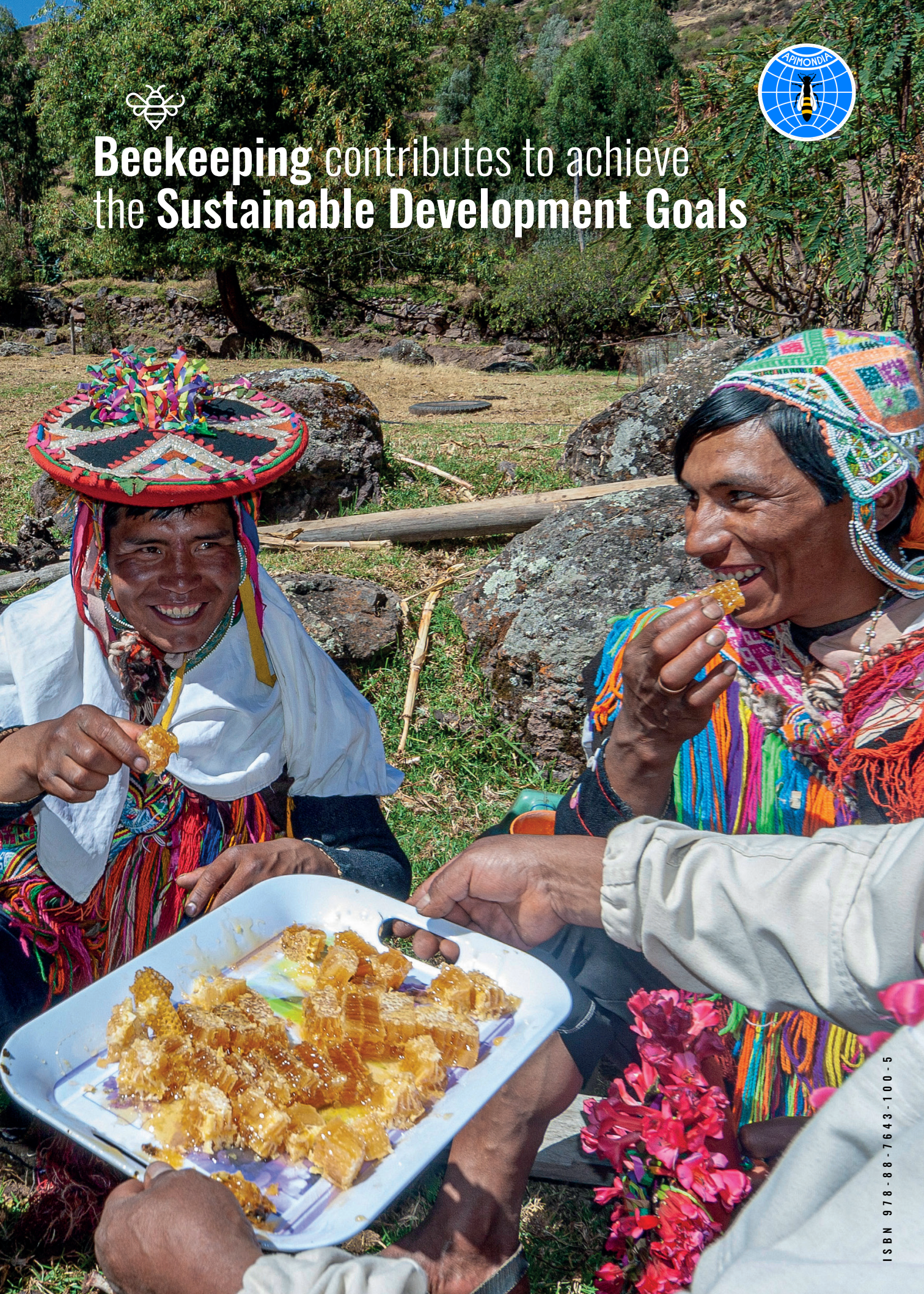


Beekeeping contributes to achieve the **Sustainable Development Goals**

ISBN 978-88-7643-100-5

Apimondia
International Federation of Beekeepers' Associations
www.apimondia.org

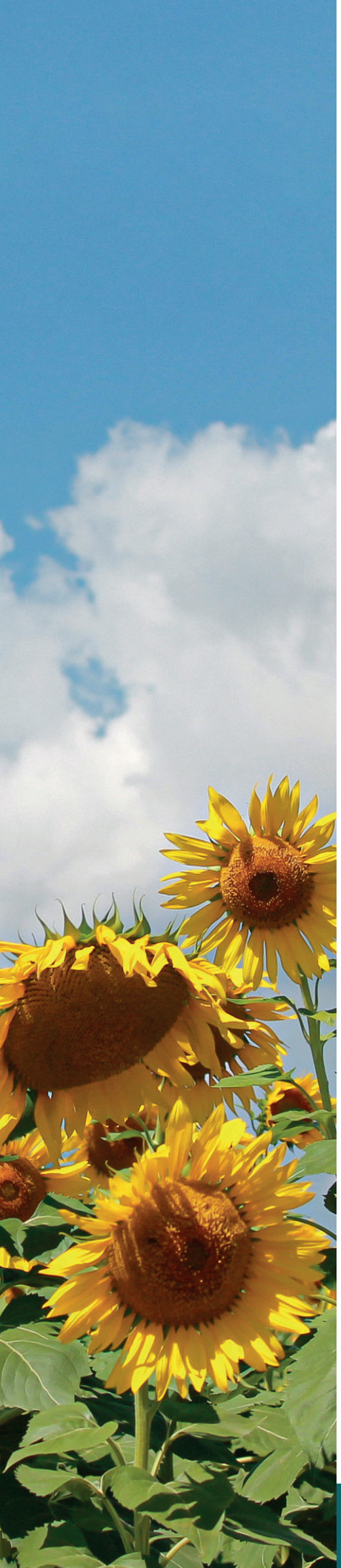
ISBN 978-88-7643-100-5

Cover photo:
Sharing the first harvest of honey after the blessing of the apiary in central Peru - Photo: Gilles Ratia

Beekeeping contributes to achieve the **Sustainable Development Goals**

Content

Unpolluted environment and happy beekeeping
Photo: Fani Hatjina



Foreword

This publication stems from the realisation that beekeeping holds an incredibly valuable potential in development work.

At present a commonly shared and recognised benchmark for the implementation and harmonised application of measures that assist interventions for development programmes is enshrined in the United Nations Sustainable Development Goals (SDGs).

These goals have been projected to unfold their beneficial effects over the 2015 - 2030 timespan so there is still a decade to support and see their implementation and further impact.

For those operating in the apicultural sector, the contribution of beekeeping to development activities is quite evident, but in other contexts this may not emerge just as clearly.

To this end, Apimondia decided to produce a concise reference publication to highlight and contextualise how beekeeping and its many declinations can contribute to the achievement of the United Nations Sustainable Development Goals.

Apimondia is undertaking an important exercise with international organisations like FAO and other United Nations Agencies to accredit beekeeping as a powerful tool that can assemble a particularly valuable combination of activities that are bound to guarantee a set of interventions that are viable, affordable and, most important of all, sustainable in the long term.

Beekeeping is so strongly linked to and dependent on the wellbeing of the environment that, by necessity, sustainability represents its key and unfailing paradigm.

The Apimondia Scientific and Regional Commissions have therefore worked in unison to glean the key elements, notions and tools that show how specific areas of beekeeping contribute specifically to the achievement of the SDGs.

It goes without saying that beekeeping does not pretend to be the panacea of all issues and problems that are encountered in development work, but still it offers a wide and articulated array of options and affordable and sustainable tools to tackle most of the challenges mankind is facing in planning its future actions in a way that is viable without side effects.

Riccardo Jannoni-Sebastianini
Apimondia Secretary-General

Acknowledgments

This document is the result of inputs from many sources: the Apimondia Commissions, President, Vice-President and Secretary-General as well as former Presidents of the Federation.

Special thanks go to **Alessandra Guidotti** and **Abram J. Bicksler** from FAO and **Dr. Chao Chen** in his position as former consultant at FAO and researcher at the Institute of Apicultural Research, Chinese Academy of Agricultural Sciences.

The Executive Officer of Apimondia **Filippo Jannoni-Sebastianini** has done a great job checking the contributions.

Editing and production: **Filippo Jannoni-Sebastianini**, **Riccardo Jannoni-Sebastianini**, **Chao Chen** and **Asger Søgaard Jørgensen**.

Art direction and graphic design: **Ilaria Alquati**.

Bombus hypnorum on *Phacelia tanacetifolia*
Photo: Asger Søgaard Jørgensen

Executive summary

Beekeeping is an activity that can have an impact on all the 17 SDGs in consideration of the possibility it offers to improve food production systems from the most subsistence production methods to the highly developed technological advanced systems. It can do so without creating pollution or waste. It has a positive impact on biodiversity. Beekeeping brings people together and Apimondia assists in the global dissemination of knowledge about all 17 goals.

Honey bees pollinating mustard (*Brassica sp.*)
Photo: Jeff Pettis

Apimondia supports the Sustainable Development Goals

Goal 1. End poverty in all its forms everywhere

Beekeeping offers unique options to fight poverty and create opportunities for landless subsistence people. It allows for utilising otherwise unexplored resources from nature and agricultural landscapes and contributes to pollination of crops. The investments can be negligible. The hive products have great market potential in local markets. The use of beekeeping products for apitherapy has a long tradition and shows promising results.

Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture

Beekeeping and the protection of pollinators are crucial to the production of a great variety of fruits and seeds of high nutritional value. Pollinating insects are valuable for sustainable agricultural production. Food security of beekeeping products is a result of training and quality standards to secure the consumer and the marketability of the products. The Apimondia Commissions are active in promoting standards and training.

Goal 3. Ensure healthy lives and promote well-being for all at all ages

Beekeeping is a therapeutic activity in itself. You must calm down to manage bees. The activity brings you high value, nutritious, health-promoting products. Pollination by bees is vital to the production of many fruits and seeds. Beekeepers are eager to share knowledge and beekeepers' meetings show a great diversity of professions creating a forum of creativity.

Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

Beekeeping is taught through vocational training given by experienced beekeepers. In implementing beekeeping courses, it is important to listen to Indigenous Local Knowledge holders as well as - through higher level courses - to learn how to adapt to the changing environmental conditions and market possibilities. Beekeepers' associations have for centuries known this and the Apimondia Commissions are active disseminators.

Goal 5. Achieve gender equality and empower all women and girls

Traditionally beekeeping has been a predominantly male activity in most countries. This is rapidly changing as women are actively taking part in all aspects of beekeeping from the practical activity to the marketing of products as well as training activities and active involvement in organisations. Beekeeping offers an opportunity to women with limited or no financial resources to establish an income generating activity without too much extra workload.

Goal 6. Ensure availability and sustainable management of water and sanitation for all

Beekeeping can be used as a tool to generate income from forests, riverbanks and rainwater catchment areas. This can help to guarantee alternative income possibilities for people living in these areas and act as an incentive to protect forests and even to plant new multipurpose forests with improved possibilities for honey production and, by improved pollination, higher production of fruits.

Goal 7. Ensure access to affordable, reliable, sustainable and modern energy for all

Small-scale beekeeping can be performed with very little input of fossil energy, by using locally produced equipment and hand-driven honey extractors as well as solar wax melters to extract beeswax. The implementation of solar panels allows for the supply of electricity in remote areas and even helps large scale commercial beekeepers to reduce the use of fossil-based energy.

Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

Beekeeping does not generate pollution or waste, making it sustainable over time. It meets the requirements to generate jobs in the form of micro-businesses as well as large companies. In developing programmes, beekeeping offers opportunities for landless people selling their products in the local markets. The challenge is to protect local markets from the import of adulterated products.

Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

A major trend in beekeeping is the use of electronic information tools for monitoring and teaching but still respecting the indigenous local knowledge. Start-up of beekeeping requires only simple equipment available in any household. Social and economic growth can be achieved through innovative thinking. Growth out of the local market makes co-operation and business skills a necessity.

Goal 10. Reduce inequality within and among countries

Beekeeping offers opportunities for even the most poor, remote and disempowered people to harvest produce, honey and beeswax, that are of quality equal to those produced elsewhere. Apimondia works actively to establish international protocols in co-operation with the legal authorities to protect the quality and the national and international markets of beekeeping products.

Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable

Interest has grown for urban beekeeping. It offers a way for urban people to have a connection with nature and acts as an incentive to make the cities greener by planting trees and creating flower-rich areas. Beekeeping offers a possibility to teach people about food production and pollination also in urban areas. Bees can act as a sentinel of the environment in the city.

Goal 12. Ensure sustainable consumption and production patterns

Beekeeping is a positive externality as it exploits natural resources like honey and pollen that otherwise would not be used. The inputs to the production can be very low. In local market contexts the need for packaging and transport is limited. Apimondia is promoting local production and consumption and has taken a strong position in fighting adulteration of the products as we are nowadays experiencing in the world market.

Goal 13. Take urgent action to combat climate change and its impacts

Bees depend on a healthy environment with unpolluted flowering plants in agricultural and natural areas. Beekeepers are among the first to experience the negative consequences of climate changes through the massive destruction of forests and the changes in agricultural production patterns. Beekeepers around the globe and Apimondia are actively promoting sustainable production patterns and planting of forests with great diversity of species.

Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development

Beekeeping offers an opportunity to create income from mangrove areas as in the case of the long tradition in the Sundarbans of India. In the Philippines, research has shown that more species of bees can be used with success to create income and improve pollination of mangroves, thus helping to incentive people to protect this important ecosystem.

Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

Beekeeping is a sustainable form of agriculture which is not detrimental to the environment, and indeed provides economic reasons for the retention of native habitats. Forest beekeeping uses locally available and renewable resources and helps to involve the local people in the protection of the forest diversity. Apimondia is actively promoting the protection and the management of the environment in a sustainable way.

Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels

Apiculture and the formation of beekeeping associations and co-operatives help to generate self-reliance and can bring a valuable source of income to poor communities. Contacts among people are encouraged and beekeepers working co-operatively are able to access larger and more distant markets that individuals may not be able to reach. At international level, Apimondia is active in promoting and establishing contacts among beekeepers, scientists and international organisations.

Goal 17. Strengthen the means of implementation and revitalize the global partnership for sustainable development

Apimondia and its Commissions actively co-operate with many international scientific and normative institutions. On account of its vision for a sustainable development and benefitting from its membership from all over the world, Apimondia holds adequate capacity, network and expertise to engage in global partnerships with national and international organisations sharing the same values.

Honey bees on pumpkin
Photo: Jeff Pettis

Key messages

BACK TO THE FUTURE WITH BEES AND BEEKEEPING

Jeff Pettis
Apimondia President

The world we live in is changing. Changes in local and regional climate are adding to the difficulties we - involved in agriculture - face in feeding the world. The United Nations have put forth a set of Sustainable Development Goals (SDGs) which serve as objectives to help alleviate poverty and hunger on a global scale.

Beekeeping and pollination play a vital part in agriculture and we in Apimondia are dedicated to working with the United Nations and FAO to meet the objectives set out in the SDGs. In this document we discuss concrete examples of how bees and pollination are linked to agriculture and feeding the world. In addition, bees and beekeeping are excellent tools to alleviate poverty and improve the lives of minority and female small stakeholder farmers. Beekeeping requires no land ownership and has low start-up costs, making the keeping of bees an ideal tool to reduce poverty. Before we discuss the future, we should briefly discuss how humans and bees have evolved into the current state of beekeeping.

Honey bee on sour cherry flower - Photo: Lise Hansted, Danish Beekeepers' Association

Humans began interactions with bees when we were hunters and gatherers and found that the bee colonies in trees and cavities contained a most sought after sweet taste in honey and valuable beeswax. We later began to recognize the role in pollination as we brought bees from the wild into apiaries. This occurred as we moved from hunting and gathering to a more agrarian society, but indeed hunting and gathering is still practiced with bees in many parts of the world. The honey hunting on cliff faces in the Himalayan mountains with the giant honey bee that builds one large comb is a good example of honey gathering. Still honey hunters know that, if they harvest only part of the nest, the bees do better and thus beekeeping is more sustainable.

Apis dorsata honey bees nest high up in central Indonesia's Flores Island - Photo: Gilles Ratia

Bees overwintering in Slovenia - Photo: Peter Kozmus

Lady beekeeper showing her colony of *Apis cerana*, Vietnam - Photo: Asger Søgaard Jørgensen

Not all bees are the same and most people think of the Western honey bee as the dominant bee in agriculture as it could be. But the Asian bee (*Apis cerana*) and stingless bees are two good examples of other bees that work well and are locally adapted. As we work to use bees for pollination or poverty reduction, we must be sure to use the right bee for any specific area of the world although it could eventually vary with climate change. A bee that had worked well in a particular environment may no longer be suited to that same area if temperatures increase or vegetation changes. Beekeeping is very adaptable as well as the bees we manage. A single species, *Apis mellifera*, the western honey bee, is managed from the tropics to Siberia, demonstrating the adaptable nature of bees.

