DIRECTORATE GENERAL OF SCIENCE AND TECHNOLOGY (DOST)
GOVERNMENT OF KHYBER PAKHTUNKHWA

KHYBER PAKHTUNKHWA SCIENCE AGENDA

DEPARTMENT OF SCIENCE & TECHNOLOGY AND INFORMATION TECHNOLOGY
GOVERNMENT OF KHYBER PAKHTUNKHWA

BEES AND HONEY

Ideal climate of KP supports a diversity of fruit and vegetable produce that ensures livelihoods, food security, and superior export potential

TASKFORCE REPORT

Bees & Honey Sector in Khyber Pakhtunkhwa: Sectoral Analysis, Local Challenges, Strategic Insights and Recommendations

2023

FOREWORD

In alignment with the Science Agenda for Khyber Pakhtunkhwa, the Directorate General of Science & Technology initiated a landmark effort to identify and advance priority areas where science, technology, and innovation can meaningfully contribute to the province's socio-economic development. We present to you the sectoral reports in key natural resource areas that are ideally unique to Khyber Pakhtunkhwa and have been identified for R&D investments. Each of these sectoral reports marks an important milestone in advancing scientific understanding and strategic development within Khyber Pakhtunkhwa's natural resource sectors, through focused inquiry and collaborative expertise. These reports, developed by thematic Task Forces constituted under the Directorate General of Science & Technology, are foundational efforts under the broader Science Agenda for Khyber Pakhtunkhwa — a transformative initiative that seeks to reposition the province as a regional leader in science, technology, and innovation as we explore the potential of Khyber Pakhtunkhwa's rich natural resource landscape.

Under the Science Agenda, we hold a bold and pragmatic approach: to build on the province's existing strengths while investing in the future. The identification of eight natural resource areas from gemstones and herbs to fisheries, fruits and vegetables, bees and honey, micro-hydro power, archaeology, and the urban environment presents a unique opportunity for science-led value addition and sustainable economic growth. Each thematic area represents not just a resource, but a vibrant ecosystem of challenges and opportunities, waiting to be enhanced through strategic interventions in research, development, and innovation. These reports are the outcome of months of rigorous consultation, deep research, and collaborative ideation by multidisciplinary experts drawn from academia, industry, public sector, and civil society. The Task Forces were entrusted with the mission to map the current landscape, articulate key challenges, and recommend high-impact R&D pathways that can guide smart investment in the sector. This body of work now forms a scientific and strategic blueprint for stakeholders across sectors to drive meaningful change.

This initiative is aligned with our core vision to move Khyber Pakhtunkhwa from being a consumer of technologies to a creator of solutions driven by our local talent, informed by global best practices, and anchored in our unique natural endowments. Through this endeavor, we reaffirm our commitment to building a culture of science that is inclusive, collaborative, and forward-looking.

I extend my deepest appreciation to all members of the Task Forces, as well as the wider science and innovation ecosystem that supported this effort. We look forward to translating the insights from these reports into tangible programs, R&D investments, and partnerships that uplift livelihoods, enhance competitiveness, and leave a lasting impact on the province's development trajectory.

Sajid Hussain Shah
Director General
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ACKNOWLEDGMENT

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The report is the outcome of a time-bound effort by a dedicated Task Force constituted for this thematic area, comprising local experts from diverse institutional backgrounds, including academia, government, industry, and the development sector. The Task Force worked collaboratively through multiple rounds of consultations to undertake a deep-dive analysis, identify context-specific challenges, and offer actionable insights to guide future scientific, technological, and policy interventions. The Directorate General of Science & Technology gratefully acknowledges the Department of Agriculture, Government of Khyber Pakhtunkhwa, for their valued insights on the Bees & Honey subsector in the provincial economy.

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POTENTIAL AND PROSPECTS FOR ECONOMIC GROWTH THROUGH THE PROMOTION OF HONEY IN KHYBER PAKHTUNKHWA

- **Scope:** *Bees & Honey* subsector in the provincial economy
- **Audience:** Researchers, Innovators, Students at universities, R&D organizations, startups and industry.
- **Goal:** To educate, inspire and direct the audience towards problems in *Bees & Honey* sub-sector that they can solve.

Introduction

One of our most well-known insects, the Honeybee has been associated with humans since the beginning of time, when prehistoric people "stole" honey from wild bee colonies. The fact that our predecessors are depicted gathering honey from bees in cave paintings from as far back as 6000 BC.

