CARITAS Schweiz Suisse Svizzera Svizra

Policy Brief
TJ 21-02

Weather-Water-Climate Services in Tajikistan

Towards a national strategy for pollinators

Summary

Tajikistan's productive land area, while limited by its mountainous environment, can adequately support the delivery of various goods and services that are important for human welfare. With the right stewardship, the land offers a good and safe place to live, an environment to provide food security and, if undertaken with care, opportunities for sustainable livelihoods in rural communities. A historical concentration on cotton production, and a more recent concentration on potatoes as a national strategic crop, are grounded in the need for foreign currency. Cotton is a key commodity in foreign exchange earnings, while domestic production of potatoes aims to reduce foreign currency spent on the import of potatoes. Increasing the land areas under these crops puts significant pressure on the production of wheat and other crops that are important for food and nutrition security in rural communities where 70 per cent of the population resides. While cotton and potatoes are self-pollinating crops, global research indicates that production per hectare (yields) of both can be significantly increased when agricultural systems are supported by an environment where natural pollinators thrive. Improving the yields of these nationally strategic crops can reduce the pressure to expand land areas, and thereby permit opportunities for expanding the production of other crops that contribute to income, food and nutrition security while maintaining the potential to earn foreign currency. Natural pollination is also important in the preservation and enhancement of biodiversity, which in turn helps reduce the risks of natural disasters. A dedicated national policy on pollinators and pollination, together with effective international collaboration, will enable Tajikistan to fully benefit from this potential. This realization of potential can be achieved through raising awareness, strengthening the knowledge base, and shifting to more sustainable and profitable land use management practices that are underpinned by effective weather, water, and climate services.

The importance of natural pollinators for Tajikistan

Tajikistan's agricultural sector has historically been characterized by an overwhelming focus on cotton through nationally mandated cropping plans. More recently, however, the republic has been gradually shifting its attention towards the production of potatoes as a second national strategic crop. The importance of potatoes is evident in a recent policy directive that mandates a forty per cent increase in land area under potatoes for the Laksh district in north-east Tajikistan and a push towards shifting land from wheat to potato production in Muminabad and other districts. These directives reduce the amount of land that is available for staple food crops that support national food security in terms of access, diversity, and quality. Approaches that assist with increasing the productivity of land (more tonnes per hectare) under potatoes and cotton can inform national policies on effective allocation of land placed under these nationally strategic crops, including the introduction of effective association of crops that improve nutrition and economic livelihoods. Natural pollination – one valid approach to improving agricultural productivity that has proven effective in many regions globally – can be made even more effective when undertaken with sound environmental land use management practices.

Because cotton and potatoes are self-pollinating crops, the importance of natural pollinators would appear to be limited for Tajikistan. Yet, research findings from the University of Texas suggest that cotton fields in proximity of healthy and thriving natural pollinator colonies may produce cotton bolls that are 18 per cent heavier than those on fields where natural pollinators are absent.[1] Heavier cotton bolls mean increased revenue for farmers without the additional cost of material inputs and labour. Earlier research on potatoes suggests that healthy populations of wild bumblebees improve self-pollination capacities in potato fields through "buzz pollination" – where vibration from the bumblebees releases natural pollen from potato flowers thereby stimulating natural pollination.[2] Experimental studies in the Fergana Valley show that pollinator services provided by honeybees can increase cotton yields by 56 per cent with limited effect on the quality of fibre and fat content.[3]

Pollinators may also supplement rural livelihoods, and the increase in domestic beehives in rural Tajikistan in part reflects a search for diversified rural livelihoods and alternative income sources. The sale of honey from domestic beehives provides an additional – often undervalued – benefit to farmers. While consuming nectar from flowers, honeybees coat their bodies with pollen that they transfer while visiting flowers, thereby fertilizing plants in the process. Other animals also transfer pollen from one plant to another in the natural fertilization and production of a full set of viable seeds and full-bodied fruits. These include bumblebees, butterflies, hummingbirds, ants, wasps, bats, moths and beetles. At least half of the pollination services globally are provided through such natural pollination. Our ability to access a variety of fruits and vegetables is due in large part to the essential service provided by pollinators.

Natural pollination is also important in the preservation and enhancement of biodiversity, which in turn helps reduce the risk of land degradation and natural disasters such as mudflows, landslides, flooding. Land degradation is largely the result of overexploitation and neglect of the natural environment. A solid population of plants is essential in mitigating further degradation and, where possible, in restoring degraded land towards the provision of vital environmental services. Globally, nearly 90 per cent of wild flowering species depend, at least in part, on the transfer of pollen by pollinators. A pollinator-friendly environment assists in the reduction of the risks that are induced by land degradation while simultaneously contributing to improvements in agricultural production systems.