Beekeepers with their top-bar hives in Beira, Mozambique - Photo: © Bees for Development

Beekeeping can be practiced in many ways from hunting and gathering to casual sideline beekeeping to more intensive commercial beekeeping. Beekeeping can thus employ people to manage hives and harvest honey. We have made advances in how we manage bees with movable combs, standardization of equipment and an increased recognition of the valuable pollination bees provide. However, in large part bees are still a semi-domesticated animal that we manage the same as we have done for thousands of years. This is a bonus, not a hinderance in that locally adapted bees are sustainable.

Beekeeping in a changing world is not without challenges. Some of these challenges include the spread of new diseases and pests and unreliable honey production with changes in weather patterns. Finally, issues like honey adulteration, where greed pushes people to add sweet syrups to honey, make beekeeping less profitable. We are working on issues like honey adulteration to provide the public with the confidence in the purity and health benefits of honey and other bee products. This is an ongoing fight and knowing your beekeeper and buying local honey is a simple choice that consumers can make to combat honey fraud. Shortening the supply and improving the local economy are also benefits of buying local honey.

Honey on display at bee product contest during the Apimondia Congress in 2005 - Photo: Asger Søgaard Jørgensen

We as beekeepers must work to continue to manage bees in a sustainable way. There is much good and joy that comes with keeping bees and it starts with a knowledgeable respect for the bees themselves and the environment. We must work with the pure products like beeswax, propolis and honey that bees can provide while not exploiting the bees as simply a livestock animal. While the Covid-19 pandemic has made us aware of our vulnerabilities, it has also provided us with an opportunity to promote sustainable local agricultural production to increase food security.

Bees and beekeepers can play an important role in improving food security through pollination and by providing a livelihood in many areas of the world without the need to own land or invest heavily in equipment. Bees and beekeeping are flexible, and we can use this flexibility to continue to reduce hunger and poverty on a global scale.

ABOUT APIMONDIA

Peter Kozmus
Apimondia Vice-President

Beekeeping is an agricultural activity that requires very little investment and can take place almost anywhere in rural or peri-urban areas. It is one of the agricultural productions that does not require land. However, it requires good know-how in order to manage bee colonies and to make choices of practices adapted to the environment. It is necessary to have a good knowledge and this is why integration of beekeepers and knowledge transfer is extremely important.

Beekeepers come together in different organisations and levels. At local level there is the highest number of connections, which are further linked at regional and national level. These Associations connect globally to regional federations and finally to Apimondia which is the International Federation of Beekeepers' Associations. Apimondia is a non-governmental organisation that brings together beekeepers, manufacturers of beekeeping equipment and a wide variety of scientists involved in apiculture, apitherapy, pollination, development and economics.

Danish beekeepers studying *Apis mellifera caucasica* in its homeland, Georgia - Photo: Dorte Hald Nielsen

Besides protecting honey bees, Apimondia connects beekeepers, scientists and others interested in other managed bee species that are also important pollinators, of which some produce honey with specific characteristics important for apitherapy.

Apimondia promotes knowledge transfer and therefore organises many beekeepers' events (symposia, workshops) and the biennial International Apicultural Congresses which are the largest international gatherings of all involved in apiculture. Here scientists working on the seven thematic areas of the Apimondia's Scientific Commissions - Apitherapy, Bee Biology, Pollination and Bee Flora, Beekeeping Economy, Beekeeping for Rural Development, Beekeeping Technology and Quality, Bee Health - present the latest research findings and seize opportunities to learn and network among each other.

Beekeeping lecture on stingless bees - Photo: Cleofas Rodriguez Cervancia

Apimondia is the successor of the Standing Organising Committee of the International Apicultural Congresses that was founded in 1895. It was transformed into an international federation in 1949. The first International Apicultural Congress was held in the Belgian capital in 1897. Nowadays the Federation connects 112 members from 73 countries and is accredited to be the only global organisation that promotes scientific, technical, ecological, social and economic apicultural development in all countries and the co-operation of beekeepers' associations, scientific bodies and individuals involved in apiculture worldwide with its General Secretariat based in Rome.

Further to the Scientific Commissions, Apimondia has also five Regional Commissions: Africa, Americas, Asia, Europe and Oceania. These Commissions deal with the various challenges of beekeeping that are present in their respective area.

Apimondia collaborates closely with regional associations such as: Apislavia, AAA (Asian Apicultural Association), Balkan Beekeeping Federation, FILAPI (Ibero-Latin-American Beekeeping Federation), NBBA (Nordic Baltic Beekeepers' Association), EPBA (European Professional Beekeepers' Association), ACBO (Association of Caribbean Beekeepers' Organisations), Arab Beekeepers' Union, ApiTrade Africa, etc.

Beekeeping is facing major challenges in the last decade, linked to global climate change, intensive agriculture, globalisation, GMO crops. Therefore, we need new knowledge, better transfer of knowledge and especially the co-operation with other organisations with the same goals to solve common problems.

We believe that in-depth co-operation between Apimondia and FAO would have many positive effects, especially because bees and other pollinators are very important for food production and because with beekeeping it is possible to reduce rural poverty and hunger. Besides, bees are producing very healthy commodities (honey, pollen, royal jelly) which could be used not only for consumption but also for medical purposes.

Therefore, we asked each member of the Apimondia Executive Council to comment against each of the UN SDGs in relation to how their Commission could contribute to achieve them. So, hereafter you can find out how beekeeping could contribute towards the achievement of the UN SDGs.

Top-bar hives, fully occupied by bees in South Sudan - Photo: © Bees for Development

The presentations from the Commissions reflect the broad spectrum of the Apimondia activities. As mentioned above, all the Commissions are responsible for the flow of information from scientists to beekeepers and vice-versa. They organise meetings, symposia and prepare the scientific programmes for the biennial congresses. In this document they will present how they specifically work towards the SDGs.

The Commission for Beekeeping for Rural Development has been for many years directly involved in development issues directed towards fulfilling the SDGs even before they were adopted.

The Commission for Apitherapy works on scientific research and development that are directly useful to achieve many of the SDGs.

The Commission for Beekeeping Economy and the Commission for Beekeeping Technology and Quality have the duty to work for improvements of the economic and technical development of beekeeping and ensure fair trade of high-quality products, thus contributing to achieving the SDGs.

Shide Gete, a trainee who learned all aspects for beekeeping – from making his own hives at no cost, to harvesting and selling the honey and beeswax he harvested from them, in a Bees for Development Ethiopia training programme - Photo: © Bees for Development

The Commissions for Pollination and Bee Flora, Bee Health and Bee Biology are more specific scientific commissions contributing with important knowledge on their respective scientific fields.

The Regional Commissions are important links between regional beekeepers, scientists and the Apimondia management.

Other specific issues are being addressed through fourteen Apimondia Working Groups. More information about Apimondia activities is available on the Apimondia website (www.apimondia.org) which operates in English, French and Spanish.

In the presentation from Oceania you will find an overview from a region with a highly developed apicultural sector, while the presentations from the Asia, Africa, Europe and Americas Regional Commissions give an indication of the challenges we have to face in order to achieve sustainable development.

We hope that, as you read on, you will gain ideas that can help all of us to build together a better and more sustainable world for everyone through collaboration that bees know best.

WORDS FROM THE DEAN OF THE APIMONDIA HONORARY MEMBERS

Gilles Ratia
Former Apimondia President 2009-2015

In this world of the Anthropocene, the various human pressures on the planet risk, in the long term, endangering two fundamental factors for our survival: water and food. For the latter, the accelerated loss of the wild pollinating auxiliary entomofauna highlights the fantastic and essential work of pollinating done by the so-called "domesticated" bees and Meliponini. Without beekeepers and their livestock, at least 30% of our food resources are at risk. WHO's nutritional recommendations for humans insist on eating more fruit and vegetables while reducing consumption of meat and junk food.

All these crops need insects for optimal pollination - Photo: © Bees for Development

The abnormal mortality of bee colonies and the precariousness of beekeepers are thus linked to the above concerns, not to say central to them.

Apimondia, because of its large database (thousands of scientific communications accumulated over the past 125 years), is witness to the evolution of beekeeping regarding both its technological advances as well as the scourges of the sector which are multiplying as much biologically as economically. Recent scientific communications and round tables at the Apimondia biennial international congresses have revealed the main stressors linked to the 30 to 40% loss of bees each year: pesticides, varroa mites, modification of nutritional intake, "industrial" management of apiaries, globalization of diseases, parasitosis and predators, various pollutions including that of wax and finally climate change.

Beekeepers can intervene on certain aspects but, without concerted actions within the agricultural world, the resilience of bees is likely to collapse in the coming decades. This could herald a dangerous era during which we would have neither the possibility of having self-fertilising cultivated plants nor the technological advances to replace bees with pollinating drones.

A reasonable future requires a paradigm shift, both in the beekeeping world and in the agricultural and forestry world. We now need a universalist conscience of eco-responsible people, from politicians to the small-scale farmers, to ensure a happy destiny for our unique planet. FAO and Apimondia have a big role to play in the future well-being of our children. We now need to join our efforts!

To support this vision and project ourselves into the future, the work of farmers and beekeepers needs to be recognised as a service of public usefulness.

FROM THE PRESIDENT OF APIMONDIA 1999-2009

Asger Søgaard Jørgensen

80% of the plants that provide food for the human beings in the world are fully or at least partly dependent upon pollination mainly by bees of some kind. The main food crops: rice, maize and wheat and some other important crops are pollinated by wind. But in the end 35% of our caloric need is the result of the activity of bees and other pollinators. In this 35% we find most of our fruit crops and crops that provide protein and vitamins and make our food nutritive, healthy and tasty.

The products of beekeeping: honey, beeswax, propolis, etc. are important cash products of subsistence beekeepers and also contribute to the income of large-scale commercial operations that make their main earnings from pollination services to agricultural and horticultural producers.

Apimondia unites beekeepers from all over the world. It unites associations of large-scale commercial beekeepers as well as associations of small-scale subsistence beekeepers and beekeepers who merely are fascinated by the life of a bee colony. Scientists working in the Scientific Commissions of Apimondia covering all aspects of beekeeping: bee biology, bee health, beekeeping economy, pollination and bee flora, technology and quality of bee products, use of bee products for apitherapy and not least beekeeping for rural development, render Apimondia fully capable in assisting to achieve the Sustainable Development Goals of the United Nations. The 5 Regional Commissions are the guarantee for Apimondia to work close with beekeepers all over the world.

Apimondia organises several symposia and conferences covering different topics addressed by its Scientific and Regional Commissions. Symposia and conferences are often organised in co-operation with other international organisations like FAO, OIE and WHO to discuss issues of mutual interest.

The biennial congresses of Apimondia attract several thousand participants from all over the world. A special feature of an Apimondia Congress is that it attracts all the different categories of people involved in beekeeping. Beekeepers have the possibility to meet and talk to the high-ranking scientists, honey traders and producers of beekeeping equipment. Representatives of governments, administrative bodies, development agencies and NGOs actively participate in the discussions at the conferences and the biennial congresses.

Plenary sessions, workshops, round tables, demonstrations as well as cultural events make the congress useful for everybody. Beekeepers learn from scientists and scientists learn from the beekeepers about their needs. The next congress is planned to be held in the Ufa, the capital of Bashkortostan in Russia, in 2021, followed by the congress in 2023 in Chile, South America.

As former President of Apimondia, I am confident that Apimondia is in a position to contribute to achieving the 17 SDGs.

Evaluation of the quality of bee products at the World Beekeeping Awards 2015 - Photos: 44th Apimondia Congress Local Organising Committee

Folklore is integrated in the Apimondia Congresses. 46th Apimondia Congress in Montreal, Canada, 2019 - Photo: Asger Søgaard Jørgensen

Bee on Eucalyptus flowers
Photo: Jodie Goldsworthy

The services and products of beekeeping

WHAT IS POLLINATION AND WHY IT IS IMPORTANT

Alessandra Guidotti and Abram J. Bicksler
FAO

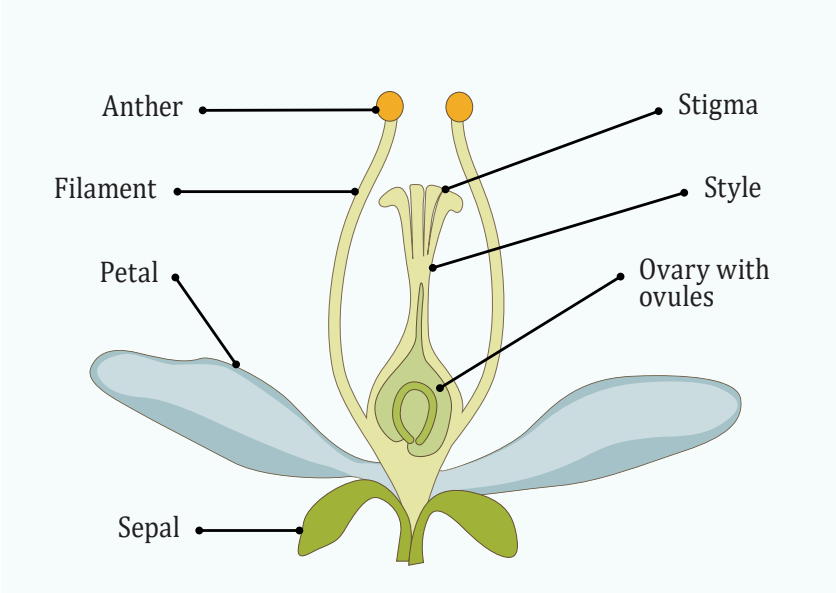
Pollination is a process of transporting pollen from the male reproductive system to the female reproductive system of the same plant or two different plants.

The male part of the flower is composed of the stamens, which in turn include:

- the *filaments*, which are the sterile part that holds the anther;
- the *anthers*, which are the fertile parts and contain the pollen.

The female part is called pistil and is composed of:

- the *stigma*, which is a sterile part where the pollen granules are deposited;
- the *style*, extension of the ovary, through which passes the pollen tube;
- the *ovary*, the fertile part, where the ovules are contained and which will develop into fruit.



Flower diagram - Rolf Theuerkauf, Danish Beekeepers' Association

According to the morphology of the plant, the pollination process can be: self-pollination, when the pollen is transferred directly from the anthers to the stigma of the same flower, or cross pollination, when the pollen is carried from the anthers of one flower to the stigma of another flower. During the cross pollination, pollen can be transferred by wind, water or animals. During the evolution process, plants and flowers have developed bright colours and unique odours to attract pollinators and allow the movement of pollen from one flower to another.

Honey bee pollinating strawberry flowers in a greenhouse - Photo: Asger Søgaard Jørgensen

As reported by Ollerton et al. (2011), around 80% of wild plants are estimated to depend on insects for pollination; while considering the 115 crops mostly used for human food consumption, 60% of their total volume comes from crops that are not pollinator dependent (cereals) and 35% comes from crops which need animal pollination (Klein et al., 2006) to improve yields and/or quality.

Many animal actors can be involved in the pollination process depending upon the plant species: flies, butterflies, wasps, mammals, birds and, of course, bees. Bees may live alone, such as the *solitary bees*, or in societies, the *social bees*. The social and domesticated honey bee, *Apis mellifera* (and its several Asian relatives, such as the *Apis cerana*), has been raised since ancient times to provide both pollination services and products for humans, such as honey, wax and propolis. Pollinators' presence may increase the quality and the quantity of agricultural production and ensure the agroecosystems' stability thanks to pollinators' support of ecosystem services and associated biodiversity.

During the last century, the world's population has grown by over 5 billion people, the cultivated land expanded dramatically and the agricultural model switched into an industrial model in many parts of the world. With these changes, managed honey bees and wild pollinators have started to face threats, including land-use change, parasites, pests and diseases, increased use of chemicals and pesticides, and climate change.

Apiary for pollinating buckwheat in Maryland, USA - Photo: Jeff Pettis

Even with these threats, the number of beehives, as well as the tons of food produced[1] and the hectares cultivated[2] increased worldwide from 2000 to 2018 (Figures 1 and 2), showing an increasing trend.

Although the positive trend in the amount of food produced is due to many factors, such as the use of modern agronomic techniques, irrigation, modern breeds, use of fertilizers and other plant production products, as can be seen from the second graph, the trend in the growth rate of the number of beehives follows the trend in tons and hectares.

Bees and other pollinators are key elements for agricultural production and without their support in the pollination process and maintaining ecosystem services, it would be impossible to maintain and sustain such a growing demand for nutritious food.

1 For this figure, we considered 30 different crops pollinated by bees and with an important nutritional and economic value. These crops are: almonds, apples, apricots, avocados, blueberries, Brazilian nuts, cashew nuts, cauliflowers and broccoli, cherries, chestnuts, coconuts, coffee, cucumbers, eggplants, garlic, grapes, kiwi, lemons, mangos, melons, oranges, onions, papayas, peaches, pears, pumpkins, raspberries, strawberries, tomatoes and watermelons. Data from FAO STAT, 2020.