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There are two types of traditional beekeeping: backyard and forest. Forest beekeeping, which involves hanging several traditional hives from trees, is a common technique in several parts of the world. Most of the world's countries have widespread backyard beekeeping practices with comparatively superior control (Nuru, 2002). The main goal of bees is to pollinate plants, which allows them to reproduce. Bees are all about that, after all. We need bees for this reason, which also explains why governments around the world invest hundreds of millions of dollars, pounds, and euros each year in bee protection, bee research, and various beekeeping subsidies. Because geography, climate, and farming methods vary from place to place, so do the distribution, kind, and period of flowering of Honeybee plants. Therefore, each region has its own short- or long-term floral abundance and dearth phases and understanding of bee flora aids in managing bee colonies effectively during these times (Bista and Shivakoti, 2001).

Only bees, which are welcomed by the landowners who allow them to do so, are likely to trespass on other people's property. For the bee and for everyone else, it is a winwin situation. Your bees are content doing their job; you can enjoy your hobby or business and, if you so choose, turn a profit; farmers get their crops pollinated and, as a result,

they make a profit; shops get food to sell and, as a result, they turn a profit; the general public has access to food; and the government is content that its agricultural and environmental sectors are operating smoothly and that, eventually, they will be able to raise some tax.

According to recent research conducted in the USA, the value of Honeybee pollinated crops is projected to be $24 billion yearly, while the value of bee pollination services provided under contracts is expected to be $10 billion annually. By any measure, they are enormous numbers that demonstrate how important bees are to the economy.

All nations have at least one institute dedicated to bee research, and many colleges have research departments. These aspects of the honey-abilities of bees are what have made it one of the most researched insects on Earth. This facility is lacking in Pakistan.

SCOPE OF THE SUB-SECTOR IN THE ECONOMY OF KHYBER PAKHTUNKHWA BEEKEEPING IN PAKISTAN

Pakistan, the sixth-most populous country in the world. It boasts a variety of landscapes, each with its own unique vegetation. The protection of native biodiversity is significantly impacted ecologically and economically by the country-specific vegetal diversity. If appropriately utilized, it offers enormous potential for a sustainable beekeeping industry. In Pakistan, beekeeping is primarily concentrated in the provinces of Khyber Pakhtunkhwa and the central and northern portions of Punjab, but it is currently spreading quickly throughout the entire country. Due to its distinct flavor and quality, honey produced in Pakistan has a good reputation in the Middle East. The export of honey from Pakistan in 2020 amounted to $ 9.8 million. In 2021, Pakistan exported natural honey to the Middle East valued $ 8.3 million (Annual international Trade Statistics by country HS02), which was 0.08 % of the cumulative export of Pakistan. Khyber Pakhtunkhwa has the capacity to produce more than 30,000 metric tons of honey.

(*Source: Agriculture Department. Link https://www.dawn.com/news/1663675)*

Table 1. Market Share of Pakistan in the Middle East (2020)

Country	Total Honey Import (USD 000)	Honey Import from Pakistan (USD 000)	Share of Imports from Pakistan in Total Imports
Saudi Arabia	105,066	6,681	6
Kuwait	19,657	740	4
Qatar	10,193	236	2

The north and western borders of Pakistan have been bestowed with rich biodiversity. These mountains are important for food security and clean energy promotion. They play a pivotal role in conserving biodiversity for a green economy. These provide opportunities for recreation and eco-tourism in an increasingly urbanized world. They are most sensitive to climate change. As a result of climate change, Khyber Pakhtunkhwa has been stuck up by more than a dozen furious floods resulted in to substantial losses of lives and assets. The symptoms of poverty, unemployment, population growth, the lack of social services and infrastructure and environmental degradation which cannot be dissociated from poverty are far more acute in these northern mountain regions of KP. Forest provide a source of organic nectar. Without pollinating activities of bees, forest plants species would have become extinct. The potential of bee keeping is very often not exploited in forestry activities and development programs in Khyber Pakhtunkhwa. The Himalayas, Karakorum, and Hindukush, the three tallest mountain ranges, converge in the north and draw mountaineers from all over the world. K-2, which has an elevation of 8611 meters, is the second-highest peak in the world after Mount Everest and is a part of the Karakorum ranges. The second tallest in the Himalayas is Nanga Parbat (8126 m). There are more than 121 peaks in this mountainous region, which is also home to some of the longest glaciers outside of the Arctic. Several more compact mountain ranges, including the Suleiman, Salt, Koh Safadi, Toba Kakar, Kirthar, and Makran coast along the western side. The Baluchistan plateau and the Potohar plateau are both significant and gorgeous plateaus that the nation boasts in addition to its mountains. Mention the importance of foregoing localities in term of Bee Keeping. Khyber Pakhtunkhwa has four honeybee species spreading from the arid south region to lush green in the north. Among the four species, three are indigenous and one is imported but well adopted with the environment of Khyber Pakhtunkhwa. The indigenous honeybee species are *Apis dorsata, Apis florea* and *Apis cerana* and exotic one is *Apis mellifera*. Each of the species has different honey production capacity but among these four, two species *Apis cerana* and *Apis mellifera* can be used for commercial beekeeping in the province These honeybees not only produce honey but also valuable products like Royal jelly, wax, pollen, popolis and venom, which

