

## **Why Honeybees Matter: The Importance of Bees in Agriculture**

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### **SUMMARY**

Pollination is very much significant to life on earth. Bees and other vital pollinators have survived millions of years thereby guaranteeing food and nutritional security and maintaining biodiversity and vigorous ecosystems for plants, human beings and the bees themselves as well. Pollinators are immensely mandatory in order to produce many micronutrients enriched fruits, vegetables, nuts, oilseeds, seeds etc.; as a matter of fact, approximately 75% of the crops for human use depend on pollinators for sustained production, enhanced yield and improved quality. Rapidly increasing concentration on excessive utilization of harmful synthetic chemicals mainly pesticides on crops causes potential or serious decline in populations of pollinators which is most favourably influence the production of vitamin rich crops such as fruits and vegetables; consequently leading to unbalanced diets and health problems related to malnutrition and non-transmissible diseases. World Bee Day presents an opportunity to recognize the role of beekeeping, bees and other pollinators in increasing food security, improving nutrition and fighting hunger as well as in providing key ecosystem services for agriculture.

### **INTRODUCTION**

Approximately 3/4<sup>th</sup> of crop species in the entire world rely upon bees and other pollinators that may confirm the major characteristics of 2030 Agenda for Sustainable Development for nourishing people and nurturing our planet. Pollinators perform a fundamental responsibility in feeding rapidly burgeoning population in a sustainable way, maintaining biodiversity and a vibrant ecosystem, building resilient livelihoods and creating new job opportunities especially for poor smallholder farmers, satisfying the growing demand for healthy, nutritious food and non-food products as well. Pollination with improved management practice may possess the potential to increase crop productivity by a quarter; thereby contributing greatest to agricultural sector worldwide. For centuries bees, busy as they are known to be, have benefited people, plants and the earth in similar way of butterflies, birds, bats and other pollinators by carrying pollen from one to another flower. They can facilitate and improve food production, hence, contributing to food and nutritional security. Every year the World Bee Day on 20<sup>th</sup> May offers an opportunity for all of us to pay tribute to pollinators specially honeybees.

### **Honeybees Play a Vital Role in Agricultural Industry**

- Pollination is the greatest contributor to yield of agricultural crops worldwide that may contribute far beyond any other management practice.
- Honeybees are essential for pollination of agricultural crops because they can be housed in colonies, transported to fields at right time to pollinate flowers and released.
- Pollination dependent crops are almost 5 times more valuable than the crops which usually do not require pollination.
- The price tag of crops in the entire world directly depending on pollinators is estimated to vary between US\$235 and US\$577 billion a year.
- Throughout the world, three out of four crops that produce fruits or seeds for human consumption as food largely rely upon pollinators.
- Improvement in density and diversity of pollinators may boost crop productivity.
- Pollinators can affect 35% of global agricultural land which generally support production of 87 leading food crops through the globe.
- Pollinator dependent food products can contribute to healthy diets and nutrition.
- The quantity of crop production has increased by 300% in the last 50 years due to pollinators.
- They have a massive role in sustaining livelihoods across the planet.
- Enhanced commercial value of honey is making bees a rising generator of income, livelihood strategy and means of food security for many small scale producers and forest dwellers.

- Due to assured higher and successful agricultural production, pollinators would contribute significantly to food security and nutrition for burgeoning global population, along with ending poverty and hunger.
- Crops like cocoa and coffee provide income to smallholder farmers and family farms more specifically in developing countries.
- Among various pollinating agents, honeybees play a significant role in oilseed crops as it not only results in higher yields but also gives a better quality of the produce and efficient pollination of flowers may protect the crops against different pests.



**Fig.: Honeybees**

- In sunflower, bee keeping is reported to be very efficacious in order to increase higher number of seeds per head, per cent seed setting, seed test weight and germination of seeds.
- It was documented that apiculture may increase number of capitulum/plant, number of seeds/capitulum and 1000-seed weight of niger.
- Number of pods/plant, pod length, per cent pod setting, number of seeds/pod, 1000-seed weight, per cent seed germination, seed vigour and oil content of mustard can be significantly improved with pollination.
- Bee pollination in sesame also improves germination and vigour of seeds.
- Introduction of honeybee colonies in castor can produce approximately 17% increment in fruit setting reaching equivalent to hand geitonogamy.
- Complementary pollination carried out by honeybees with wild pollinators in soybean recorded more number of pods per plant and seeds per pod.
- Estimates of augmented crop yields due to pollination by honeybees have been made in different parts of the world and the increase in yields due to bee pollination in oilseed crops are presented below:

<b>Crop</b>	<b>Yield increase due to bee pollination (%)</b>
Rapeseed	12.8 to 139.3
Mustard	128.1 to 159.8
Sunflower	48.2 to 155.0
Niger	38.5 to 260.7
Safflower	4.2 to 114.3
Sesame	22.0 to 33.0
Soybean	18.1
Castor	30.6
Linseed	1.7 to 40.0

Source: P. Duraimurugan and A. Vishnuvardhan Reddy, ICAR-Indian Institute of Oilseeds Research, Rajendranagar, Hyderabad, Telangana, India

- It was noticed from several researches conducted by eminent scientists that the qualitative and quantitative parameters of oilseed crops significantly increased with honey bee pollination; therefore, an integration of beekeeping as a vital part of best management practices should be adopted to enhance productivity in oilseeds.

### Threats to Pollinators

- Now-a-days, pollinators are under major threat; in this context, sustainable agriculture can reduce the hazards to them by diversifying agricultural landscape and making use of ecological processes as part of food production.
- At present, the extinction rates of species range between 100 to 1000 times higher than normal rate due to human interventions.
- Insects will likely make up the bulk of future biodiversity loss with 40% of invertebrate pollinator species, especially bees and butterflies that face extinction.
- On the other hand, vertebrate pollinators are also threatened with extinction globally up to 16.5 percent.
- Alterations in land use and landscape structure, intensive agricultural practices, monoculture, use of hazardous chemical pesticides, climate change impacts such as higher temperatures, droughts, floods, other extreme climate events and changes of flowering time have led to several negative impacts like large scale losses, fragmentation and degradation of their habitats and also hinder pollination largely by desynchronizing the demand of flowers at blooming stage with the supply of service providers *viz.* abundant and diverse populations of pollinators.
- Pests and diseases resulting from reduced resistance of bee colonies and globalization, facilitating transmission of pests and diseases over long distances may pose a special threat as well.
- Safeguarding bees can also safeguard our biodiversity.
- The vast majority of pollinators are wild, including over 20,000 species of bees.
- FAO plays a leading role in facilitating and coordinating the International Pollinators Initiative 2.0 for promoting coordinated action throughout the world in order to monitor pollinator decline, identify practices and build capacity in managing pollination services for sustainable agriculture and improving food security, nutrition and livelihoods.

### CONCLUSION

With an objective to protect bees and other pollinators from massive threats imposing to their abundance, diversity as well as health, efforts must be made in order to build a colossal diversity of habitats in agricultural and urban areas. Policies favouring pollinators which promote biological pest management and limit the utilization of chemical pesticides should be widely implemented. Cultivators can maintain abundance, diversity and health of pollinators through innovative practices integrating local and scientific knowledge and experience and diversification of farms with an aim to make food resources and shelter continuously available to the pollinators. We have to enhance collaboration between national and international organizations, academic and research bodies and networks to monitor, research and assess pollinators and pollination services; thereby getting a chance to grow our appreciation for bees and other pollinators, more specifically on 20<sup>th</sup> May that is celebrated as World Bee Day throughout the world.

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