2 The hectares cultivated are for the same 30 crops considered for food.

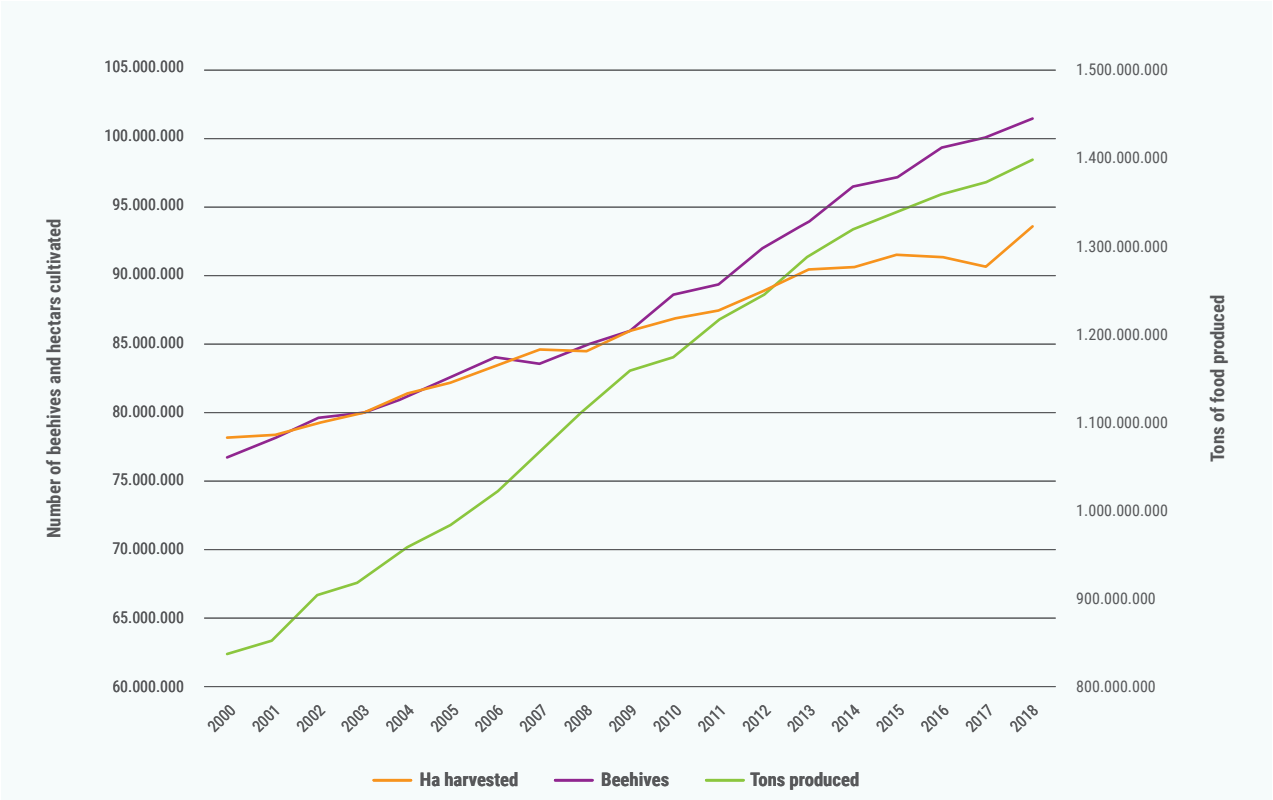


Figure 1: Numbers of beehives, hectares cultivated for 30 different crops dependent on pollinators, and tons of food produced from 2000 to 2018.

Figure 2: Growth rate (%) of beehives, hectares cultivated for 30 different crops, and tons of food produced from 2000 to 2018.

THE PRODUCTS OF BEEKEEPING

Cristina Mateescu
President of the Apimondia
Scientific Commission for Apitherapy

Bee products - Photo: Cristina Mateescu

Harvesting royal jelly - Photo: Cristina Mateescu

Propolis products - Photo: Cristina Mateescu

Honey. Valued as a sweetener since early times, honey can be consumed raw as table honey, and also as an ingredient for preparing candies, conserved fruits, juices, cakes and cooked foods. It has a long history of utilisation for processing mead or specific beer in some African countries. Moreover, showing a strong antibacterial activity, it can be used as preservative for storage of foods. In developing countries, honey is used as a household medicine for disinfecting slight external wounds or for supplementing carbohydrates by adding it to water supplied for treating diarrhoea caused by infectious diseases of digestive organs. For those purposes, even a very small-scale production of honey can be considered to be sufficient for satisfying the needs at household level.

Royal jelly. Although produced in very small amounts under natural conditions, techniques to produce larger amounts have been developed. The amount of collectable royal jelly from one royal cell is at most 300 mg. It can be used raw, as food supplement, and since it is valued for its proved effects on health, it can be widely used as a raw material in manufacturing various kinds of health food. In small scale industry, royal jelly can be further introduced into industrially processed products. In certain countries, especially Asian countries, commercial production of royal jelly has reached a significant level but such results are almost absent in other regions as in African countries.

Propolis is a sticky solid resinous material deriving from exudates secreted by plants as defensive substances which is collected by honey bees and mixed with their own secretions. Honey bees smear propolis on hive entrances, gaps between frames and in the hive box, top board, etc. to keep the interior of the hive clean and thus maintain also health. While information about propolis produced for instance in Africa is rather scarce, we are convinced that, with the extension of beekeeping practice, propolis production should be considered as valuable also in this region. The geopropolis* produced by *Scaptotrigona postica* in NE Brazil is used by natives as an ointment for wound healing and in the treatment of tumours (Coelho et al., 2015). This is also supported by a recent article (Flavia Lavinas et al., 2019). The propolis and geopropolis of stingless bees could be a promising source of healthy products. In the same regions of Brazil, propolis obtained from *Tetragonisca fiebrigi* (a stingless bee species present in a large part of the country) is used in local folk medicine for its nutritional and therapeutic properties. In addition to the possibility of spreading propolis, honey and pollen markets, stingless beekeeping may be an economic and social input in many areas of the world, especially in tropical regions, were most economic and social needs are found (Salatino et al., 2019). Beside the exploitation of the stingless bee products, the indigenous communities can obtain other benefits such as a better pollination of forest and crop species as well as the possibility of increasing yields in small scale agriculture, still practiced in many areas of the world.

* Geopropolis, the soil-enriched resin, differs from propolis samples due to its mineral and soil content and the absence of plant trichomes** (Barth and Luz, 2003). Despite differences in composition, geopropolis displays similar functions to the hive (de Souza et al., 2018).

** Trichomes are fine outgrowths of the plants, lichens.

Bee pollen can be easily produced by installing pollen traps in front of the hive entrances or by harvesting pollen combs from inside the hive. In this way various pollens can be collected even in rain forest regions. When collected from very humid areas, pollens have to be dried immediately for conservation or frozen. The dried or frozen pollens maintain the same granular form as that found on the legs of the honey bee and many commercial products are offered in this state without further processing, ready to eat.

Bee pollen pellets - Photo: Rolf Theuerkauf, Danish Beekeepers' Association

Beeswax is synthesized in the body of the bee and secreted through the wax glands. It is used in large quantities as a crude material for manufacturing candles, it is also popularly used in the sector of handicrafts as coating agent, and for batik and wax moulds. Beeswax has no significance in terms of nutritional value, but in the food processing industry its utility is significant as desiccant for diverse kinds of food, or as coating material in the fabrication of medicines like sugar-coated pills. Regarding the methods of processing wax, there is the one based on heating and compressing the wax with the heat generated by gas or firewood, and the other one based on processing the wax with solar heat. The latter method is recommendable in areas benefitting from the availability of abundant solar energy and is also environmentally friendly. Beeswax produced in Africa is highly appreciated for its better qualities that makes it suitable for various uses.

Beeswax candles - Photo: © Bees for Development

Larvae of bees pupae of male honey bees (recently including larvae of queen bees as by-product of royal jelly production) are consumed as a delicacy food and a health food. In China larvae of bees have been consumed as a food since early times and were described in the book of Materia Medica "they are effective for curing various ailments by removing causes, and habitual consumption is beneficial for improving general health status - physical as well as spiritual - of humans". As a health food, the demand for it is increasing. Furthermore, powder of drone larvae is effectively used for rearing ladybirds and lacewings as natural enemies of pests that can be used for agricultural purposes.

Nepalese honey hunter - Photo: © Early to Rise Publishing, LLC.

Bee venom contains important biological active compounds. In Asian countries, medical treatments using honey bee stingers (with venom) has been practiced as a cure, since ancient times. With modern beekeeping, bee venom (apitoxin) can be obtained, with special devices, provided that at least a source of electric continuous power is available. Apitoxin is used as an active ingredient in medicines. Bee venom is mainly effective for those illnesses which are difficult to cure by modern medical treatments such as arthritis and rheumatism, establishing a place in the domain of health care as an alternative method of treatment. The risks associated with bee venom treatments essentially concern the allergic reaction.

Bee sting on the back and shoulder - Photo: © Dr. Igor Krivopalov-Moskvin MD, Russia

There are actual cases of application of apitherapy concepts contributing to the health enhancement of local residents in developing countries: the representatives of the Apimondia Scientific Commission for Apitherapy have established apitherapy centres in Cuba (La Havana, Las Terassas) and Burkina Faso to help people by utilising not only bee venom but also other products of honey bees. To obtain all these products a special training is needed.


DARLING

1 NO POVERTY

Beekeeping offers a uniquely feasible, sustainable and environmentally beneficial way to help the world's rural poor to create livelihoods.

Beekeeping offers unique options to fight poverty and create opportunities for landless subsistence living people. It allows for utilising otherwise unexplored resources from nature and agricultural landscapes and contributes to pollination of crops. The investments can be negligible. The hive products have great market potential in local markets. The use of beekeeping products for apitherapy has a long tradition and shows promising results.

Training in making and using top-bar hives in Mbale, Uganda
Photo: © Bees for Development

Scientific Commission for Beekeeping for Rural Development
Nicola Bradbear, President

Tiringo, a young beekeeper from Ethiopia, holds a honeycomb she is harvesting from her top-bar hive - Photo: © Bees for Development

Beekeeping is a feasible way to enable financially poor people to create their own sources of income. What makes it a highly appropriate activity for rural people with few resources is that honey bees can be obtained from the wild, and all necessary equipment can be manufactured at village level. Simple hives can be made from local materials and imported goods are certainly not required. Bees do not require daily attention. Beekeeping can be done when other activities permit and is scalable. In very poor situations the ownership of just one hive can significantly increase a family's annual income.

Importantly, for poor people in remote places in developing countries, income from beekeeping is akin to 'free cash' - cash which can be invested in other livelihood activities like farming, trading or establishing a business. These other activities need money to get started - to buy seeds, to buy fertilizers, to buy goods, to buy tools, to buy materials. The 'free cash' from beekeeping is invaluable in helping a poor family transition from a subsistence livelihood to a more successful and resilient livelihood with a good breadth of income-generating activities.

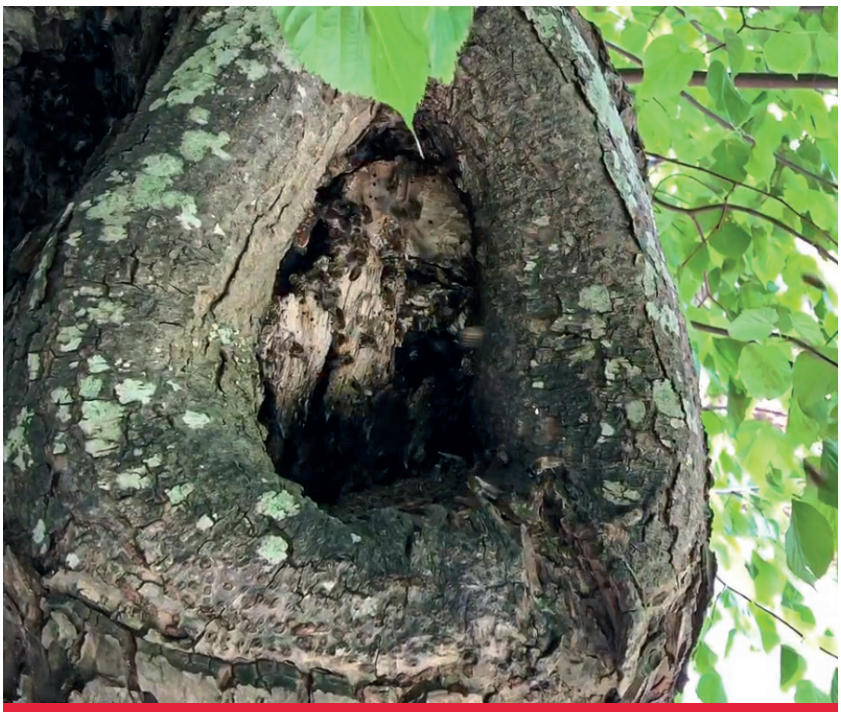
In north-west Zambia honey selling underpins the household economies of thousands of families. Research has shown that out of 475 answers about the use of honey income given by 152 beekeepers, 36% of answers concerned investing in farming or trading, whilst 25% of answers pertained to paying for school fees. Other answers concerned meeting direct household needs such as buying food, repairing homes or paying for hospital bills.

Honey from stingless bees traded by the road side in El Salvador - Photo: © Bees for Development

Beeswax has many uses, including candle manufacture and the preparation of ointments and skin preparations. As a cash and export crop, beeswax is an ideal commodity for rural communities because it does not deteriorate with age. Individual beekeepers or co-operatives can store small amounts until they have sufficient to sell. Compared with honey, beeswax has a higher price per unit weight. In addition, complex processing methods are not required. Processing involves only simple heating and filtering methods, to ensure that the beeswax is clean. It is usually moulded into blocks using whatever suitably sized containers are available for moulds. The resultant blocks are then broken into small pieces (to assure buyers that the beeswax is pure and clean). Beeswax requires no special packaging. It is normally exported as small lumps of unwrapped beeswax inside hessian sacks. Like honey, beeswax can be considered an appropriate export crop for developing countries as beekeeping does not take up land required for local food production.

Scientific Commission for Pollination and Bee Flora
Alessandra Guidotti and Abram J. Bicksler, FAO

Pollinators and, in particular, honey bees and beekeeping activities can help in eradicating poverty. Beekeeping is a low-cost activity, since beehives and other equipment can be realized locally, and can provide farmers with the opportunity to sell local and value-added products, such as honey, propolis and wax. In addition, in many parts of the world, other pollinator products (not just from honey bees, but also other social bees) are sold and consumed locally for nutrition, medicine and craft (Lyver et al., 2015). Local retailers can also benefit from the beekeeping business, by producing and supplying essential equipment.



Wild colony of honey bees - Photo: Rune Havgaard Sørensen, Danish Beekeepers' Association

Many types of pollinators do not necessarily depend upon beekeepers for food and many colonies can be found in the natural environment. With some intervention, wild pollinators can become an additional source of livelihoods and incomes. Beyond pollinator products, pollination activity can become an important livelihoods component, improving crop yields and enhancing the income of farmers. Many of the crops dependent upon animal pollination tend to be high-value, nutritional and niche products (e.g. nuts, horticulture crops, coffee and cacao), which improve smallholder livelihoods (FAO, 2018). Moreover, especially in areas severely affected by climate change events (such as years of extreme drought or flooding), beekeeping can help farmer communities to diversify the sources of income and ensure a source of profit even if part of the agricultural production is lost.

Beekeeping is an agricultural activity that requires very little investment and can take place almost anywhere in rural or peri-urban areas. It is one of the agricultural productions that does not require land. However, it requires good know-how in order to manage bee colonies and to make choices of practices adapted to the environment in which we find ourselves. It is necessary to have a good knowledge of its floral environment and the threats that can be linked to it (pesticides). The production of beekeeping products can also be carried out with basic equipment that is not very sophisticated but meets the necessary hygienic standards. It must be adapted to the volume that local beekeepers can actually produce. Large extraction chains make little sense in less developed countries. Small extractors with simple equipment to uncap the honey and filters are more than enough in most cases.

Scientific Commission for Beekeeping Technology and Quality
Etienne Bruneau, President

Beehives for pollen production in a flooded natural vegetation area in the Paraná Delta, Buenos Aires Province, Argentina - Photo: Apícola Mercedes

To enable the sector to develop, supervision is often necessary during the project start-up phase. The person in charge of this training and technical assistance must have a good knowledge of bees but also of the local environment and, if possible, of local beekeeping practices in order to be able to draw important lessons to improve the situation by avoiding or limiting the investment in expensive technology (import of hives, wax, extraction equipment). The improvement of local practices should allow the development of beekeeping projects with local craftsmen who can produce the really necessary equipment and thus develop a small local business.

In more developed countries, beekeeping can be an essential source of income for people who have little or no access to financial benefits (unemployment). Thus, beekeeping is mainly developing in countries experiencing a major economic crisis.

Beekeeping products are high value products. This is especially true proportionally in countries where poverty is present. They have very interesting feeding characteristics.

In poor countries, with small production, beekeepers can have a very significant additional income that will stimulate others to start beekeeping. Thus, projects consisting, for example, in giving two hives at the beginning to a person who had to give two hives back two years later, have made it possible to develop really important productions with very little seed money.