Status of pollinators

Pollinators are at risk. Where there is data, these show that the population of insects over past decades have declined dramatically. In Germany, studies have found a decline of 75 per cent of flying insects over 27 years.[4] While data for Tajikistan are not readily available, heuristic evidence from the national Red Data Book of Tajikistan would suggest a similar trend to that of Germany and other countries globally. Drivers for the decline of pollinators are land-use management changes that are unsustainable due to heavy soil disturbance, increasing use of pesticides, introduction of invasive alien species, pathogens and climate change.

1 Cusser, Sarah, John L. Neff, Shalene Jha, Natural land cover drives pollinator abundance and richness, leading to reductions in pollen limitation in cotton agroecosystems. Agriculture, Ecosystems & Environment, Volume 226 (2016): 33-42. Accessed March 2, 2021. ISSN 0167-8809, https://doi.org/10.1016/j.agee.2016.04.020. (https://www.sciencedirect.com/science/article/pii/S0167880916302237)

2 Batra, Suzanne W. T. «Male-Fertile Potato Flowers Are Selectively Buzz-Pollinated Only by Bombus Terricola Kirby in Upstate New York.» Journal of the Kansas Entomological Society 66, no. 2 (1993): 252-54. Accessed March 2, 2021. http://www.jstor.org/stable/25085442

3 https://www.besnet.world/sites/default/files//mediafile/CA_ActionDocument_F_web_0.pdf Page 18. Accessed March 2, 2021.

4 Hallmann CA, Sorg M, Jongejans E, Siepel H, Hofland N, Schwan H, et al. More than 75 per cent decline over 27 years in total flying insect biomass in protected areas 12 (2017). PLoS ONE. Accessed March 14, 2021. https://doi.org/10.1371/journal.pone.0185809

« The need for such measures in developing sustainable production systems will grow with the increasing climate change impacts of higher temperature extremes and increased variability in access to water for irrigation. »

Opportunities to support pollinators

The presence of domestic pollinators such as honeybees and wild pollinators does not automatically result in successful fertilization, and when there is marked variation from year to year, there may be a mismatch between local climate (microclimate) and the pollination system.[4] Pollinators may fail to visit the flowers, or they may visit and fail to transfer pollen, or they may transfer pollen but germination fails. One or more of these essential steps may not succeed if the microclimate is not suitable or is unstable for effective pollination.

Weather-Water-Climate Services: Supporting farmers and local communities in selecting crop species and varieties that can be grown within the climatic tolerance of a local pollination system is essential in the development of national plans for the production of strategic crops. In relatively more developed economies, imported seeds from other climatic regions and artificial means for pollination are widely used. The extent of poverty and the lack of resources in Tajikistan, however, require a matching of production potential within national climatic conditions rather than a reliance on imported solutions. This requires the use of weather and climate data for decision-making and the support of Weather-Water-Climate Services (WWCS).

Such WWCS – whether publicly provided or on a fee-for-service basis – are urgently needed to support the transfer of knowledge and to provide technical backstopping to farmers. These services include measures such as the provision of sheltered microclimates around beehives, the enhancement of natural environments for wild pollinators, strip planting of essential flowers and herbs that support pollinators in orchards and fields dedicated to food crops, practices for increasing humidity in the air through misting to support robust production systems and more efficient irrigation practices . The need for such measures in developing sustainable production systems will grow with the increasing climate change impacts of higher temperature extremes and increased variability in access to water for irrigation. Identifying and working within the microclimatic constraints on pollination for a plant in its natural habitat is cost effective and environmentally sound. In Tajikistan, such services are aligned with strategies for poverty alleviation and the enhancement of environmental services.

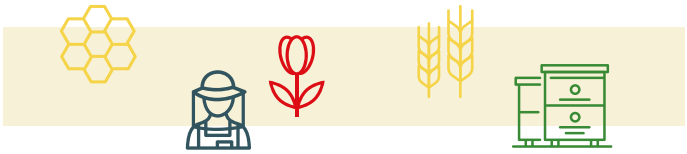
Protection for the wild pollinators: Protecting diversity in the natural habitats of wild pollinators helps improve agricultural productivity by supporting effective associations among food and forage crops. Anthropogenic disturbances to natural habitats interfere with the ability of wild pollinator communities to thrive, and thereby compromise the efficiency of food and livestock feed production systems. In Tajikistan, these disturbances come in a variety of forms including deforestation in areas where the supply of electricity or natural gas is erratic, poor and untimely livestock grazing practices on mountain pastures, and monocropping in agricultural production systems. Some of these challenges result from the nature of poverty and the marginalization of rural communities, but some stem from well-meaning policies and practices that have unintended consequences on natural habitats for wild pollinators.