has great national and international market. (Ali et al.,2021). Currently the sector is providing jobs to 0.5 million people in the province and still we have the capacity to double the size of the people by mass plantation of honey producing plants. The number of beekeepers varies from 20,000-30,000 in the province with an annual production of 12,000-15,000 tones different floral honey. Honey sector exported honey worth 10.00 Milion $ in 2020. (Amir Saeed, 2021 & Trend Economy). The main honey producing plants in the province are Pulai (Acacia modesta), Ber (Ziziphus numelaria), Sarson (Brassica), Shesham (Dalbergia sisso), Baiker (Adhatoda vesica), lachi (Eucalyptus spp.), Louqat (Eriobotrya), Ajwain (Thyme), Berseem (Eygptian clover) and Robinia Pesudoacacia). The main areas of the plants are Nowshehra, Karak, Kohat, Lakki Marwat D.I.Khan, Swabi, Mardan, Haripur, Manshera, Swat and Chitral and merged districts (Younis et al., 2020).

TABLE 2. TOP 10 EXPORTERS IN PAKISTAN

S.No	Name of Firm/company	S. No	Companies
1	M/s AL Safe Trading Est Ward no 6 Barf Khana Teh Fateh Jang Distt Attock Email: saamkhan@gmail.com	6	M/S. Pakhtunkhwa Enterprises Tarnab Farm Honey Market Hidayata- bad Chamkany Gt Road Peshawar. Contact: +92-333-9151176
2	M/s. Ihsan Muzamil Enterprises Main gt Road Mingora, SWAT, Karachi Office: M-1, Queens Centre M.t Khan Road Karachi 74200, Pakistan	7	M/S. Abdul Sami Enterprises Pak International Honey Market, Gt Road, Chamankhani, Peshawar Contact: +92-3005975486 Email: sami 201555@yahoo.com

3	M/s. Pak World International Room # 16, 2 Floor Khatak Plaza Jamrud Road Peshawar Khyber Pakhtunkhwa Contact: +92-333-9124173 Email: pakworld 76@yahoo.com	8	M/S. Gulf Trading co. Shop No. 18 Khyber View Plaza University Road, Peshawar. Contact: +92-91-843077
4	M/s. Mohammad Ubaid Enterprises Pak International Honey Market, Gt Road, Chamankhani, Peshawar Contact: +92-311-9921213	9	M/S. Wazir Traders Pak International Honey Market, Gt Road, Chamankhani, Peshawar Contact: +92-300-59119640 Email: wazirtraders1985@gmail.com
5	M/S. Bashir Traders Shop No 3 Kinar Shah Market Tarnab Farm Gt Road Peshawar. Email: alfalah honey@yahoo.com	10	M/S. M.S Enterprises Pak International Honey Market, Gt Road, Chamankhani, Peshawar Contact: +92-346-9040053 Email: wazirtraders1985@gmail.com

The Swat, Chitral, Peshawar, and Bannu valleys, as well as others, are intermountain scenic valleys (Khan, 2020). Khyber Pakhtunkhwa is highly suitable for honey production due to its diverse ecosystem and agroecology. The area has rich flora, and its potential could be harnessed through an increase in bee flora, which can promote not only honey production but also other valuable products. This would ultimately lead to improved farmers' income, enhanced food security, and economic growth in Khyber Pakhtunkhwa.

Forest cover (scrub, temperate, riverine, and plantations), agricultural land (irrigated, rainfed, and rodkohi), rangelands, deserts, and snow/glaciers account for approximately 5%, 20%, 27%, 10%, and 2% of the country's total area, respectively. In Khyber Pakhtunkhwa, beekeeping is most prevalent in the central and northern regions, and it is currently expanding. Bee-feeding flora is found in natural forests, pastures/rangelands, linear and block plantations, and agricultural lands. However, beekeeping in Khyber Pakhtunkhwa does not fully utilize these natural resources.