Scientific Commission for Apitherapy
Cristina Mateescu, President

Harvesting honey from meliponas in the central jungle of Peru - Photo: Efrain Valdivia - Iberoabeja, Peru

Bee products other than honey and beeswax, including propolis, bee pollen and royal jelly, can be delivered in any region where flora and appropriate climate conditions are available. However, we still need to solve some technical issues. But in principle each of these by-products are profitable, offering some extra income for the beekeeper.

In Africa, Asia (Vietnam) and South America (especially in Brazil) stingless bee species (*Melipona*, *Trigona*) collect propolis, and geopropolis, so even local bee species can be used to practice stingless beekeeping. *Melipona* are the largest group of stingless bees spread throughout the tropical and subtropical areas of the globe. They are found in South America, Central America, south of North America, Africa, Southeast Asia and in Northern Oceania (Hrncir et al., 2016).

Stingless bee products such as honey, pollen, propolis and geopropolis have been used for centuries in traditional medicine for the treatment of several illnesses. Bee pollen for example is a good source of food which will offer both income and also, if consumed in the household, a better health condition and thus, less expenses for health care. In order to produce these by-products, trainings on the benefits and controlled and responsible use of bee products for medicinal purposes are needed.

Beekeeping is an important tool to improve the livelihoods of people all over the world. Beekeeping is accessible to low-income people as it requires little investment and no land tenure rights.

It has been demonstrated that the price of honey mainly powers the decisions of beekeepers to maintain and/or increase their colony counts and also greatly determines the attractiveness of the activity for many young people from rural regions. Any variation of honey prices in the international market has a direct effect on the beekeeping sector in countries with a significant participation in the international market, but also indirectly in countries with a lower participation. As clearly described in the Apimondia Statement on Honey Fraud, the preservation of honey quality and purity becomes absolutely essential for the sustainability of beekeeping chains. By preserving the purity of bee products, we defend the incomes of millions of honest people that work with bees and help them prevent poverty.

Although the primary production of bee products is considered the main activity of our sector, there are also many other people involved in this value chain. The production and trade of beekeeping inputs, the activities related to apitourism, etc. also constitute working sources for many humble people, especially in rural communities.

Scientific Commission for Beekeeping Economy
Norberto Luis García, President

In Peru, when money is scarce, local materials can be enough to build efficient beehives - Photo: Gilles Ratia

Healthy honey bees can help to alleviate poverty by producing income locally for beekeepers through the sale of honey, wax and other bee products, including pollination services. Unlike many other forms of farming, beekeeping requires very little start-up costs and you do not have to own land to keep bees. As bees can offer pollination services, they are welcome in urban as well as in different areas, cultivations, wild pastures or forests. A wide variety of honey bees flourish across the globe and can be managed such as the giant honey bee of Asia and the well-known European honey bee. They can be managed in virtually all climates where humans live and the sale of bee products is often a very good source of income, thus reducing poverty.

However, beekeepers face many challenges in keeping bees alive; pests, parasites and diseases can cause colonies to be weak or die. A lost colony is not only a loss for the beekeeper but also a loss to the environment. Furthermore, unhealthy bees do not produce profits and are not adequate pollinators. Unhealthy bees might require treatments, which immediately means loss of income and possible pollution of products. Therefore, maintaining healthy bees is suggested instead of treating bees. Prevention of pests and diseases does not mean prophylactic treatment, but requires the adaptation of Good Beekeeping Practices, in order to avoid dissemination of infections, ensure good nutrition, use local and well adapted stock, avoid areas with pesticides and minimise the use of veterinary medicines.

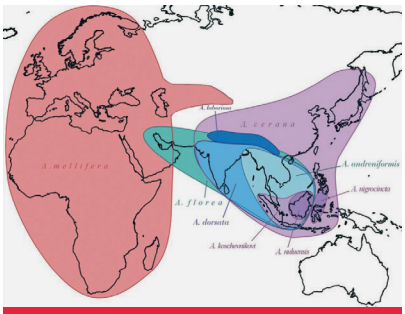
It is well documented that a healthy environment and good beekeeping practices can ensure the health of our beekeeping stock. As a reward, bees will maintain the balance in the healthy environment, otherwise this balance can be distorted, with adverse effects to all, bees and humans.

Scientific Commission for Bee Health
Fani Hatjina, President
Jeff Pettis, President of Apimondia and former President of the Commission for Bee Health

Contradicting environmental conditions for unhealthy and healthy bees - Photos: Fani Hatjina

Scientific Commission for Bee Biology

Geraldine Wright, President



A map of the natural distribution of *Apis* - © World Organisation for Animal Health (OIE). Extracted from Le Conte Y. & Navajas M. (2008). - Climate change: impact on honey bee populations and diseases. In Climate change: impact on the epidemiology and control of animal diseases (S. de la Rocque, S. Morand & G. Hendrickx, eds). Rev. Sci. Tech. Off. Int. Epiz., 27 (2), Fig. 1, page 500. doi:10.20506/rst.27.2.1819. Originally from Franck, P., H., 1999. Approche Génétique des Questions Evolutives Associées à la Sociobiologie et à la Phylogéographie de l'Abeille Domestique (*Apis mellifera* L.) (Doctorat). Ecole Nationale Supérieure d'Agronomie, Montpellier

Research on bee biology is fundamental to world food security. One in three mouthfuls of food produced throughout the world requires pollination. Honey bees are the main source of domesticated pollinators used for crop production. Scientific research on bees and bee biology makes a major contribution to food security, through the positive impact on beekeeping and crop production.

The production of bees is a fundamental part of the economies supported by honey production, wax production and pollination services. Advances in our understanding of the fecundity and ability to selectively breed honey bees for particular climates, conditions and features will lead to increased ability of beekeepers to overcome problems with parasites and pathogens. Research on bee breeding and storage semen will also permit the preservation of bee races from specific areas of the world.

Bee biology is also important for our understanding of important biological processes, such as evolution and behaviour. Honey bees are complex eusocial groups that have evolved forms of communication, intelligence and adaptability that permit them to live in many different habitats throughout the world. Their behaviour and their biology have led to important insights into the evolution of complexity in social organisation. Research on the molecular mechanisms that permit this form of social organisation could lead to a deeper understanding of the ways that environment and nutrition influence development in all animals.

Regional Commission for Africa

David Mukomana, President

The African continent is one of the regions with huge potential in beekeeping both at communal and commercial levels. The extensive forests that stretch thousands of kilometres in some countries right from Southern Africa to Northern Africa are a perfect habitat for the African bee that is one of the most resilient bee species. Research confirms that Africa has the strongest surviving wild bee colonies on earth. Favourable all-year weather conditions sum up the extent of the potential Africa has to be among the highest producers of honey and beeswax in the world.

An apiary with hives made from locally available materials in Nyabibwe, Kahele Territory in South Kivu, DR Congo - Photo: Mukamba Watongoka

Despite all the abundant resources and favourable weather for extensive beekeeping, Africa is battling extreme poverty in some parts of the continent and some governments are struggling to meet the food requirements and resorting to seeking external assistance from humanitarian organisations, such as the World Food Programme.

Apimondia is fully convinced that beekeeping is the low hanging fruit that African communities can use to not only fight extreme poverty but see many communities earn decent livelihoods without the need to invest considerable amounts of capital. The necessary conditions are there for communities to start beekeeping initiatives with very little government and external assistance. It is for this reason that the Apimondia Regional Commission is tasked with the responsibility of creating the environment that will provide communities with much needed awareness about the massive potential for beekeeping in Africa, joining hands with all stakeholders in promoting honey production and sales at local, national and regional levels.

The case of the Democratic Republic of Congo (DRC)

In Central Africa, the Democratic Republic of Congo is one country endowed with abundant natural resources that, if beekeeping was to be commercialised, the country could easily be one of the highest producers of pure residue-free honey in the world! The massive potential will remain potential until every possible material and technical support as well as capacity building is provided to communities that seek to use these natural resources to fight poverty, create hope and dreams for many children and youths, whose lives have been shuttered by the civil wars in the Congo.

SOS-JED has been doing their bit in Fizi, South Kivu Province, on the Eastern DRC since 1989. This not-for profit organisation was formed to provide real hope to these vulnerable members of society especially promoting education for children and young people, rehabilitation of victims of torture and war as well as improving gender equality in the society. The organisation has identified beekeeping as a viable initiative to fulfil its objectives having realised how beekeeping has changed lives of communities in the neighbouring Central and East African countries such as Rwanda, Uganda and Tanzania.

Apiary with local hives, Democratic Republic of Congo - Photo: Shamutwa Justin

And more requests have been channelled to Apimondia by community groups that are seeking for assistance for them to realise many community members' dreams through beekeeping, having realised the massive potential there is in this sector. Theirs is the cry of desperation, being helpless when they are surrounded by resources that can turn their lives for the better overnight.

Imagine the positive impact beekeeping can have in DRC if one community is empowered and adopted as a pilot project to help the communities attain some of the UN SDGs such as poverty eradication, fight against hunger, ensure gender equality, protection and conservation of the biodiversity in Central Africa. Apimondia, through the Regional Commission for Africa, fully recognises the need, the potential and support needed in the DR Congo to make a difference in communities through beekeeping. The Regional Commission has this special message to the beekeeping world: we can share our expertise, we can share our time, we can share the very little that is available to make a difference in these communities, helping them fight extreme poverty.

Regional Commission for the Americas

Lucas Martínez, President

The American continent is characterized by its diversity, both from an environmental and socio-economic point of view, where societies of the most varied strata coexist, with significant differences in the Human Development Index (HDI) and in the use of natural resources.

However, beekeeping cuts across all these differences, since it is present as a productive activity in all the countries of the continent. Said differences are found in the productive objective and the size of the enterprises, but beekeeping is still a primary activity that has direct effects on human development:

- it produces natural and healthy food, for direct consumption and of high nutritional value;
- it is essential in the production of other foods, with pollination services for crops with high nutritional value;
- it maintains biodiversity through the breeding of pollinating agents (different type of bees) of species of economic value and the provision of ecosystem services;
- it generates economic development in populations with different income levels throughout the continent.

Beekeeping must be considered a tool that positively modifies ecosystems and societies. Representatives from the following countries have participated in this reference publication: Argentina, Brazil, Canada, Chile, Cuba, El Salvador, Mexico, Uruguay and USA. The collaboration of Misael Cuevas Bravo (Chile), Rene Sayago (Argentina), William Melo (Colombia), Norberto Gugliota (Argentina) and Efrain Valdivia (Peru) is especially appreciated.

Beekeeping is a tool for population development, since it does not require a large initial investment and can grow according to the realities of each individual. The main input is bees, which in our continent may be *Apis mellifera* or different species of *Melipona* or *Trigona*, species native to the tropical and subtropical areas of America, which are found naturally in almost the entire continent.

From the capture of a family of bees, a family enterprise can be started, with few elements that are obtained in the region or even manufactured by the same members of the family. No land or capital is needed, only work.

Training of Granita Co-operative beekeepers in Tame, Colombia - Photo: Granita Beekeepers' Co-operative

When learning to keep bees, the products obtained can be consumed directly (without any type of industrial process) or exchanged or sold to other inhabitants of the same city or village, generating the possession of goods, which is the economic principle of development.

In turn, extra value can be added to the products, using them as a base for the production of beverages (mead), medicines, cosmetics or distributing them in other markets. A large number of countries in the region are important honey exporters while others are importers.

Beekeeping, as a development tool, is used in several countries in the region; one of the projects that we can mention is in Colombia, where the Tamarindo Integral Farm Association (GRANITA) has 140 beekeepers, 70 of whom belong to the Somos Rurales programme (led by the Ministry of Labour and UNDP), focused on generating income and employment for victims of the armed conflict in Colombia.

Another example is the COOPSOL Limited Labour Co-operative, established in 1992, that promotes social entrepreneurship and inclusive business. It is mainly dedicated to the production and marketing, at national and international level, of high quality and added value apicultural and agricultural products, at a high level of efficiency. Today it has 1,300 hives under organic certification and for ten years it has been allocating its honey to Fair Trade markets. In turn, APONA (Association of Organic Producers of Northern Argentina) is made up of small producers and peasant families who started organic beekeeping with COOPSOL. Most of its members live in rural communities between Santiago del Estero and Chaco (Argentina). It currently has more than 100 producer partners and all of its hives have already achieved bio certification, in addition to having obtained the FLO Fair Trade certification in 2011.

Organic apiary certified by Fairtrade on the slopes of Mount Chaqueño, Santa Lucia, Santiago del Estero, Argentina - Photo: Lucas Martínez

Honey bees are not just *Apis mellifera*. In Asia we are harvesting honey from other bee species like *Apis breviligula, Apis dorsata, Apis laboriosa* in a sustainable way and we promote the use of native bees for pollination to increase crop yields.

Regional Commission for Asia
Cleofas R. Cervancia, President

Giant bee species are well distributed in Asia, except *Apis laboriosa* which is limited to the Himalayas. So far, it has only been identified in the mountainous regions of Bhutan, the Chinese province of Yunnan and India. Premium honeys are produced by the giant bees because the colonies are not fed artificially and there are no residues from miticides. The honey has relatively lower sucrose content, but the moisture is high even when harvested ripe. There are only three major steps in harvesting their honey. First, harvesting should be done during summer honey or flow season. During this stage, you get more honey and it is usually ripe. When the honey combs are fully capped, the moisture content is lower. Second, do not burn the colony, just apply cool smoke just to drive away the bees. Some hunters cut only the honey comb, leaving the rest of the broods in the nest. Third, and most importantly, observe hygienic practices in handling the products, from extracting to bottling.

On the Indonesian island of Sumbawa, each family has its own tree with *Apis dorsata* nests for honey collection - Photo: Gilles Ratia

Regional Commission for Europe
Róbert Chlebo, President
Asger Søgaard Jørgensen,
Former President of Apimondia

Beekeeping and beekeeping development have a long tradition in European countries. Since ancient times, beekeeping has contributed to the well-being of the people and has been considered a valuable activity. The value of beekeeping is reflected in the legislation from old times, protecting bees, beekeepers and the quality of the hive products. Almost every farm kept bees. Early beekeeping was seen as an important economic activity, as taxation of beekeepers was early implemented. Beekeeping schools were founded in the 1700s and beekeeping was seen as a valuable way to give landless people and smallholders ways to creating income.

Beekeepers eventually united and formed strong organisations fostering co-operation and development of the activity. Governments were aware of the values of beekeeping and established research bodies to support the developments.

With the development of intensive agriculture, the possibilities for beekeeping have changed; there is a need to access grants for development beekeeping projects and research, especially in European countries not eligible for EC funding.

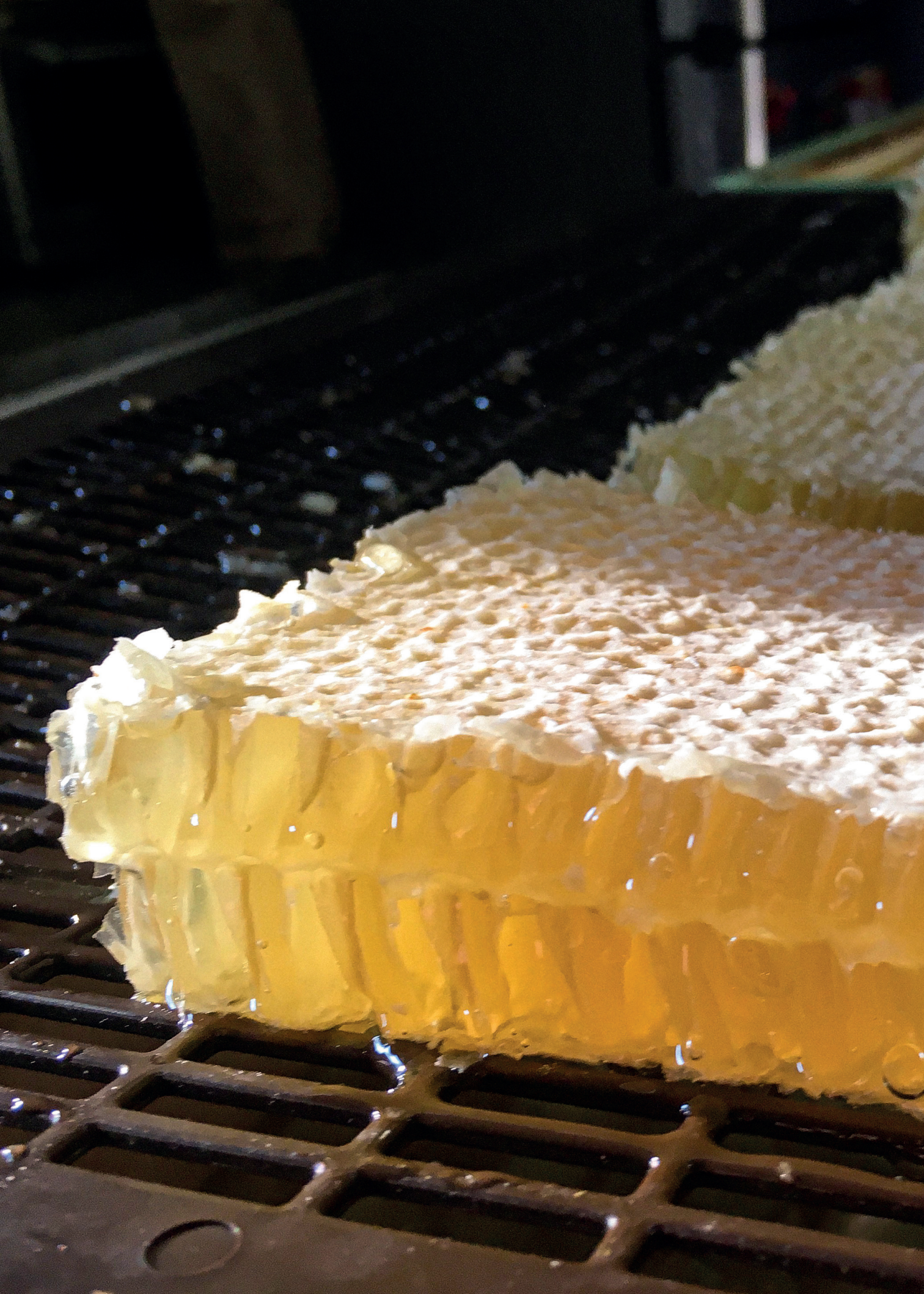
Bee yard on the slopes of Mount Etna, Sicily, Italy - Photo: Asger Søgaard Jørgensen

Regional Commission for Oceania
Jodie Goldsworthy, President

The Oceania region is made up of both developed and developing countries and beekeeping has been used in our region as a tool to improve the livelihoods of people in all parts of our region. In particular Australia and New Zealand apiculture scientists have worked in the Pacific islands of Papua New Guinea, Fiji and the Solomon Islands to study pests and diseases of honey bees. Through the respective efforts of both the Australian and New Zealand governments there have been examples of information exchange which have allowed the keeping of bees by nations in development.