[5] Corbet, Sarah A. Pollination and the Weather. Israel Journal of Botany, 39 (2013): 13-30. Accessed March 2, 2021. DOI: 10.1080/0021213X.1990.10677131

While the 2019 revision of the law on pastures is a significant development, a number of challenges persist. The annual (publicly announced) timing for grazing on summer pastures coincides with the flowering phase of many plants that are essential for pollinators – a situation that is exacerbated by the need for pasture user unions to facilitate access to the increasing numbers of livestock owned by their members. Systems of enforcement and penalties for willful damage of livestock to pastures and private property remain nascent. Supporting intensive livestock feed and forage operations on farms has not been actively pursued at scale nor promoted to reduce the pressure on both spring and summer pastures. Better understanding of the role that natural pollinators play within interlinked agriculture and livestock production systems may uncover effective approaches in the law on pastures and for resolution of challenges related to pasture degradation and destruction of natural habitat for pollinators.

Annual plans developed by state forest enterprises detail a "sanitary logging" activity that comprises two elements: the removal of dried material, branches and trees that have succumbed to the impact of heavy winds and snowfall to avoid risks of fire, and the removal of trees or forest cover that exhibit "infection" or the manifestation of "unwanted pests". Although this practice is appropriate where threats to public forests are warranted, sanitary logging for access to revenue through the sale of harvested debris is detrimental to habitats for natural pollinators. There has been little discussion or constructive debate on this issue, and the possible need for revising contemporary practices. A better understanding of pollinator habitat, and the importance of pollinators to natural environmental systems (forest, agriculture and inherent linkages between the two) offers an effective entry point for engaging in this discussion.

Recommendations



1 Jointly develop, adopt, and implement an effective national strategy for protecting natural pollinators

The protection of natural pollinators is a shared responsibility that requires an overarching and enabling policy environment. By working together, the government, farmers, communities, and international development organizations can ensure that the needs of pollinators are embedded within a system of effective land and habitat management. A necessary starting point in the development of an effective national strategy is a common understanding of the current situation for pollinators and an agreed-on set of implementation measures on which to base a methodology for tracking progress. This will require joint consultations with public agencies, private landowners, civil society organizations, district administrations, private businesses and international organizations willing and committed to lend their support.

While the development of a national strategy will take time to conceptualize and develop, there are immediate actions that can be taken now as stepping stones toward coordinated action. Some actions include broad dissemination of knowledge on the importance of natural pollinators for Tajikistan and advice to farmers and households on simple changes to land management that enhance the services provided by, and well-being of, natural pollinators. These should be adapted carefully to prevailing weather and climate conditions. Equally important are sustained and effective discussions aimed at adopting pasture management practices that support native plants and species frequented by pollinators, as well as technical discussions on the merits for preserving natural pollinator habitat within public forests. Approaches to resolving these complicated and persistent challenges are an essential input into an effective national strategy for protecting pollinators.

2 Consider joining the Coalition of the Willing on Pollinators

Tajikistan is a signatory to the Convention on Biological Diversity (CBD) and a member of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). In response to this cross-cutting issue in the context of the CBD programme on agricultural biodiversity and linkages with other programmes, the convention formally established an initiative on conservation and sustainable use of pollinators[6] in 2018. The execution of this initiative is currently in its initial phase, and Tajikistan may benefit by following this development carefully.

In 2016 IPBES published the Assessment Report on Pollinators, Pollination and Food Production.[7] In response to this report, and in the context of the CBD, a coalition of countries was established to work on the protection of pollinators – the Coalition of the Willing to Promote Pollinators.[8] The arguments for why Tajikistan should devote effort to this coalition are compelling – some of which have been elaborated within this brief. As a starting point, the government can take inspiration from a number of other countries around the globe that have committed to take action to protect pollinators and their habitats in order to stop and reverse their decline.

6 https://www.cbd.int/doc/decisions/cop-14/cop-14-dec-06-en.pdf

7 https://www.ipbes.net/assessment-reports/pollinators

8 www.promotepollinators.org

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Confederation
Конфедератсияи Швейтсария

OFFICE FOR FOREIGN AFFAIRS
PRINCIPALITY OF LIECHTENSTEIN

LEOPOLD BACHMANN
STIFTUNG

About the authors

Shinan N. Kassam
Country Director – Caritas Switzerland, Dushanbe
Martijn Thijssen
Senior advisor – ORG-ID, Netherlands
Boris Orlowsky
Programme Director – Caritas Switzerland, Lucerne

Acknowledgements

The arguments presented in this brief are those of the authors and may or may not represent the offcial views and policies of the Swiss Agency for Development and Cooperation, the Principality of Liechtenstein or the Leopold Bachmann Foundation.

Das Richtige tun
Agir, tout simplement
Fare la cosa giusta

Caritas Switzerland
59 Shukofon Street
Dushanbe, Tajikistan
Tel +992 44 600 51 08
skassam@caritas.ch

Caritas Switzerland
Adligenswilerstrasse 15
P.O. Box
CH-6002 Lucerne
Tel: +41 41 419 22 22
info@caritas.ch