Sustainable management of agro-biodiversity is crucial for promoting honey production, yet this aspect has not been adequately addressed in beekeeping practices. Beekeeping is not integrated into forestry and development programs. The country's bee flora is capable of supporting up to 3.5 million bee colonies (Khan et al., 2014). With appropriate focus on promoting bee flora, honey production could be doubled or even tripled, contributing to increased honey exports of up to $70 million and the creation of 70,000–100,000 jobs (Amir, 2020).

TABLE 3. HONEY EXPORT FROM PAKISTAN

(Unit US Thousand Dollars)

Importers	2015	2016	2017	2018	2019
World	7579	7633	6431	7042	8308
Saudi Arabia	5477	5903	4838	4970	5866
United Arab Emirates	874	1009	982	1067	1291
Kuwait	182	431	282	441	559
Qatar	0	76	54	201	188
Oman	23	30	139	62	89
Mozambique	42	12	21	24	67
Japan	2	0	0	14	41
Bangladesh	0	6	0	20	37
Afghanistan	354	46	0	3	34
Malaysia	36	5903	46	27	33

Sources: ITC calculations based on Pakistan Bureau of Statistics.
ITC calculations based on UN COMTRADE statistics. Almost 80% of beekeepers belong to Khyber Pakhtunkhwa, so the share of the KP is approximately 70-80%.

TABLE 4. WORLD TOP HONEY-PRODUCING COUNTRIES

Serial NO.	Producer	Production (Metric Tons)
1	China	497,286
2	Turkey	117,044
3	Iran	78,553
4	Argentina	78,188
5	Ukraine	69,491
6	United States	68,352
7	India	68,157
8	Russia	66,230
9	Mexico	61,078
10	Ethopia	50,840

TABLE 5. TOP 10 HONEY EXPORTERS IN THE WORLD

Exporter	Value in USD Thousand	Quantity in Tons
New Zealand	328,641	14,354
China	254,045	132,469
Argentina	170,242	71,543
Germany	149,758	29,740
Ukraine	138,787	80,795
Spain	112,438	28,263
Brazil	98,560	45,728
Hungary	95,989	23,063
India	83,406	54,834
Belgium	74,651	22,353

TABLE 6. TOP 10 IMPORTERS OF HONEY

Importers	Imported value in 2020 (USD Thousand)
World	2,269,523
United States of America	441,475
Germany	279,454

Japan	173,744
France	129,213
United Kingdom	121,313
Saudi Arabia	105,066
China	89,231
Italy	83,566
Poland	79,039
Belgium	70,360

HONEY VARIETIES IN KHYBER PAKHTUNKHWA

The following are the main varieties of Honey in the country: -

1. Sidr (Beri or Ziziphus) which is harvested in October 2.

Acacia and Orange are regarded the best in the world.

3. Berri is a wild species found in Kohat, Chakwal, Tala Gang, Mianwali, Bannu, Nizampur and Dhadhra etc.

SOME OTHER VARIETIES OF HONEY IN PAKISTAN INCLUDE

1. Rapeseed / Mustard Honey
2. Eucalyptus Honey
3. Lychee Honey
4. Sunflower Honey
5. Karanja / Pongamia Honey
6. Multi-flora Himalayan Honey
7. Acacia Honey, Wild Flora Honey

HONEY PRODUCTION IN PAKISTAN

Beekeeping is a profitable business in Pakistan. About 7,000 beekeepers are now rearing exotic species, *Apis mellifera* in the modern beehives. There are about 300,000 colonies producing 7,500 metric ton honey annually. The following demand and

supply data were reported in a study by Helvetas Swiss Intercooperation at the Agricultural Research Institute Tarnab in 2005.

TABLE 7. DEMAND AND SUPPLY OF VARIOUS VARIETIES OF HONEY IN KHYBER PAKHTUNKHWA.

Sr. #	Variety	2005	2006	2007
		Supply (Tons)	Supply (Tons)	Supply (Tons)
1	Ber	2,925	3162	2272
2	Palosa	1,872	2,023	1,454
3	Bhaikar	800	1,000	600
4	Citrus	1,872	2,023	1,454
5	Shaftal	800	1,000	600

TABLE 8. HONEY EXPORT FROM PAKISTAN

(Unit US Thousand Doller)

Importers	2015	2016	2017	2018	2019
World	7579	7633	6431	7042	8308
Saudi Arabia	5477	5903	4838	4970	5866
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Bangladesh	0	6	0	20	37
Afghanistan	354	46	0	3	34
Malaysia	36	5903	46	27	33

Sources: ITC calculations based on Pakistan Bureau of Statistics. ITC calculations based on UN COMTRADE statistics