Many species of *Acacia* are important for honey production - Photo: Asger Søgaard Jørgensen

Both New Zealand and Australia lead the world in commanding prices for their unique honeys which are in excess of the global benchmark averages. New Zealand has led the world in differentiating, studying and communicating the benefits of New Zealand manuka honey and have shown what is possible in commanding high prices for unique honeys with unique scientific characteristics and provenance. Australia holds the largest collection of most diverse honey varietals anywhere in the world with over 800 species of indigenous flora many of which produce uniquely different honeys. Australia is still to understand the market potential for these honeys but there are promising examples such as jarrah and leatherwood honeys not to mention the many diverse and different eucalypt species.



2 ZERO HUNGER

Bees are at the heart of sustainable agriculture: they pollinate food crops and provide nutritious honey and other valuable products.

Beekeeping and the protection of pollinators are crucial to the production of a great variety of fruits and seeds of high nutritional value. Pollinating insects are valuable for sustainable agricultural production. Food security of beekeeping products is a result of training and quality standards to secure the consumer and the marketability of the products. The Apimondia Commissions are active in promoting standards and training.

Comb honey ready for being marketed
Photo: Jeff Pettis

Scientific Commission for Beekeeping for Rural Development
Nicola Bradbear, President

Bumble bee pollination is an important input for commercial strawberry production - Photo: © Bees for Development

Honey for sale in Azerbaijan - an important source of income for rural people everywhere - Photo: © Bees for Development

The major value of honey bees is as pollinators of over 100 cultivated crops, and they are therefore crucial for food security. This most important benefit of honey bees, and of course many other bee and insect species, is poorly appreciated - although most flowering plants benefit from insect pollination because they have evolved in association with these pollinating insects - and the plants and insects are interdependent for survival.

In some areas the increased production brought about by the presence of honey bees is fully appreciated and beekeepers receive a fee from farmers for pollination services. As an example of the value of pollination, consider the Chiang Mai area of Thailand where the longan fruit (*Euphoria longana*) is cultivated. A few years ago it was realised that yields of this crop are dependent upon adequate honey bee pollination. Colonies of honey bees were brought into the area and yields of this valuable export crop increased by 30%. As an additional benefit, the crop also supports a viable beekeeping industry.

Honey - as a food. In all societies honey is valued as a sweet and flavoursome food. At times of food shortage honey is a useful carbohydrate source, adding nutritional diversity to poor diets. Honey often has an important place in traditional food preparation. In Islamic countries honey is particularly highly prized because of the emphasis the Koran gives to the value of honey and honey bees.

Honey - as a medicine or tonic. Honey is used widely as a medicine or tonic food. Honey has scientifically proven medicinal properties: it is a sterile solution (its high sugar concentration prevents growth of micro-organisms); it contains enzymes which produce bactericidal hydrogen peroxide and can contain various complex biochemicals and trace elements.

Honey - as a cash crop. Once harvested, honey does not require further processing other than to ensure that it is free from debris introduced during harvesting. Honey processing requires only simple equipment as used in other forms of food preparation: bowls, sieves, straining cloths and containers. Honey is a stable commodity with a long shelf-life: if harvested carefully it will remain wholesome for years.

Learning skills to make hives, at no cost, in Ligaba, Ethiopia - Photo: © Bees for Development

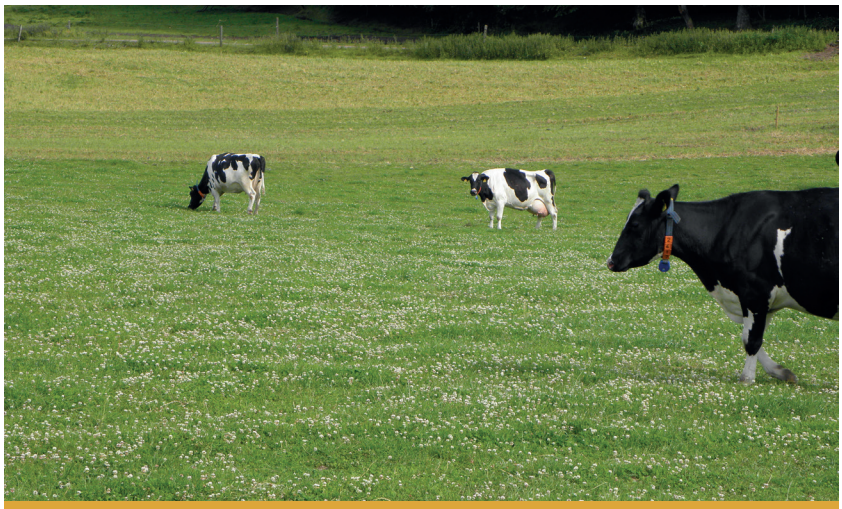
In one project in Amhara, Ethiopia, beekeeping helped to reduce the level of food insecurity faced by project beneficiaries. Women-headed households were helped to get bees and start beekeeping. At the start of the project 62% of the women in this group were suffering from severe food insecurity; by the end of the project this had fallen to 15%. The difference had been achieved because the women were able to sell honey and buy food and farming inputs - so increasing their ability to grow their own food. This change in access to food also impacted on the children in the households.

In Uganda, during the severe drought and food shortages of 2017, women beekeepers diluted honey with water and gave these high-energy drinks to their children for breakfast, before school.

Scientific Commission for Pollination and Bee Flora

Alessandra Guidotti and Abram J. Bicksler, FAO

Pollinators can help farmers and communities to produce healthy and nutritious food: around three-quarters of the world's crops depend, at least in part, on bees and other pollinators for improved yields and quality (FAO, 2018). According to several scientific reports, pollinator activities can increase yields, the number of seeds and the dimensions and quality of crops. Tomato, apricot, coffee, blueberry, almonds, avocado and many other crops, especially the ones richest in micro-nutrients, are all pollinator dependent (Wendee, 2015). Without these sources of vitamins, minerals and energy, the risks of malnutrition might increase dramatically. Indirectly, pollinators are partly responsible for the protein supply from meat and dairy products since alfalfa, which is an important feeding element for ruminants, is pollinated by bees. Pollinators, including the world's wild pollinators - including more than 20,000 species of bees, some species of flies, butterflies, moths, wasps, beetles, thrips, birds, bats and other vertebrates - play an important role in providing ecosystem services, since 90 per cent of wild flowering plant species depend, at least in part, on the transfer of pollen by animals (Potts et al., 2016). Healthy ecosystems connected to agricultural landscapes play an important role in crop and food production.



White clover is dependent on bees for pollination. It is an important source of protein for cattle in many areas of the world. Cows enjoying pasture with white clover - Photo: Asger Søgaard Jørgensen

In addition to pollination services, pollinators also produce many products for the food system, such as honey, larvae (an important source of protein in many parts of the world), propolis and other comb products. In the perspective of world's growing population, preserving and promoting pollinators is an essential measure in order to ensure enough food for the coming generations.

Checking nectar in rapeseed flower, to evaluate the attractiveness for pollinators - Photo: Asger Søgaard Jørgensen

Scientific Commission for Beekeeping Technology and Quality
Etienne Bruneau, President

Beekeeping is certainly the agricultural sector that best integrates the notions of sustainability because the bee produces no waste and in order to feed itself, it plays a very important role in pollination. In addition, the surplus of its harvest allows us to obtain first quality products. Thus, among the beekeeping products, we find the best foods that can be found on the market. Honey is undoubtedly the best sugar insofar as it is not denatured by inappropriate treatment. Pollen, and more particularly in the form of bee bread, is one of the best sources of vegetable protein with an extreme richness in microelements. We can meet all our food needs by eating only pollen with fruit or vegetable juices. Bee larvae are also of great interest as a protein source. However, the production of these latter products (pollen and larvae) requires very good hygienic conditions, which is not always easy to achieve.

Hives in a pinewood in Turkey for pine honey production - Photo: Etienne Bruneau

However, all this is only possible if we respect the environment and maintain and even promote biodiversity. The agricultural model of intensification is totally against the development of sustainable beekeeping. The notion of animal welfare can also apply to bees and is directly linked to this sustainability. Today, there is an increasing movement of beekeepers who want to help bees and who want to work towards its respect by no longer putting priority number one on production and profit. Natural beekeeping is part of this movement. On the contrary, the intensification of agricultural systems will generate a model of beekeeping which will have to become itinerant (development of transhumance) with concentrations of colonies in certain places to ensure partial pollination of the huge surfaces of honey plants. The case of almond trees in the USA is the most striking example. Colony concentrations will promote the spread of diseases. The lack of diversity in crops will also raise weakness among bees and poorly diversified environments will also be more exposed to pesticide pressure, which will also cause bee losses.

The search for more productive colonies under such conditions will also lead to genetically impoverished breeds of bees that risk losing their enormous resilience. Feeding supplements are becoming increasingly important and this again only weakens the bees' immune system and results in the survival of bees that would not survive alone in the environment.

Some large trees on the Indonesian island of Flores can accommodate more than 150 colonies of *Apis dorsata*! - Photo: Gilles Ratia

The subsequent loss of colonies will require an extreme multiplication of colonies by division and by the addition of selected queens bred under unsustainable conditions. Agricultural intensification thus generates beekeeping intensification and its loss of sustainability. Movements of hives, feeding syrups and antibiotic material are all increasing, which is really worrying for our future.

Honey contains vitamins and minerals (although in small amounts) that are extremely helpful for children's growth and development. Consumed directly, or in various combinations with other bee products or with other natural products (fruits, seeds, etc.), honey offers a better energetic condition, strength and no feeling of hunger or weakness. Children who eat honey have improved metabolic reactions, a better ability to resist or even fight diseases; consumed from early childhood, honey can promote a good health condition and longevity. The positive effect of honey on the nutritional function is also due to its both prebiotic and probiotic effects.

Scientific Commission for Apitherapy
Cristina Mateescu, President

Children enjoying honey - Photo: © London Honey Co.

The Malagasy bee *Apis unicolor* is particularly gentle and children can easily participate in the activities in the apiary - Photo: Gilles Ratia

Praised as the "non-meat protein" with excellent health benefits, bee-collected pollen contains highly valuable substances which are credited with both nutritional and physiological effects. Together with its natural derivative, bee bread, they may be considered natural functional food or dietary supplements due to their health promoting effects. Eating bee pollen or bee bread can supply the necessary amounts of valuable nutrients - almost all humans need to thrive - and protein is one of them - for a good nutritional status and a better health. In equal weights, bee pollen contains more proteins and free amino acids than most of our usual animal source food (beef, eggs or cheese) and due to its high degree of assimilation, it is excellent for the normal protein dietary needs. Correcting deficient or unbalanced nutrition, bee pollen plays an active role in promoting growth and development, preventing hunger and malnutrition and accelerating recovery after illness.

Considered a "super-food", royal jelly is a precious product of the young nurse bees, which offers new perspectives for a better nutritional status and functioning of the human body. Given as a food supplement to both children with nutritional or neuropsychic-motor disorders and elderly, royal jelly can correct many deficiencies and offer a better functioning of the body.

Bee brood - drone larvae, worker larvae and even queen larvae (following the royal jelly production) can be also considered a good source of nutrients with benefits to human and animal health.

Propolis, the resinous product collected by worker honey bees from plant exudates and mixed with vegetable and bees wax, is not a food itself but can be used to correct some disfunctions occurring in normal physiological processes of the body, thus having an indirect but valuable effect on human health.

Regular consumption of natural honey offers nourishment and favours metabolic activities, all supporting growth in young organisms and a healthy living. Honey enhances the digestion (pre and probiotic activities) and absorption of the major dietary components and micronutrients, as well as of those required for metabolism and body functions.

Pollen production in the Paraná Delta, Buenos Aires Province, Argentina - Photo: Apícola Mercedes

Bee pollen and bee bread can enable a better metabolization and help to balance cravings. They are both rich in essential nutrients (vitamins C, E and most of the B vitamins), which help to improve digestion and increase energy.

They are rich in amino acids, including phenylalanine, which helps to control hunger and appetite. Both products provide about 25% of the bioavailable proteins and promote growth and development, preventing malnutrition. According to Salles et al., 2014, bee pollen improves the energetic and muscle protein metabolism. There is only one important restriction in consuming these products: known allergenic reactions to bees or a specific health condition like asthma.

Royal jelly for improved metabolism - Royal jelly supplementation improves lipoprotein metabolism in humans. Among the lipoprotein fractions, small very-low-density lipoprotein was decreased ($p<0.05$) after royal jelly intake. Thus, it might be suggested that dietary royal jelly decreases TC and LDL by lowering small VLDL levels. Royal jelly supplementation has a regulatory effect on body weight, total daily energy and macronutrients intakes in type 2 diabetic patients.

Beekeeping guarantees food security as it provides direct access to food, economic means to buy it and steady supply of good quality food. The protection of bee products purity is not only a problem of food safety or food defence, but it is mainly a problem of food security, thus concerning the capacity of countries to provide their own food.

Scientific Commission for Beekeeping Economy
Norberto Luis García, President

The human diet is composed of about 2/3 wind pollinated crops such as wheat, rice and corn. However, it is the remaining 1/3 of our diet that is animal pollinated (think of bees!) that keeps us in good health. We will not starve without pollinators, but we will be in much poorer health and our diet would be bland and our bodies starved for nutrients and vitamins. We can survive on wind pollination, but we thrive on bee pollination. Healthy pollinators equate to food security, plain and simple. The fruits, nuts and vegetables that animal pollination provides are invaluable to human nutrition. Honey bees provide the bulk of pollination in modern agricultural systems and are vital to production.

Small scale farms in many areas of the world must rely on local wild pollinators and as such the habitat of wild bees and their health must be protected. With managed bees we - as beekeepers - can take steps to improve bee health but wild pollinators depend on a healthy ecosystem to survive. Thus, land conservation and sustainable farming practices are vital to maintaining viable wild pollinator populations. Pollinators provide increased food production which can offset hunger and provide valuable nutrition for a healthy human population.

The Bee Health Commission works for reducing the use of pesticides and veterinary medicines as well as highlighting the economic aspects of bee pests/pathogens while, at the same time, guaranteeing the quality of hive products.

Scientific Commission for Bee Health
Fani Hatjina, President
Jeff Pettis, President of Apimondia and former President of the Commission for Bee Health

In a natural flowering area, if no mowing or reduced mowing takes place, the wild bees will thrive! - Photo: Fani Hatjina

Regional Commission for Africa
David Mukomana, President

Climate change has created a serious challenge in many African countries with unpredictable weather patterns that has left many subsistence farmers wondering when to plant their crops. This has seriously affected production of the traditional drought-resistant food crops that have been a reliable buffer between seasons for generations. These traditional crops (small grains) helped in complementing the maize and other crops that have become the staple food across Africa. This turn of events has left many African countries being food insecure and urgently looking for sustainable agricultural practices - SMART Agriculture - to mitigate the effects of unpredictable weather and recurring droughts.

Bee hives do not need to cost money. Here is a hive in Zambia - long lasting, sustainable and durable. Extensive beekeeping using a large number of low cost, or no cost, hives is widely practised in Africa, yet remains poorly appreciated by many - Photo: © Bees for Development

One of the reasons why the yields have gone down drastically is the decrease in insect pollinators, especially the honey bees that have been under threat from many factors. Excessive use of agro-chemicals has become a seemingly normal agricultural practice due to the pressure to increase yields per hectare. On the other hand, such chemicals have adversely affected the pollinators. The traditional honey hunting has expanded with the increase in demand for honey. The harvesting methods often leave colonies decimated as the bees are burnt, brood vandalised and colonies left with no new bees hatching.

