers on associating fruit trees with vegetables, herbs and / or fodder crops.
By <b>grafting different species</b> , a better climate-adapted fruit tree can be grown or several varieties are grown on one tree.		Encourage grafting species to increase their resilience to climatic changes, such as heatwaves and dry spells in summer, as well as heavy rainfalls in spring. For instance, a sweet almond tree grafted on a bitter almond rootstock is more resilient and requires less water. Hence, grafting has increased harvest and nut quality.
		Collaborate with local research institutes that have the required expertise and experience in grafting. Build up a network of local experts on grafting tree species, who can provide the service to the farmers.
		Encourage farmers to diversify one single tree by grafting different species together what ripen at different types of the year.

<p><b>Integrated Pest Management</b>, especially phytosanitary measures and biological pest control should be promoted to not harm beneficial insects and other species in the surroundings.</p>		<p>Promote IPM measures that are not harmful to neither plant nor humans while effective in combating the pest. Promote IPM measures especially for pest prevention instead of damage control.</p>
		<p>Provide training on IPM for farmers and service providers. This is especially important if farmers have little knowledge on how to apply pesticides and do not possess the needed equipment (e.g. protection not to inhale the pesticides when applying). Introduce precaution measures that prevent the most common pest to break out.</p>
		<p>Engage local institutions, NGOs, and agricultural extension service providers in IPM, as currently, they are connecting many farmers in Tajikistan with access to low-cost and often low-quality chemical fertilisers from China. Through these local institutions, the application of IPM can be further disseminated.</p>
<p><b>GIZ Experience for Implementation</b></p>	<p><b>Kitchen gardens</b> are very important for improving the nutrition of Tajik families in rural areas as they contribute to food security by providing a diversity of vegetables, herbs, and berries. Vegetables, herbs and spices, berries, and fruits are cultivated in small-scale kitchen gardens, often directly adjacent to houses. Products from kitchen gardens can be sold fresh or processed, generating additional income. Harvest and post-harvest management skills, including drying and storage, are specific skills passed through generations.</p> <p><b>Reference material:</b> Documentation of biodiversity enhancing land use methods: <a href="#">K-Link / Website</a></p>	
<p><b>Key Elements of the Experience</b></p>	<p><b>Guiding principles and the way how they are related to ILUMA dimensions</b></p>	
<p><b>Diversification of crops</b> and practice of <b>crop rotation</b> will increase soil fertility and contribute to a nutritional diet.</p>		<p>Promote the diversification of species in kitchen gardens and encourage soil rotation. this will help to increase soil fertility while mixed crops are less perspective to pests.</p>
		<p>Document knowledge on traditional and local varieties of annual crops. Make the knowledge on traditional and local varieties available on macro, meso and micro levels. Promote new crops through farmer field schools.</p>
		<p>Support an old species that might have been lost in the Soviet area or during the Civil War. Local communities often still remember these species and know how to cook or process them. Consequently, the communities adapt more easily to the new species.</p>
<p><b>Processing of products</b>, such as canning, pickling, juice, etc., ensures food in the winter and can provide additional income to the farmers if sold on the market.</p>		<p>Support farmers in the processing of products which can be sold on the local market and for which a higher price can be received when selling during winter times.</p>





<p><b>Compost</b> By decomposing organic matter, natural soil fertiliser can be generated from what is usually regarded as waste. Composts are often applied in kitchen gardens or to high-value crops. Compost mainly consists of cut grass, weeds, green and brown pruning material, and kitchen waste, such as eggshells and vegetable peels.</p>		Promote the establishment of simple composting facilities in kitchen gardens to boost soil fertility.
		Provide training material on how to establish a compost and how to maintain a healthy balance in ones composted. Compost needs a balanced mixture of green and brown material.
		Encourage farmers to establish a compost as it is currently not very much widespread in Tajikistan. Reasons for this is that much of the kitchen scraps are fed to the livestock while composting requires some specific knowledge of content, storage, and application.