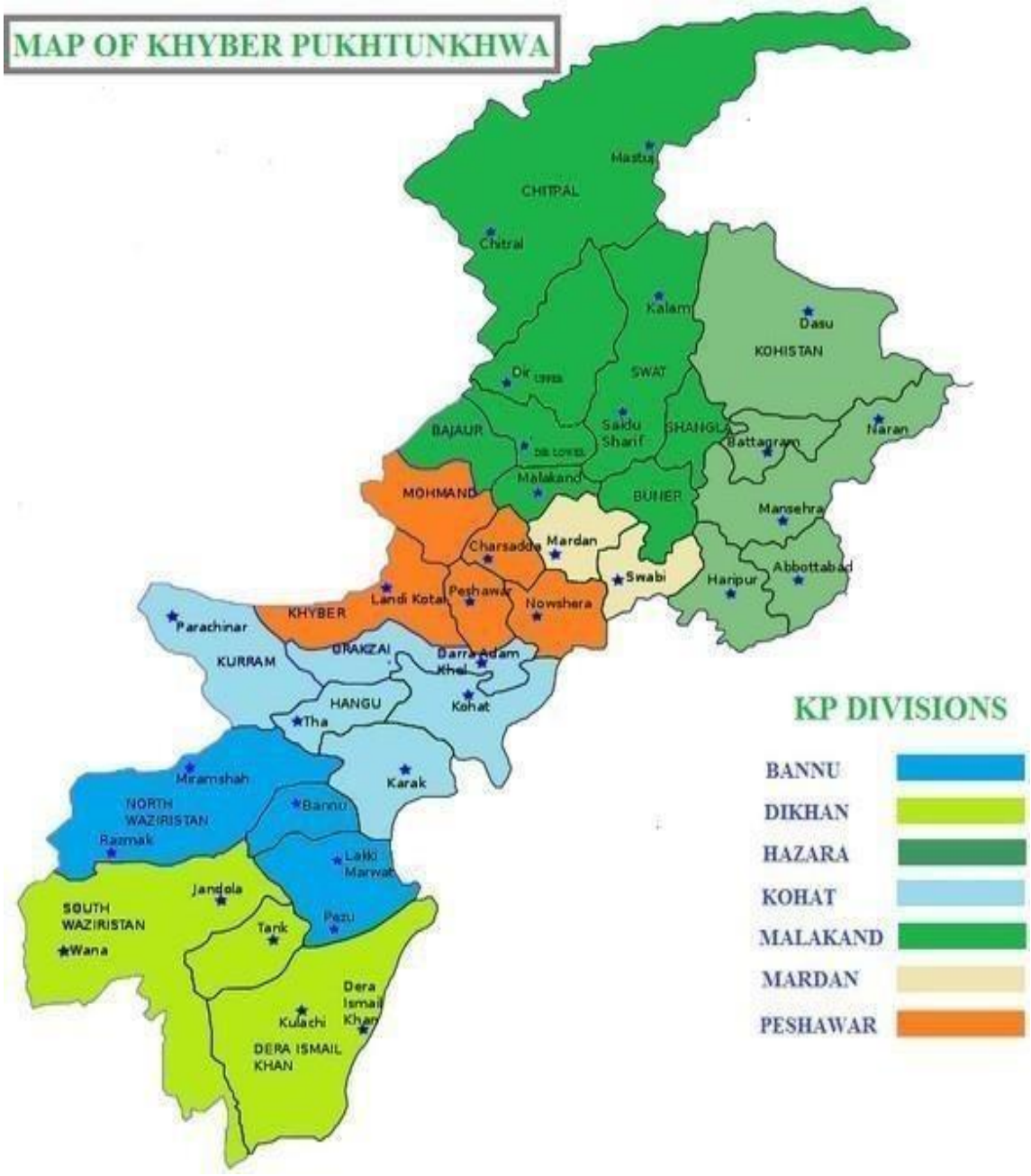
In Pakistan, there are different types of flora, each with a unique range of plant life that has significant ecological and monetary effects. When sustainably managed, they can greatly contribute to the sustainability of the local fauna and the beekeeping sector. Forests occur in different vegetation zones of Khyber Pakhtunkhwa including Alpine, subalpine, temperate, sub-tropical pine forests, sub-tropical evergreen forests. Alpine scrub found above 150 meter above the sub-alpine. Sub-alpine forests are evergreen. This type occurs throughout Himalayas from about 3260 meters to the timber line. Himalayan temperate forests occur between 1500 m 3000 meter. Sub-tropical forests occur between 1000 to 1,600 meters above sea level. These forests can be found in Dir, Swat, Chitral, Shangla, Buner, Newly Merged Districts Nowshera, Kohat, Karak, Lucky, DIK and Tank., and Hazara Civil Division. Major species found in these forests are Salix, Lonicera, Cotoneaster with Juniper, Vibururnum, Salix, Cedrus deodara, Pinus wallichiana Pinus gerardiana, Picea simithiana, Abies pindro, Quercus dilatata, Quercus semicarpifolia Juniperus macropoda, Pinus roxberghii, Quercus incana, Rhododendran, Olea cuspidata, Acacia modesta, Prosopis spicigera, Capparis dedcidua, Zizyphus mauratiana, Tamaris aphylla and Salvadora, Adhatoda and Acacia catechu. Besides above about six hundred Medicinal and Aromatic Plants (MAPs) are found in these forests. Few of these medicinal plant species are given below:-