The increase in demand for food production due to droughts and growth in population has created a massive opportunity for beekeeping in Africa. Commercial farms growing cash crops have increased in recent years to the extent that pollination services have become a massive business opportunity for beekeepers.

Pictogram of new label for agrochemicals harmful to bees, being discussed and to be adopted in South Africa

With new fields of macadamia and other cash crops coming up throughout Africa, beekeeping has become a pillar of sustainable agriculture in order to ensure viability of such ventures. Vast tracks of fields are being cleared in South Africa, Mozambique, Malawi and Zambia for crop and citrus farming that requires pollination. The same is happening in Nigeria, Ethiopia and Burkina Faso where research has been carried out on the effectiveness of bees as pollinators. All these developments are pointing to the fact that beekeeping is the game changer in agriculture in a few years to come and African beekeepers are getting ready for the business.

Increasingly, governments are responding to the lobbying by beekeepers for regulations to be put in place to protect bees from agro-chemicals harmful to

bees. This has seen Ministries of Agriculture in many countries working closely with beekeeping associations to promote better and sustainable agricultural practices that are not harmful to bees and the environment. Now chemical manufacturing companies are compelled to indicate if their respective chemicals are harmful to bees and to what extent. Ethiopia has the same policy where it is an offence to spray chemicals that kill bees.

The case of South Africa and the pollination industry

South Africa offers a very unique beekeeping story of two extremes. South Africa's fresh fruits, wine and other horticulture products are known globally with most of these products coming from Western Cape, Free State, Mpumalanga and Limpopo. This success story cannot be celebrated without acknowledging the role of the honey bees in the extensive pollination work on these massive fields to the extent that South Africa is one of the few African countries with a well-structured honey bee pollination industry. Western Cape has most of the commercial beekeepers in South Africa and probably Africa, providing the bulk of the bee pollination services which has become a multi-billion Rand business annually. So significant has the service become that there is pressure on commercial beekeepers to increase their colonies to meet the pollination services required nationally. There is now an aggressive drive to encourage smallholder beekeepers to register with the Department of Agriculture in order for them to qualify to offer pollination services.

On the other hand, South Africa comes from a past that has seen many black South African families not able to realise the benefits from the bees due to a number of factors including general phobia for bees and lack of training to the extent many families in the rural South Africa are living in poverty but surrounded by massive forests that can be used for beekeeping activities to earn these communities a livelihood. These communities to a greater extent are part of the over 18 million South Africans entirely dependent on government social grants, a situation that has put immense pressure on the national budget.

To this end, there have been recent efforts by stakeholders - Department of Agriculture, Forestry and Fisheries (DAFF), South African Bee Industry Organisation (SABIO) and the Apimondia Regional Commission for Africa to extend beekeeping to the grassroots at an accelerated rate. And the momentum is unbelievable!

In November 2018, DAFF called the stakeholders in the apicultural sector to the first National Beekeeping Conference held in Pretoria bringing together commercial beekeepers, smallholder beekeepers, communal beekeepers, all the nine Provincial Governments and other interested stakeholders to discuss the status of beekeeping in South Africa and how this strategic sector can be used to help meet the Government's Vision 2030 to create jobs and help bring social transformation in South Africa.

The South African Beekeeping Conference (BEECON) held in July 2019 in Zebula, Limpopo, was such a landmark step towards a sector that has a collective vision to take beekeeping in South Africa to the regional and indeed to the international forum. The number of delegates that attended the Conference was impressive with a remarkable increase in black smallholder beekeepers coming on board. The idea being to ensure these small-scale rural beekeepers earn a living through beekeeping in order for them to put food on their tables and send their children to school.

David Mukomana
Contributions from:
South African Department of Agriculture, Forests and Fisheries (DAFF)
South African Bee Industry Organisation (SABIO)

Pollination services in the North West Province, South Africa - Photo: Nono Mohotkheng

Regional Commission for the Americas

Lucas Martínez, President

Gladstone Solomon holds beautiful combs from his top-bar hives in Tobago - Photo: © Bees for Development

There is no sustainable agriculture without bees, as they are essential within the ecosystems and especially in regions where intensive agriculture is practiced for the production of fruits, vegetables and seeds.

Pollination generates more efficient agriculture, which drives more production that in turn promotes food security, with a greater diversity of products which, combined, offer proper nutrition.

The direct effect of beekeeping in itself is to generate healthy, natural and high nutritional value foods. As mentioned by the Scientific Commission for Apitherapy, honey, pollen, royal jelly and other products from the hive have exceptional nutritional values.

By promoting beekeeping, we can guarantee better access to foods of high nutritional value and very affordable.

Regional Commission for Asia

Cleofas R. Cervancia, President

Honey seller in a suburban area of Islamabad, Pakistan - Photo: Gilles Ratia

The paradigm shift to natural farming systems/organic agriculture leads to pollinator conservation. Asia uses a lot of pesticides that harm the bees and other pollinators, and we recommend to the farmers the use of IPM (Integrated Pest Management) to minimize pollinator losses. On the other hand, the establishment of the tropical honey standards is one step forward in producing authentic honey of high quality for human nutrition.

The Commission for Asia worked on the standardisation of tropical honey. We also consider the production systems for honey harvesting and processing that determine largely the quality of the honey. The only major deviation of this standard from that of the *Codex Alimentarius* is the higher moisture content (23%) for wild honey. It is important that wild honey, especially from giant bees, be harvested during the honey flow season, and that the honey be ripe. Off-season harvested honey is unripe and has very high moisture content, ranging from 24 to 32%. The next step to be done by the Commission is to study further the honey and other bee products from native Asian bee species.

Regional Commission for Europe

Róbert Chlebo, President

Honey is high in calories and can be used in moderation to replace refined sugar and other sweeteners, thus contributing to public health. Honey has a positive physiological impact, particularly in terms of health, given its antiseptic, anti-inflammatory and healing properties, which could be further recognised in the future agricultural policy.

Apimondia and COPA-COGECA statements on honey frauds are periodically published and up-dated.

From a health point of view, it is particularly worrying that a big portion of honey on the global market is produced using resin filters, additional water removal or syrup additions. However, since such “honey” contains practically no biological value, it should not be called honey, but a kind of sweetener.

Some fraudulent honey packagers and traders improve these substances by mixing them with high-quality European honey, applying the "blend of EU and non-EU honeys" label, as permitted by Directive 2001/110/EC. In order to fight this situation that hits true and honest beekeepers, Apimondia set up a dedicated Working Group to identify stringent procedures and tight control measures.

Honey shop in Hungary - Photo: Asger Søgaard Jørgensen

Regional Commission for Oceania

Jodie Goldsworthy, President

The Oceania region is well placed in close proximity to a number of countries where access to nutritional foods is a daily challenge. Both Australia and New Zealand are highly active in scientific research and advancements which link honey bees and pollination with both Governments investing somewhat in this topic. Australia and New Zealand both play significant roles in supplying important volumes of food to the rest of the world as net exporters of their produce.

Importantly, policy makers have recognised the crucial role in underpinning food security that honey bee pollination plays. For example, in Australia it is well known that honey bees underpin two thirds of Australia's agricultural production through their pollination services. Strategies are being developed to support and sustain beekeeping in both these important countries so that productivity can increase. It is pleasing to be part of conversations that refer to pollination as the fourth lever of productivity in addition to the prior focus on the other three levers which have been well exploited for productivity, these being water, chemicals and fertilizers.

In a climate changed world, agriculture and the beekeeping industries are realising the need to work more closely together to meet the challenges needed to produce more food for the rest of the world.

Knowledge transfer across our region into countries such as Papua New Guinea, Fiji and the Solomon Islands in relation to establishing beekeeping enterprises is likely to have assisted with this goal, although its data to support such a claim is not available from our region.

Honey marketing in Fiji - Photo: John Caldeira

3 GOOD HEALTH AND WELL-BEING

Beekeeping gives people identity, self-confidence and self-reliance.

Beekeeping is a therapeutic activity in itself. You must calm down to manage bees. The activity brings you high value, nutritious, health-promoting products. Pollination by bees is vital to the production of many fruits and seeds. Beekeepers are eager to share knowledge and beekeepers' meetings show a great diversity of professions creating a forum of creativity.

Honey being traded outside hospital in Zanzibar
Photo: © Bees for Development

Scientific Commission for Beekeeping for Rural Development
Nicola Bradbear, President

Beekeeping as an activity can be therapeutic - bees fare best with calm and gentle management. As people learn beekeeping, they gain social identity, and the activity helps to generate self-reliance. The formation of beekeeping associations or co-operatives encourages contacts between people.

Honey is an important source of food and income for rural people in Kyrgyzstan - Photo: © Bees for Development

Beekeepers in Chechnya with their bees - Photo: © Bees for Development

The high nutritional and therapeutic value of honey has been long appreciated and honey is widely used as a medicine, particularly by people who find it difficult to access mainstream health services. Honey contains vitamins, enzymes, amino acids and polyphenols and honey is known for its antioxidant activity. Stingless bee honey is appreciated and used for healing in all societies where stingless bees are found. For example, one study from Ecuador showed that stingless bee beekeepers kept five different species of stingless bees and used the honey for eight different medicinal uses (Vargas, 2015).

In Uganda, coffee farmer and beekeeper Phillip Wakuma, Mbale, insists on feeding his children a teaspoon of honey every day and reports, “they never miss school due to coughs”.

In Sierra Leone, Masanga Hospital, a referral hospital for people with chronic wounds, relies so heavily for honey as a wound treatment that in 2019 they took steps to establish their own apiary to secure they own supply of honey.

Scientific Commission for Pollination and Bee Flora
Alessandra Guidotti and Abram J. Bicksler, FAO

Honey - from honey bees as well as from other bee species - is rich in vitamins and enzymes and has antioxidant, antimicrobial, anti-inflammatory activity. Propolis, among many different substances, contains flavonoids, polyphenols, caffeic acid and presents antibacterial, antiviral and antifungal properties (Viuda-Martoz et al., 2008). Royal jelly is rich in sugars, proteins and mineral salts, and it is useful as energizer. In contrast to many other products, pollinators’ products are relatively easy to find and can be self-produced with low resources. Larvae are eaten in many cultures for

protein. Bee products have high food value and may provide several health benefits to people who have difficulties in finding foods with high nutritional and healthy properties.

In addition to the direct bee products, pollinators (honey bees and a myriad of other animal pollinators) are important for ensuring that many crops high in micro-nutrients (e.g. vegetables, fruits and nuts) are pollinated, contributing to increased yields and quality. Good health and well-being are further ensured through the nutrients available in the food that has been produced thanks to the pollinators' activities.

Lush coffee farm with many trees providing shade and wild flowers to feed the bees, India - Photo: Lise Hansted

Products such as honey, pollen, royal jelly and bee larvae, which are healthy foods, if not super foods, should be promoted. They are available almost everywhere in the world and could help to maintain a part of the disadvantaged population in good health. Bee venom can be used for medication. All these products are available at very low prices compared to commercially available processed products. Information should be provided in this regard.

The beekeeping activity allows the person who practices it to learn about the surrounding environment and to remain in close contact with the evolution of nature. When you visit your hives, the attention required helps you clear your mind. Working in the hives is for many an important source of relaxation that allows them to forget their everyday worries during a visit. This generates a sense of well-being and a real rejuvenation that is so difficult to find in our world today.

Ageless beekeeping: technical visit during the 46th Apimondia Congress in Canada - Photo: Efrain Valdivia - Iberoabeja, Peru

It is an activity that is practiced at almost all ages from about fifteen years to the end of life. However, there is a peak between 45 and 70 years of age. Many people are developing this activity when they reach retirement age. This allows them to remain active and useful to society.

Scientific Commission for Beekeeping Technology and Quality
Etienne Bruneau, President

Scientific Commission for Apitherapy
Cristina Mateescu, President

Following surgery, treatment with arohoney and propohoney offered very good results in a *Staphylococcus aureus* knee infection (apitherapy project in Cuba) - Photos: Cristina Mateescu

Besides its nutritious value, honey is well known in many cultures and traditions for its valuable medicinal properties. Liver protection, treatment of cough and colds (sore throat), wound and burn healing, stomach pains or other gastrointestinal disorders (diarrhoea associated with gastroenteritis) in children are but a few of the benefits from the treatment with honey. In such treatments, honey might be effective as part of oral rehydration therapy. Honey has also inhibitory activity against *Bacillus anthracis* (anthrax), *Corynebacterium diphtheriae* (diphtheria), *Klebsiella pneumoniae* (pneumonia), *Mycobacterium tuberculosis* (tuberculosis), *Salmonella typhi* (typhoid fever) and *Vibrio cholerae* (cholera).

Bee pollen has been used for medicinal purposes for centuries. In ancient records, like the ones of early Egyptians, it was described as "Life-giving dust". Together with bee bread, pollens contain antibiotic factors effective against salmonella and some strains of other harmful bacteria. Clinical trials have shown important regulatory effects of bee pollen and bee bread on gastrointestinal function, liver and prostate disorders, various types of cancer, immune system deficiencies, etc.

Propolis too is a remedy in traditional medicine. Some of its more than 300 compounds are biologically active ingredients with important therapeutic effects: wound healing, antibacterial, antiviral, antifungal, antioxidant and anti-tumour properties, to mention but a few. In some regions of the world it could help to overcome critical health situations/conditions affecting the population.

Last but not least, bee venom - applied as either bee stings or apitoxin in various pharmaceutical preparations - could open a new gate in treating common inflammatory as well as more severe conditions as the neurodegenerative diseases (Parkinson diseases, Alzheimer, multiple sclerosis) or even viral diseases with important negative prognostics on the affected populations (HIV-AIDS, B and C virus hepatitis, etc.).

Scientific Commission for Beekeeping Economy
Norberto Luis García, President

Much of the bee pollination-dependent food consists of phyto-chemically vital foods, fruits, vegetables and nuts. Proper management of bees ensures no foreign or potentially dangerous residues in bee products.

Scientific Commission for Bee Health
Fani Hatjina, President
Jeff Pettis, President of Apimondia and former President of the Commission for Bee Health

The major means by which bees and beekeeping aide in Goal 3 is with increased nutrition as mentioned in Goal 2 above. However, bees and beekeeping can also impact the lives of people of all ages if they take up the craft of beekeeping.

Beekeeping is both a craft, an art and a labour of love. It teaches one's respect for the land and the plants. It forces you to be calm and focused and reduces stress when you manage a bee colony. Bees make you pay attention and they induce the beekeeper to be calm and in tune as they work in the hive.

Even with all the positive aspects of bees in human wellbeing, it is essential that the bees themselves be maintained in good health so that it is a positive experience. Having bee colonies dying can be traumatic and impact the livelihood of beekeepers. The Bee Health Commission of Apimondia works to educate beekeepers globally about the threats to bee health and the steps to be taken to decrease the negative impacts of pests and diseases.

Monitoring for bee health, in the laboratory and in the field - Photos: Evangelos Theodorakidis

Monitoring bee health is vital when bees are managed as livestock in crowded conditions. In many cases chemical treatment is required. Beekeeper's education and early detection of diseases are extremely important and the Bee Health Commission plays a role in providing good information to beekeepers to manage bee diseases with as little chemical treatments as possible. Healthy bees and good beekeeping management practices can ensure the production of high-quality bee products of high nutritional value.

In addition to the benefits to one's soul by the positive energy of bees, increased nutrition, wellbeing and improved focus make beekeeping a valuable tool in the lives of humans.

Regional Commission for Africa
David Mukomana, President

Contributions from:
The Ugandan National Apiculture Development Organisation

High quality value added apitherapy products from South Africa on exhibition during the 46th Apimondia Congress in Montreal, Canada 2019 - Photo: Metsana Kojane

Many African communities have been using hive products as part of their treatment for generations. With an increased number of African delegates attending past Apimondia Congresses and learning more about apitherapy, there is a renewed sense of urgency for African communities to go back to the basics - use of honey and other hive products for their wellness.

In 2019, the Apimondia Scientific Commission for Apitherapy and the Regional Commission for Africa were engaged by some medical doctors in Sierra Leone who are looking at formally including beekeeping at their hospital so they can experiment and do research on the use of honey to treat some ailments. The Regional Commission President also had a meeting in Dodoma in February 2020 with a group (Visionary Group) of young medical profession graduates from the University of Dodoma who have attended beekeeping training as they want to get more understanding on the use of honey and other hive products such as pollen, propolis and royal jelly especially for expecting mothers.

The Regional Commission is also working with stakeholders to promote awareness on health benefits of honey and other bee products to the young generation as part of their wellness programmes. To this end, the youths in Nigeria (Youths for Apiculture Initiative - YFAI) took time to educate children at crèches on the benefits of bees, honey and other products as a way of celebrating World Bee Day in May 2019. The Regional Commission President was also invited to make a presentation on bees and the benefits of honey to Grade 00 at a private school in Waverley - Johannesburg, South Africa, in October 2019. The intention is to ensure that many households embrace the use of honey and other hive products as part of their diet in order to create a healthy society dependent on nature for their well-being.