## Cornerstone 2: Governance

<p><b>GIZ Experience for Implementation</b></p>	<p>Despite the sound <b>legal framework</b>, the enforcement of laws concerning biodiversity and ecosystem services in the agrarian landscape is weak. There is an urgent need to harmonise policies and strategies to avoid contradictions and to develop and enforce bylaws. Only if action is taken, land use practices can be changed towards more sustainability to ensure food security today and in the future.</p> <p><b>Reference material:</b></p> <p>Policy Brief Biodiversity and Agriculture EN: K-Link / <a href="#">Website</a> RU: K-Link / <a href="#">Website</a></p> <p>Report on international commitments EN: K-Link / <a href="#">Website</a> RU: K-Link / <a href="#">Website</a></p> <p>Report on the reflection of biodiversity in the legal framework: EN: K-Link / <a href="#">Website</a> RU: K-Link / <a href="#">Website</a></p>	
		<p>Ensure implementation of laws and regulations. Support the government in developing new or in updating laws. Support the government in developing adequate by-laws. Ensure and support an adequate reporting structure for the government.</p>
		<p>Support national institutions in implementing laws and regulations, Enable different institutions, local NGOs, and the private sector to exchange in a constructive dialogue regarding laws and regulations.</p>
		<p>Synthesize and if necessary simplify information regarding laws, regulations, etc. for all stakeholders, and share the information accordingly.</p>
<p>A <b>policy analysis</b> provides an overview of the most relevant legislation, policies, plans, and regulations of Tajikistan concerning biodiversity and ecosystem services in agrarian landscapes. This analysis highlights the opportunities and limitations in the legal framework and the related policy implications and includes recommendations for policymakers.</p>		

<p>The <b>involvement of the local farmers</b> in policy development and implementation has proven to be crucial. The project supported exchange visits of governmental working groups to project fields sides and arranged town hall meetings where different perspectives and ideas can be exchanged.</p>		<p>Organise exchange visits from national to the local levels, as well as town hall meetings in the relevant districts, so as to ensure the local opinions, challenges, and ideas are reflected in the development of new laws and regulations.</p>
		<p>Ensure that new laws are understood to ensure compliance.</p>
<p><b>GIZ Experience for Implementation</b></p>	<p>Tajikistan is party to several <b>international commitments</b> relevant to the issue of land use management. These commitments include: 1) The Convention on Biological Diversity (CBD), an international legally binding treaty that aims to conserve biodiversity, ensure the sustainable use of biodiversity, and that the benefits of the genetic resources use are shared fairly and equitably, signed by Tajikistan on 27 January 1998. 2) The Cartagena Protocol, signed by Tajikistan on 12 May 2004. 3) The Nagoya Protocol on Access and Benefit-Sharing, signed by Tajikistan on 12 October 2014.</p>	
<p><b>Key Elements of the Experience</b></p>	<p><b>Guiding principles and the way how they are related to ILUMA dimensions</b></p>	
<p>Tajikistan has ratified the <b>Convention on Biological Diversity</b>, as well as the <b>Nagoya and the Cartagena protocols</b>. Consequently, Tajikistan is obliged to contribute to the Aichi Targets and report to CBD on an annual basis. GIZ has supported the National Centre for Biodiversity and Biosafety (NBBC), the Tajik counterpart to the CBD, helping it to look beyond protected areas and conduct a baseline study on biodiversity and ecosystem services in agrarian landscapes.</p>		<p>Involve different institutions and governmental bodies in dialogue so as to foster a strong inter-sectoral exchange. Align your work and interventions with international conventions and treaties to which the country is already committed.</p>
<p><b>GIZ Experience for Implementation</b></p>	<p>Mainstreaming biodiversity on the national level</p> <p><b>Reference material:</b></p> <p>Training material IES “Integrating Ecosystem Services into Development Planning” for Trainers  EN: <a href="#">K-Link / Website</a>  RU: <a href="#">K-Link / Website</a></p> <p>Training material IES “Integrating Ecosystem Services into Development Planning” for Participants  EN: <a href="#">K-Link / Website</a>  RU: <a href="#">K-Link / Website</a></p>	



Key Elements of the Experience	Guiding principles and the way how they are related to ILUMA dimensions	
<p>GIZ has developed a guide for development planners and policymakers on <b>Integrating Ecosystem Services (IES) into Development Planning</b>. The training advocates a step-wise approach through which it is possible to recognise, demonstrate and capture the value of biodiversity and ecosystem services for development planning in economies where agriculture plays a major role. The training combines theoretical and practical elements.</p>		<p>Cultivate understanding about the importance of biodiversity and ecosystem services on national and local levels.</p>
		<p>Involve different state institutions working on biodiversity and agriculture in a more general sense, so as to facilitate dialogue, exchange and collaboration among institutions.</p>
		<p>Make knowledge on biodiversity and ecosystem services available via different platforms, both on- and offline.</p>
<p>Regular <b>Steering Committee meetings</b> with the political partner, the Ministry of Agriculture, as well as with other related governmental bodies, such as the Committee for Environmental Protection and the State Forest Agency, allow for an inter-ministerial dialogue and exchange.</p>		<p>Encourage inter-ministerial dialogues through meetings, conferences, or other means. Engage national-level stakeholders in project planning and monitoring.</p>

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