Primula, Ranunculaceae, Aconitum heterophyllum, A. chasmanthum, A. laeve, Saussurea lappa, Rehum emodi and Podophyllum hexandrum (Khan 2020). Pollination Benefits for Different Crops The tables cover popular temperate crops in Afghanistan and Pakistan, where honeybee pollination increases fruit output. Honey production has a long history in Chitral, especially among women. The two indigenous species (*Apis cerana* and *Apis dorsata*) and the imported Honey Bee (*Apis mellifera*) are the principal species of Honeybees found in the region (European Honeybee).

TABLE 9. POLLINATION IMPACT ON FRUIT CROP PRODUCTIVITY

Pollination – Essential for good fruit production	
Common name	Latin name
Cantaloupe, Melons	*Cucumis melo L.*
Cucurbits (e.g., Squash, pumpkin)	*Cucurbita* spp.
Watermelon	*Citrullus lanatus*
Pollination - Large effect on fruit production	
Common name	Latin name
Apple	*Malus domestica*
Cucumber	*Cucumis sativus*
Pear	*Pyrus communis*
Stone fruit (Cherry, Peach, Nectarine, Plum, Apricot)	*Prunus spp.*

FIGURE 1. MAP OF KHYBERPAKHTUNKHWA



KEY ISSUES AND CHALLENGES IN THE HONEY SUB-SECTOR

Barriers to utilizing honey and bee products are the lack of awareness and knowledge about the benefits of this essential food, the high cost, the scarcity of high-quality honey, as well as the minimal or non-existent promotion of these goods long sentence needs revision. The problems/challenges need to be given in bullet shape and then briefly narrated for each issue.

The following are a few of the issues/challenges being faced by the honey sub-sector in Khyber Pakhtunkhwa: -

1. **LACK OF HONEY PROMOTION POLICY KP**

Policy is a broad guiding statement that defines the mandate and objectives of sectoral agencies. Sectoral policy aims at providing a comprehensive, integrated, and coordinated framework for the management of both human and physical resources towards the sector's objectives. Every sub-sector in the province has a policy which provides strategic guidance to promote the sector on a sustainable basis. Apiculture is one of the sub-sectors of Agriculture/forestry, but policies of both sectors have the least focus and have been completely ignored in the beekeeping and promotion of honey and its byproducts. Honey sub-sector, despite having high economic potential for the province and the locals but has not received due attention for its sustainable development/promotion. There is no dedicated department of Honeybee keeping for the promotion of honey, which could provide strategic guidance, extend support and play the role of regulator for the sector. Honey production and marketing are being undertaken in a disorganized, traditional, and unsystematic manner. Apiculture is less expensive and can be used by every class of farmers or landless farmers to boost their income.

2. LACK OF CREDIBLE BASELINE

A baseline is an essential precursor to a viable and robust sectoral development. It is a fixed point of reference that is used for comparison purposes. The promotion of a sector/product is often measured against a baseline. It allows you to monitor and assess your achievements over time to determine if you are on track, get an overview of your entire sub-sector and identify areas to improve. It can be used for comparison purposes. At present, no credible honey sub-sector baseline exists. Honey sub-sector is lacking credible baseline which can be used a reference point for the sustainable development of honey.

3. LACK OF EXTENSION SERVICES IN APICULTURE

It includes public and private sector activities relating to technology transfer, attitudinal change, human resource development and collection and dissemination of information. There is a need for a policy which sets standards of performance, inclusivity and effectiveness to ensure extension services, bee disease surveillance and prevention. It could be high high-priority area for the Khyber Pakhtunkhwa government, which, without adequate policy or regulating practice, is not possible. Throughout the world, new technologies are being developed in the promotion of the Apiculture sub-sector, but these technologies could only be fruitful if they reach the honey producers, processors and market actors in Khyber Pakhtunkhwa, Extension services are recognized as a potent and critical force in the development of the Apiculture sub-sector. These services will assist the honey producers and handlers to improve production methods and techniques, increasing production efficiencies and incomes. Due to the lack of these services primitive/ traditional methods are used by the honey producers, handlers and exporters.