The Regional Commission for Africa, in partnership with Bees for Development and the Scientific Commission for Beekeeping for Rural Development see beekeeping as one initiative that can be used to break the barriers of disabilities with programmes that include those living with disabilities into beekeeping. The story of individuals living with disabilities in Africa doing beekeeping is a true testimony that, if Social Development Departments and those promoting the welfare of such groups can invest in beekeeping, such communities can live enriching lives. The idea behind the initiative is not necessarily for them to make money but to create hope and a lifeline for those living with disabilities to look forward to the next day because they are excited about how their bees are doing and this is in itself rewarding. This has the effect of providing an environment that promotes a state of wellness psychologically, socially and economically, important ingredients for good health and long life.

The Regional Commission President with the beekeepers living with disabilities in Uganda during the Uganda Honey Show. From left: Mr. Matia Kasule (deaf), Mr. Abdul Mayanja (blind), Mr. David Mukomana (centre), Ms. Jennifer Piloya (Francis' wife), Mr. Francis Okello (blind) and Mrs. Phionah Birungi, TUNADO Executive Officer - Photo: David Mukomana

The Regional Commission for Africa President had an interview with a number of beekeepers living with disabilities in Uganda and it was such an emotional experience! To hear Mr. Abdul Mayanja, a 65-year-old blind beekeeper narrate his story left the Regional Commission President with many questions as to who can come on board to partner and make these untold stories get all the coverage and support they deserve. After losing his sight at the age of 60, he lost his livelihood as well (subsistence farming) and could only remember how the two hives he had bought two years before losing his sight looked like.

And he realised that his welfare and well-being is in trying to make hives from the visual flashbacks he had of the hives. And today he has sold some hives to the Uganda Minister of Agriculture and has thrown a challenge at the President to provide him with the platform where he can demonstrate how he makes the hives from scratch.

The Chairman of SABIO shared another untold story of the biggest wheelchair beekeeper in Africa with more than 2,000 hives who, he believes, can inspire other members living with disabilities on the massive potential of living a healthy fulfilling life even with disabilities. These are some of the stories Africa wants to tell the world, that beekeeping can do wonders for people of all ages and with any abilities or disabilities, only if we talk about it.

The Regional Commission President holding the piece of wood Mr. Abdul uses for making his hives where he was challenged to provide a platform for him to demonstrate how he constructs his hives. Behind are the hives he makes. Just before this report was sent, the Regional Commission President had a meeting with Ms. Robyn Mellet who was so touched by Mr. Abdul's story and offered to buy him and the assistant a ticket to fly to South Africa for the World Bee Day Celebrations! - Photo: David Mukomana

Regional Commission for the Americas
Lucas Martínez, President

We have talked about beekeeping as a development tool from a productive point of view, however, beekeeping offers the population an approach to natural life and to understanding many processes of nature. There are few activities that people can carry out over time, without doubt the keeping of bees is one of them.

Today, there is a large number of people who, in rearing bees, find personal well-being in the production of their own food, regardless of age or sex, generating emotional satisfaction.

Regional Commission for Asia
Cleofas R. Cervancia, President

A natural farming system in Majayjay, Laguna, Philippines, was used as model for pollinator conservation and production of food safe to human health. Among the crops grown were pepper, tomato, papaya, red and green amaranth, eggplant, okra, cucurbits and crucifers. Planting materials were sourced from reputable seed companies and organic fertilizers were applied. A total of 1,500 colonies of stingless bees were initially reared in the farm for pollination purposes.

Ame Locsin with a hive to house stingless bees in the Philippines - Photo: © Bees for Development

To sustain the forage resources, compositae (*Cosmos* sp), Verbenaceae (*Vitex negundo*), native guava (*Psidium guajava*), banana (*Musa sapientum*), durian (*Durio zibethinus*), mulberry (*Morus alba*), pineapple (*Ananas comosus*), coconut (*Cocos nucifera*), native lime (*Citrus aurantiifolia)*, calamondin (*Citrofortunella microcarpa*), pili (*Canarium ovatum*), sapodilla (*Manilkara zapota*), tiesa *(Pouteria campechiana*), jackfruit *(Artocarpus heterophyllus*), pomelo (*Citrus maxima*), Brazilian star apple (*Chrysophyllum cainito*), asana (*Pterocarpus* sp), kamantigue *(Impatiens balsamina*), acapulco (*Cassia alata*), coffee (*Coffea liberica*), alagaw (*Premna odorata*), cadena de amor (*Antigonon leptosus*), horseradish (*Armoracia rusticana*), marigold (*Tagetes erecta*) and zinnia (*Zinnia* sp) were cultivated and most of the wild plants present in the farm were allowed to grow.

The development of alternate hosts of the bees and modification of the hive design resulted in the rapid colony growth. The observed pollinators were stingless bees, carpenter bees, Halictidae, Anthoporidae and wild honey bees. The primary pollinators of pepper are the stingless bees.

Regional Commission for Europe
Róbert Chlebo, President

The "European Honey Breakfast" initiative launched in 2014 is aiming at contributing to the education of children as regards eating healthy food such as honey and to promote the apicultural sector.

Honey is one of the agricultural products that could be included in the "School fruit, vegetables and milk scheme" to boost the participation of local honey producers in the relevant school programmes, and stresses the importance of educational measures aimed at raising awareness among young people of local products, while opening up the world of farming to children. School programmes are also a perfect forum for including honey in developing and broadening children's mindset. Another potential benefit includes strengthening awareness of the nutritional benefits of honey, the importance of apiculture, encouragement to increase consumption and the smooth involvement of mainly local beekeepers.

Beekeeping products contribute to the health and well-being of people all over the world - Photo: Asger Søgaard Jørgensen

Other beekeeping products such as pollen, propolis, beeswax, bee venom and royal jelly contribute significantly to the citizens' wellbeing and are used as high-quality foods and sought as part of a natural way of life; they also play a key role in the healthcare and cosmetics industries and therefore constitute an additional resource for improving the economic situation of beekeepers.

Regional Commission for Oceania

Jodie Goldsworthy, President

Beekeeping in the Oceania region contributes to healthy lives and promotes well-being for all ages through a number of aspects including the production of healthy food, the employment of beekeepers and the downstream food industry reliant on bees along with honey bees being a source of apitourism and the inspiration of many cultural and artistic initiatives.

Honey bees not only produce honey, they also pollinate the most nutritionally important fruits, vegetables, nuts and seeds and underpin pastures that our protein source (cattle, sheep, etc.) feed upon. Since the introduction of European settlements and honey bees, both Australia and New Zealand have grown to support a larger population that lives healthy lives off the back of honey bees. The introduction of non-indigenous foods and crops have transformed the landscapes of our region for the immediate benefit of a growing population. We must now ensure that we manage the challenges that these changes have brought in order to ensure long term sustainability of healthy lifestyles.

On a cultural and employment note, bees and beekeeping are a source of employment and leisure and pleasure. There is a growing number of beekeepers in our region with the increasing popularity of keeping bees.

The Sydney Botanic Gardens held a major “Pollination” pop-up floral and botanical display exhibition in 2018. Melbourne International Flower and Garden Shows hold competitions on bee friendly garden displays and artists convey the importance of the environment through honey bees.

New Zealand is a mecca for apitourism that provides and promotes educational environmentally based experiences for visitors and tourists helping to enhance their lifestyles whilst also educating them about the importance of bees. This education is critical to building knowledge within the broader population about the importance of bees which will in the longer term help to protect the interests of bees and beekeepers and underpin the long-term sustainability of this goal.

A family of happy beekeepers showing their produce in Solomon Islands - Photo: S. Gulick


CRIANZA DE REINAS

4 QUALITY EDUCATION

Beekeeping is a fascinating topic: you are never too old to learn about bees!

Beekeeping is taught through vocational training given by experienced beekeepers. In implementing beekeeping courses, it is important to listen to Indigenous Local Knowledge holders as well as - through higher level courses - to learn how to adapt to the changing environmental conditions and market possibilities. Beekeepers' associations have for centuries known this and the Apimondia Commissions are active disseminators.

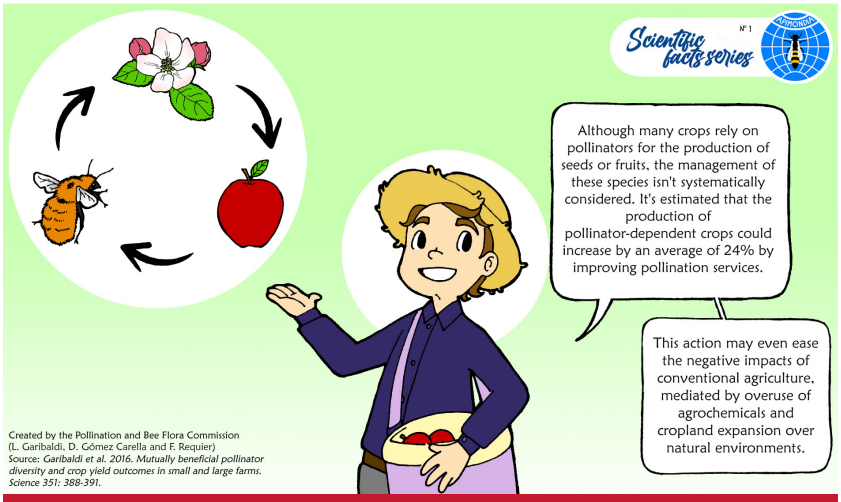
Field class in Peru
Photo: Efrain Valdivia - Iberoabeja, Peru

Scientific Commission for Beekeeping for Rural Development
Nicola Bradbear, President

Lucy (in yellow) and the other women in her beekeeping group, Agata, Vivian, Mary, Monica and Mercy started beekeeping with Michael (far right). Mercy explains "We help each other when we harvest honey. It is the hardest, but best part of beekeeping". All the women in the group prioritise their children's education as the first call on the income they earn from honey - Photo: © Bees for Development

Restricted access to education is one of the surest ways of transmitting poverty from generation to generation, and education is one of the surest ways of breaking this cycle of poverty. It is therefore not surprising that women beekeepers near Techniman in Ghana placed meeting their children's educational requirements as their number one reason for keeping bees. This imperative was mirrored in another community in the east of Ghana as woman beekeeper Hawa Ekima explains, "I have six children. There are no secondary schools here in the village so four of my children are staying with relatives in town to go to school. I have to send money to pay for their upkeep. It is a constant struggle to keep them in school. I keep bees to get money to support them", Hawa Ekima, Apesika, Kwahu Plains North (2019).

In South-West Ethiopia near Masha and Anderacha, young teenagers harvest honey by making their own hives and placing them in the forest to attract wild swarms. They use the income they gain to cover their school expenses so they can progress with their education. Other potential sources of income such as cattle-keeping and farming are not accessible to these school students because they have no money and no land. Beekeeping is however something they can do.



Apimondia Scientific Fact Series - Apimondia Scientific Commission for Pollination and Bee Flora (L. Garibaldi, D. Gómez Carella and F. Requier) - Source: Garibaldi et al. 2016. Mutual beneficial pollinator diversity and crop yield outcomes in small and large farms. Science 351: 388-391

Scientific Commission for Pollination and Bee Flora
Alessandra Guidotti and Abram J. Bicksler, FAO

Involving vulnerable and marginalized people, such as women or unemployed youth in educational courses on beekeeping, honey hunting and/or rearing other types of pollinators (e.g. stingless bees) can provide them with new sources of income, which in turn can help ensure economic resources are available, leading to greater enrolment in schools.

Indigenous and Local Knowledge (ILK) holders can also prove to be a source of great wisdom for the combining of scientific and academic research on pollinators' production and rearing, which is especially meaningful among those communities with high endemism of wild social bees (Pot-

ts et al., 2016). Many times, ILK holders tend to be women; by including them in co-creation of knowledge, their practical wisdom can be validated and shared with a wider community of education, helping to meet the other SDGs.

Beekeepers studying the anatomy of the honey bee - Photo: Asger Søgaard Jørgensen

Experience shows that beekeeping encourages learning processes. The enthusiasm for the activity fosters the reading of books, magazines, participation in meetings and belonging to professional groups. These activities, besides providing knowledge and training towards a productive activity, are a starting point to improve the education, culture and quality of life for many people.

It is well demonstrated that incomes from beekeeping have historically allowed the support for formal education for thousands of children from families dedicated to beekeeping. The possibility that beekeeping gave to many families to support the education of their children may have been a cause for the increasing average age of beekeepers that has been affecting beekeeping activities during the last decades. In numerous cases, beekeeping made possible a next generation of engineers, physicians, lawyers, teachers, etc.

Scientific Commission for Beekeeping Economy
Norberto Luis García, President

Trainees pausing for a picture with KTB hives they produced - Maunga VAG, Itezhitezhi, Zambia - Photo: Tarisai Mazinyani

To keep healthy bees is not an easy task, it needs continuous efforts and education. Beekeepers and their family members are life-long pupils, and this education ensures work opportunities. Keeping pathogens and infections away is achieved only be sharing knowledge, through a continuous information flow. By offering workshops and symposia on bee health and through training carried out by local beekeeping organisations, beekeepers can learn of the latest techniques to better manage pests and diseases.

Scientific Commission for Bee Health
Fani Hatjina, President

Education and training sessions are essential! - Photos: Fani Hatjina

Healthy bees and correct management practices mean sustainable beekeeping, improvement of the skills of people and serve as a training for environmental awareness. Healthy bees and the way they manage their society is a life-long vocational training for all ages of people, especially the young ones.

Regional Commission for Africa
David Mukomana, President

Contributions from:
South African Department of Agriculture, Forests and Fisheries (DAFF)
South African Bee Industry Organisation (SABIO)
Bee African Initiative
The Village Markets Africa

During the South African Beekeeping Conference (July 2019), the Regional Commission President had an opportunity to interact with a couple who has a heart of gold. With limited private resources at their disposal, they felt compelled to make a contribution to the vulnerable groups within the rural communities of South Africa such as Winterveldt. In fact, Winterveldt is also known as the “dark city” because it is an area where residents believed that they were the lost and forgotten children of oppression, which is still evident today with the lack of economic development and activity even after 25 years of democracy.

School club members posing for a picture after inspecting a hive bees absconded from post harvesting - Photo: Japhyter Mudongo

Winterveldt is located North-West of Pretoria where African people were allowed to purchase land for agricultural purposes in the apartheid regime. Today most of that land lays fallow since it has been abandoned by owners looking for greener pastures in townships, squatter camps or urban areas and the poverty scourge continues, with high unemployment and illiteracy rates and the majority of the people dependent on social grants. Part of this community are vulnerable children who are being raised by single parents, barely affording to feed their children and send them to school, and visually impaired individuals, whose families relocated to this community to access the school for the blind in that area.

Portia and Desmond, through Village Markets Africa, decided to provide these and other rural communities with a source of livelihood through beekeeping. They have provided these communities with hives, unfortunately only brood boxes, to start beekeeping in order for them to earn income to feed themselves as well as for paying school fees. This has had an impact in restoring hope in many of these community members who had resigned in the fate that South Africa is not for them but the chosen ones even in a free South Africa. The resounding request has been for the supply of supers and more hives as the ones they have are colonised. They are convinced this is their lifeline to fully realise their desires - arresting poverty and hunger and providing access to quality education for the communities of Winterveldt.

Such is the potential beekeeping has in bringing hope and access to education for vulnerable children. This is one classic example which has made the Commission for Africa believe beekeeping in schools will not only provide the children with career options in apiculture but a possible source of revenue for paying the fees for the kids coming from poor rural families. The Commission has already established a model beekeeping in "the schools' initiative" and the results are far-reaching with more kids coming on board, asking for assistance to have their own hives at home in order to raise their fees.

Gambian beekeepers with an experimental no-cost top bar hive. Danish Beekeepers' Association's training project - Photo: Ole Hertz

The challenge is now for stakeholders to join hands in partnership to support such initiatives and create an environment where young generations have access to quality education and better job opportunities regardless of their backgrounds through beekeeping.

Muzokomba High School Beekeeping Initiative in Buhera, Zimbabwe, is one of the model initiatives adopted by the Regional Commission to help promote beekeeping in schools.

Regional Commission for the Americas

Lucas Martínez, President

Access to education is a social asset that generates inclusion and equity. However, many people in the Americas do not have the basic training to be able to access undergraduate education from technical organisations or universities. Therefore, beekeeping training is carried out mainly by the same beekeepers who, through their organisations, provide access to people of various ages without basic knowledge.

Practical class at the SADA school in Buenos Aires, Argentina - Photo: Emiliana Racigh Lazo - SADA

Sensitization of Peruvian schoolchildren to the wonderful work of pollinating bees - Photo: Gilles Ratia

The need for access to beekeeping training, basic to achieve a good development, is a paramount issue in many countries of our continent, where to access education trainees undertake long journeys to attend major sector events. The limited support to this crucial strategic aspect by many governments means that they do not dedicate enough economic resources to training or to the technical improvement and support of the population interested in beekeeping and even less to native bees (*Melipona* and *Trigona*). Resources are mainly dedicated to productions that generate commodities and not food such as beekeeping.

A case to mention is the beekeeping school of the Argentine Society of Beekeepers (SADA) which - since 1939 - stages beekeeping courses open to the entire population where individuals from all over the region are trained. The courses are taught by expert beekeepers in the different disciplines of beekeeping.