4. LACK OF STRATEGY FOR THE CONSERVATION AND PROMOTION OF INDIGENOUS HONEY BEES

Apis cerana encompasses a wide range of climatic zones, including moist and dry temperate and subtropical areas of the western and north-eastern zones of Khyber Pakhtunkhwa. This indigenous honey bee, also known as the Asian honey bee, is reared at the household level by poor communities in the Malakand and Hazara civil divisions and NMDs of the province, since time immemorial. This species is well adapted to the mountainous regions of the province. It produces less honey than Apis mellifera but fetches very high prices. Apis cerana is a natural host and does not require beekeeping interventions. It produces organic honey and is known to be an excellent pollinator of many crops of fruits and vegetables. The areas mentioned are famous for growing temperate fruits and off-season vegetables, which are high-value crops and fetch very high economic returns for small farmers. Apis cerana is a superior pollinator compared to Apis mellifera. Unfortunately, there is no credible data on the economic contribution of Apis cerana as the best pollinator.

Since the areas of Khyber Pakhtunkhwa where Apis cerana is cultured are the fruit basket of KP/Pakistan, biodiversity loss, land-use changes, and indiscriminate use of pesticides on fruits and vegetables contribute to a steady decline in the Apis cerana population. The replacement of Apis cerana management with Apis mellifera in these areas affects the

native flora in addition to the bee population. Though the quantity of honey produced by Apis cerana is less than that of Apis mellifera, the cost per unit of honey obtained from Apis cerana is manifold higher. The honey produced by Apis cerana is completely organic, and if exported to the lower districts and foreign countries as an organic product, it can fetch a very high price. Due to a lack of focus and attention to the management of Apis cerana, poor farmers are using primitive methods for its management. There is a complete lack of extension services for the conservation and promotion of indigenous honey farming, processing, storing, packing, branding, and marketing.

5. CAPACITY GAPS IN PRODUCTION AND MARKETING

Due to a lack of service providers, there are serious capacity gaps at the production and traders' levels. Awareness, skills and knowledge gaps of the producers and traders are not able to produce quality honey to fetch appropriate prices. Due to the illiteracy of producers, they are not able to adapt the best honey production, honey processing and packaging, sales and marketing practices, including access to market information. The lack of an enabling environment and service provider, the value chain actors could not be supported. Lack of skills and knowledge, the producers are not able to reduce the pre- and post–harvest losses. Capacity gaps leading to a lack of facilitation of players in the honey market to acquire processing, quality control, marketing and business management skills and exposure and experience sharing in critical component. Honey bee producers are not yet organized in the shape of an association at the provincial and local levels to promote production, processing and marketing of honey as per the required standards and market demand. There is no facilitation by the service providers to develop a business development plan for the honey sector.

6. ISSUES IN VALUE ADDITION AND VALUE CHAIN DEVELOPMENT

Honey value chain has great economic and social benefits, but due to the insensitivity of government, there is little attention to address the issues faced by the honey value chain actors. Honey production, processing and packaging, sale and marketing, including access to market information are the grey areas in the value chain which need redressal. At the production the major impediment is illiteracy, lack of skills and knowledge, exposure and experience sharing in critical compartments, lack of honey producer's association to promote market-oriented production. Besides the above,

there is a lack of business development planning for honey sector. The value chain also lacks certification and quality standards for national and international markets. There is a lack of institutional capacity to perform, a lack of service delivery mechanism, poor coordination between state institutional machinery and noninclusion of primary stakeholders, an absence of regulatory body to control quality standards and eliminate unnecessary interference by various departments in the honey sector. The supporting role of the government is missing. The regulatory body needs to avoid the chances of negative competition and monopoly. Lack of honey testing laboratories, certification and quality standards are the major grey areas in the honey value chain.

There is a lack of coordination between the honey producers and the provincial forest department to promote the indigenous trees suitable as honey flora and to avoid the promotion of invasive tree species. Due to a lack of a code of conduct, the confidence of consumers and purchasers has been shaky regarding the purity of the products. They need confidence-building measures amongst the producers, wholesalers, retailers, consumers, exporters and international purchasers. Lack of provision of credit for the honey entrepreneurs is one of the big impediments to the promotion of the sector. Technology transfer and honey expos at the country and international level are also one of the major issues in the sustainable development of the honey value chain.

7. INSUFFICIENT INFORMATION ON EXISTING HONEY FLOW AND MARKETING MECHANISM

Due to a lack of credible and sufficient information on the honey flow and marketing mechanism, the entrepreneurs face difficulties in business planning and investment in the sector. Documentation of honey trade flow data and marketing mechanisms will give a boost to the marketing of the honey in national and international markets.

8. DETERIORATION OF HONEYBEE FLORA AS A RESULT OF INCOMPATIBLE PRACTICES

Sustainable and quality Honey production mainly depends on the availability of indigenous forest flora. Due to burgeoning population pressure, major land use changes have been happening in Khyber Pakhtunkhwa. Indiscriminate use of pesticides is

adversely affecting honeybee's population and honeybee flora. Deforestation and expropriation of prime agricultural land are adversely affecting forests and agrobiodiversity, which are negatively contributing to honey production.

9. INSUFFICIENT AND PROBLEM-BASED R&D

Investment in honey research and development and transfer of new technologies in the sector is one of the grey areas in Khyber Pakhtunkhwa. The honey sector needs the support of scientific and research institutions for the sustainable development of honey bee keeping for commercial purposes. The honey sector is playing a specific role in the livelihoods of the rural population and safe, healthy and nutritious food for the urban areas of the province and the country as well. Developed countries have promoted great awareness amongst the general masses regarding the health and environmental benefits of honey. They have also invested in investing in honey bee's problem-based R&D. The consumers are willing to pay 25-30% more for organic honey as compared to conventional honey and its products.

10. CLIMATE CHANGE

The Global Climate Risk Index 2019 report focuses on floods, storms and other extreme weather events, which are the most recurrent challenges to agricultural production fueled by climate change. According to the report, during the last 20 years (1998-2017), more than 11,500 extreme weather events have killed over 526,000 people globally and caused losses worth
$3.47 trillion. Pakistan is the seventh in the list of 180 countries suffering alarming water depletion, and the sixth largest growing population. Over the 20-year period, Pakistan was fourth in terms of the number of climate-triggered events and second in terms of the total climate losses, which comes to $3.8 billion according to the Climate Change report[1]. Most of the rivers in Pakistan are vulnerable to annual flood hazards, leaving behind severe losses of croplands, livestock, honeybees and water systems. More than two million people were displaced by floods that inundated one-fifth of the country in 2010, triggering mass migration from rural to cities.

Farmers, beekeepers and agro-pastoralists suffer high levels of vulnerability and exposure to climate shocks (particularly severe droughts and floods), which cause low land productivity with limited access to water (rain, surface and groundwater) resources.

Farmers also need appropriate plans for adequate and productive infrastructure (e.g. barrages and irrigation canals) to increase productivity and commodity values, ultimately improving the socioeconomic resilience of farming families. Due to limited adaptation and mitigation strategies for DRR/DRM in changing climatic conditions, it is imperative to surge technical and institutional capacity in information management for policies, governance, public services and Natural Resources Management and Development. The current early warning techniques provide climate forecasts for lifesaving in short durations, whereas very early warning elements inform much earlier climate actions that save lives, assets, ecosystems and services.

Climate change has a negative impact on the productivity of honey bees; altering bee flora flowering timing; increasing water stress during the drought period, thus reducing pollen and nectar availability, inhibiting movement, affecting bee's communication, causing physical damage to bee hives, colony starvation and retarding bee forage activities

11. BEST PRACTICES AND LESSONS LEARNED

Pakistan can learn from the top honey-producing nations like China and Turkey, where the beekeeping sector is becoming more organized and large-scale. This is because scientific beekeeping has been adopted, as well as national regulations promoting beekeeper cooperatives (The Nation September 12, 2022). Some commercial actors involved with cooperatives provide them with funding, equipment, and training. Because of the higher yields and higher quality, beekeepers are paid more than they would from wholesale market traders. This motivates beekeepers to produce highquality honey and steer clear of adulteration.

1 *Long-Term Climate Risk Index (CRI) - from 1998 to 2017 (annual averages): Pakistan is ranked on the eight position, with 10,248 lives lost and $3.8 billion equivalent losses. The short-term, 'the climate risk index for 2017: the 10 most affected countries',*

Pakistan is ranked on 33rd position with 262 lives lost and $384.52 million equivalent to 0.036 per cent of the GDP losses.

In Pakistan, only a few business entities have adopted this strategy. They either sell their produce domestically through brick-and-mortar stores or online marketplaces, or they export it to Saudi Arabia, the United Arab Emirates, and Qatar.

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IMAGE GALLERY










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