Regional Commission for Asia

Cleofas R. Cervancia, President

Stingless beekeeping is capable of contributing positively to economic, social and ecological sustainability. The interaction among these dimensions is important in ensuring a balanced and sustainable future. As a new industry, it has the potential to be further developed with the participation of communities.

Beekeepers are always eager to learn about the latest findings in apiculture. Workshop at the Apimondia Congress 2015 - Photo: 44th Apimondia Congress Local Organising Committee

Initiated under the Knowledge Transfer Programme (KTP) by the Universiti Sains Malaysia (USM), the Reinventing Honey Quality (RHQ) project is directed towards stimulating rural transformation through sustainable stingless beekeeping. The community engagement project targeted underprivileged communities from rural areas in the state of Kelantan. Promoting a sustainable ecosystem along with manufacturing of high-quality honey and instilling entrepreneurship mindset are key focuses of the project.

The locals were trained to adopt good stingless beekeeping practices and hygienic harvesting with the use of MUSTAFA-Hive and SOP guidance. The community engagement is not limited to apiary level, but is further expanded at the marketing level where the honey is commercialized. Despite being novel practices, experiences from the project proved plenty of scope for transforming stingless bee industry into providing a valuable source of income to communities in developing countries like Malaysia. The prospects can be extended as a novel rural transformation plan in benefiting not only mankind, but also bees.

Regional Commission for Europe

Róbert Chlebo, President

The apicultural sector in Europe suffers from a particularly serious demographic and ageing problem, with only a small percentage of beekeepers aged under 50, even though beekeeping represents a potential source of work and integration for young people in rural areas, since access to land is limited in many European regions.

A pan-European epidemiological study (Jacques et al., 2017) reveals that honey bee colony survival depends mainly on beekeepers' education and disea-

se control. Good theoretical knowledge combined with practical training can help facilitate better understanding of and action to deal with the challenges ahead for bee colonies, and both are therefore important.

The International Centre for Young Beekeepers (ICYB) supports and co-ordinates young and new beekeepers and organises the International Meetings of Young Beekeepers (IMYB). Aims of ICYB also include co-operation in the field of teaching of beekeepers and exchange of methodological and training materials.

Different national basic and vocational beekeeping education programmes exist to encourage young people to enter the beekeeping profession, given the pressing need for generational renewal in the sector. Secondary Beekeeping Schools exist in the Czech Republic, Poland, Slovakia, Ukraine and Romania. In the Eastern part of Europe (Russia, Ukraine) there are also higher education curricula (university beekeeping-based studies). Within the European Union countries, lifelong learning is supported by educational funding schemes like Erasmus+, ESF or Horizon 2020.

Open house in connection with the "Forest Beekeeping Project" in the Island of Bornholm, Denmark. With the porpose of securing proper pollination, local beekeepers were supported in placing 60 bee colonies in the government and municipality forests - Photo: Ole Hertz

Developing good practice guidelines, in conjunction with the farming and beekeeping sectors that will promote synergies between the activities, is needed - such common standards for beekeepers still do not exist.

Teaching materials should contain information related to pollination and other environmental practices, such as maintaining the ecological balance, preserving biodiversity and improving the survival conditions for pollinators in farmed landscapes. Specific training modules on these issues should be developed together with beekeepers for agricultural producers engaged in the cultivation of land.

Regional Commission for Oceania

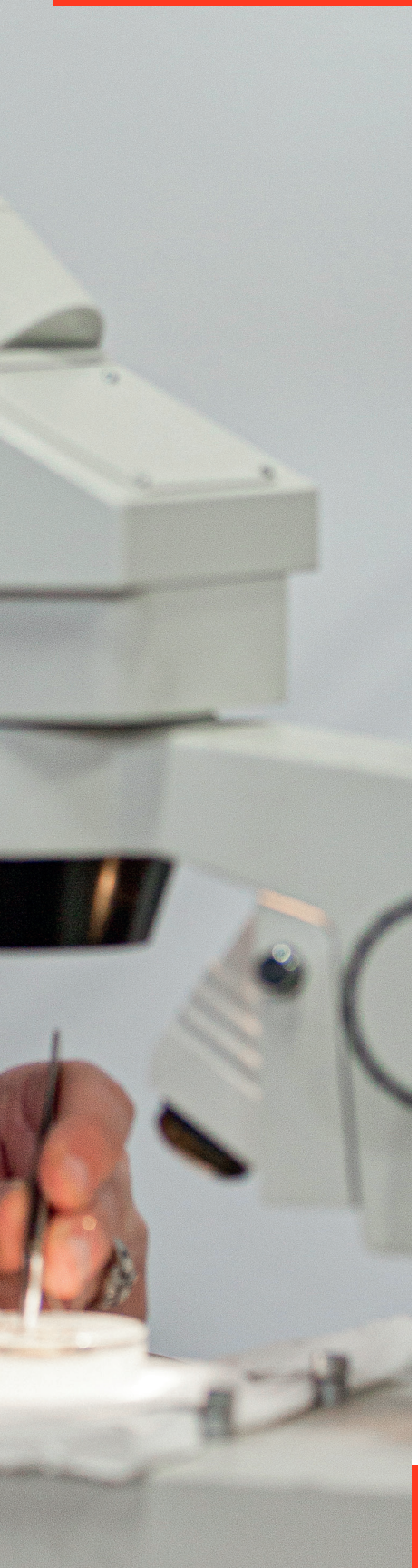
Jodie Goldsworthy, President

The long-established collaborative beekeeping industry structures that have evolved in Australia and New Zealand over the past 150 years underpin the transfer of important education and knowledge across beekeepers and the wider community. Industry structures are evolving in the region and the ease of travel has allowed for more international exchange of research, knowledge and science surrounding beekeeping and the wider food industry within the Oceania region and with the rest of the world. Beekeepers from our region are good travellers and welcome incoming information and many school-based activities and programmes assist with imparting beekeeping knowledge. Government apiary extension officers have delivered important new knowledge over many years to the beekeeping industry and ways to make these services more accessible are evolving through the use of technology and the Internet.

A beekeeping trainee attending a field class in Fiji - Photo: Saimone Tunaqase

Both Australia and New Zealand hold national apiculture conferences which attract up to 1,000 people and are world class in their organisation and delivery and highly attractive and important in creating fora for lifelong learning and information exchange.

5 GENDER EQUALITY



Bees do not need daily attention - they fit alongside other activities and as time permits. Beekeeping is possible by people everywhere - regardless of their gender or age.

Traditionally beekeeping has been a predominantly male activity in most countries. This is rapidly changing as women are actively taking part in all aspects of beekeeping from the practical activity to the marketing of products as well as training activities and active involvement in organisations. Beekeeping offers an opportunity to women with limited or no financial resources to establish an income generating activity without too much extra workload.

Bee scientist at work in her laboratory
Photo: Christina Alambasyni

Scientific Commission for Beekeeping for Rural Development

Nicola Bradbear, President

A queen rearer in Turkey - Photo: © Bees for Development

Women and girls can practise beekeeping, and they can be involved in many different aspects of the sector - all along the value chain.

Beekeeping can help empower women and girls provided they are given the right type of support to get started. Women and girls are very often obliged - due to social norms and domestic duties - to confine their economic activities to home-based activities and this easily includes beekeeping. Women need extra income, not extra work. Again, beekeeping helps meet this need because the time-demands of beekeeping are relatively low. In the north of Ethiopia there has been a notable uptake of beekeeping by young women who, through no fault of their own, have been unable to complete their education. With no prospect of employment, beekeeping is an accessible, manageable and profitable activity through which they can earn their own money and so achieve a level of economic independence.

Scientific Commission for Pollination and Bee Flora

Alessandra Guidotti and Abram J. Bicksler, FAO

Beekeeping, honey hunting and bee-rearing are gender inclusive: both men and women can practice this activity. The involvement of women in the management of beekeeping activities (acquisition of hives, harvesting, selling, etc.) can contribute to their empowerment and can make them more economically independent by generating a consistent income from the sales of honey and other bee/pollinator products.

As many Indigenous and Local Knowledge holders tend to be women, involving them in pollinator activities can help to validate their knowledge and contributions to income generation. In addition, this activity can be carried out in parallel with other activities - such as looking after the children - since it does not require as much daily work as other livestock operations.

Beekeeper showing her colony of *Apis cerana* in the clay wall to the beekeeping consultant Mr. Niem, Vietnam - Photo: Asger Søgaard Jørgensen

If beekeeping activity was usually almost exclusively male, today it is not so and in some courses women are even in the majority. In the past, they were often assigned to the packaging and marketing of the hive products. Today, while they continue to perform these tasks, many of them are involved in monitoring the colonies. They even excel in breeding activities and they are more skilled than men once it comes to artificial insemination. Women therefore have a very important role in the beekeeping sector, even if they are not yet too present in the sector's representative positions.

Scientific Commission for Beekeeping Technology and Quality
Etienne Bruneau, President

The number of people affected by hunger and malnutrition is still highly disproportionate if women and girls are considered. In many regions of the world, women and girls are disadvantaged by social and religious norms, local traditions and the household duties they have to carry out. With little or no access to education, the chance of being employed is rather weak, if not inexistent. Practising beekeeping for domestic needs can obtain a better value if women and girls are trained to acknowledge the benefits of producing not only honey but all the other bee products.

A suitable training support may empower this gender category to get some extra income. Production techniques, hygienic conditions and how to use these products for both food and health care are important issues. With such skills acquired, women and girls in rural communities can harness the bee products obtained and earn an income to empower them and offer confidence in their new economic condition as well as a new social position in which they can really help people in providing healthcare services.

Scientific Commission for Apitherapy
Cristina Mateescu, President

Beekeeping makes no difference between genders. The production of honey, royal jelly, bee venom, queen breeding, cosmetics and other activities, also including the trade of bee products, are full of examples where young girls and women found a successful and very respectable position. Indeed, girls and women have historically showed the way in many bee-related activities.

Scientific Commission for Beekeeping Economy
Norberto Luis García, President

The art of beekeeping is gender neutral and in fact in many areas of the world most beekeepers are female. Honey bees are a matriarchal society, dominated by females with males playing only a small part in the colony life. Not that the honey bee matriarchy will influence what human gender keeps bees, but the predominantly female bee colony does provide a beautiful example of co-operation and collaboration.

Beekeeping can be done as a hobby or as a sideline to other duties or jobs: it does not need to be full time. The Commission for Bee Health provides information exchange on best beekeeping practices and bee health with

Scientific Commission for Bee Health
Fani Hatjina, President
Jeff Pettis, President of Apimondia and former President of the Commission for Bee Health

FAO and other aid organisations to all countries. Good information on beekeeping is vital in developing areas where women can use this knowledge to take control of their own lives by managing bees and controlling the income from honey, pollen, royal jelly and wax.

Women power! - Photo 1: Theodoros Alambasynis / Photo 2: Cristina Mateescu / Photo 3: Per Kryger

Beekeeping can augment other works of women and girls and provide income directly to these individuals with local sales of bee products. Keeping healthy bees does not require special inputs or equipment and, if indigenous races of bees are properly managed, the bees themselves can often fight the diseases. Small scale organic beekeeping is more attractive to women and gives opportunities for the exploitation of more side products as well as financial independence.

For many years, South African women, especially in the rural areas, have suffered two-fold. The apartheid laws promoted separation of families where men were hired to work in the mines and cities; staying in the hostels that were provided, they could not bring their families or wives, thus confining most women to the rural homes. Culturally, women were also considered inferior to men and major decisions were left to the men. This had a serious socio-economic impact on many women to the extent they were excluded from participating in the mainstream economic activities in South Africa. However, things have changed and the Government is working to empower rural women in South Africa.

Bee African Initiative, a brainchild of Ms. Memme Ramaila (Female Farmer of the Year Award recipient and social activist) has taken up the challenge to empower rural women and youth in South Africa through beekeeping. And the results are beginning to show. North West Provincial Government has already started making efforts to ensure this initiative is well supported, in order to emancipate many rural women in the Province as it boasts massive potential for beekeeping.

Similarly, many corporations are showing interest in funding programmes that are geared towards empowering rural women through beekeeping, breaking the socio-economic and often political barriers that have caused gender-based discrimination thus meeting the UN SDG 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all read in conjunction with Aspiration # 7 of Agenda 2063 “A prosperous Africa”, based on inclusive growth.

Bee African Initiative’s intention is to raise enough support to ensure the provision of five beehives per household in order to fully transform the rural communities of South Africa and Africa spearheaded by women.

Similarly, it is quite encouraging to see many women now fully engaged in beekeeping in order to empower themselves both socially and economically in other parts of Africa. For instance, it used to be considered a taboo for a woman to be seen next to a hive in the Maasai community, let

Picture time with the trophy winners for best beekeepers during the Apimondia Symposium in Addis Ababa, Ethiopia, proving women in Africa are doing even better beekeeping in the rural communities - Photo: David Mukomana

Regional Commission for Africa
David Mukomana, President

Contributions from:
Bee African Initiative
Maasai Beekeeping Initiative
Rural Women in Beekeeping

Deborah with her bee hives, all made at no cost, waiting for the right season to site them in trees, Mbale, Uganda - Photo: © Bees for Development

alone owning a hive. But with efforts to run inclusive projects such as the "Maasai Beekeeping Initiative" in the Narok County, Kenya, women are proud members and owners of hives, an initiative that has gone some way to liberate them from the cultural barriers and allow them to earn income they are using to feed their families and send children to school.

The same is said about women in Ethiopia, especially rural women who are significantly contributing to the honey that is being exported to Europe and other overseas markets. The contribution of these women is so significant that in December 2018 they were presented with awards during the Apimondia Symposium hosted in Addis Ababa.

This is the extent to which Africa has used beekeeping to fully empower women and girl children in the communities. There are even more coming on board with hive products, value addition and apitherapy.

"Bee African Initiative" (North West Province, South Africa) is another model adopted by the Regional Commission for Africa to drive the vision of fully engaging rural women in Africa to get into commercial beekeeping to earn a living.

Regional Commission for the Americas
Lucas Martínez, President

In the American region the role of women in beekeeping is essential since they are the basis of families and those who foster beekeeping within the family. In several countries of the region there are organisations of women beekeepers; as an example, the Latin American Federation of Beekeepers (FILAPI) has a permanent Secretariat for women beekeepers.

Apicultural Women Secretariat during the Latin American Beekeeping Congress in Montevideo, Uruguay - Photo: Emiliana Racigh Lazo - SADA

Regional Commission for Asia
Cleofas R. Cervancia, President

In the Philippines, beekeeping in rural areas is dominated by females. Such livelihood opportunities keep family breadwinners away from environmentally destructive activities such as slash-and-burn farming and deforestation.

Regional Commission for Europe
Róbert Chlebo, President

Not all countries have a beekeeper and beehive registration system that would facilitate the monitoring of developments in the sector. Although most colonies are registered to males, beekeeping is typically a family business, women's parity therefore can be expected, especially in the phase of honey harvest, packaging, marketing and value-added products introduction (e.g. honey cakes, apitherapy and cosmetic products).

Gender is not an issue studying the bees - Photo: Asger Søgaard Jørgensen

Regional Commission for Oceania
Jodie Goldsworthy, President

Gender equality within the beekeeping industry is keeping pace with the level of gender equality in the broader food and agriculture arena in our region. Much has been achieved so that we now see a good diversity of women represented, but much can still be done to balance diversity.

Our region has a number of strong female leaders and a culture of inclusiveness and nurturing that supports women in their journey as beekeepers and stakeholders in the apicultural community. Our region generally also embraces diversity in culture, age, religion and sexual preference and beekeepers are all united by their love of bees. Examples of such diversity is perhaps best seen in the growing non-commercial hobby beekeeping space.


02144
02144

6 CLEAN WATER AND SANITATION

As we restore water catchment areas, beekeeping offers a useful opportunity for income.

Beekeeping can be used as a tool to generate income from forests, riverbanks and rainwater catchment areas. This can help to guarantee alternative income possibilities for people living in these areas and act as an incentive to protect forests and even to plant new multipurpose forests with improved possibilities for honey production and, by improved pollination, higher production of fruits.

Beekeepers using natural waterways to transport their hives to a new location in the Bonaerense Delta, Argentina
Photo: Apícola Mercedes

Scientific Commission for Bee Health

Fani Hatjina, President
Jeff Pettis, President of Apimondia and former President of the Commission for Bee Health

The Commission for Bee Health is working to increase knowledge on bees with higher adaptability to local specific environmental conditions, with scarce water, where they can also serve as pollinators of particular plant species. Healthy bees are the guardians of forests and other ecosystems helping to restore water equilibrium.

Apiary in the forest - Photo: Dimitris Tselios

Regional Commission for Africa

David Mukomana, President

Africa is divided into the Sahara and Sub-Sahara regions with differing levels of readily available water either for domestic or farming purposes. Apart from the African deserts in the north, Ethiopia and Southern Africa, greater parts of Africa receive some considerable amount of rainfall that can sustain beekeeping activities without having to provide supplementary water.

Due to climate change, many African countries are beginning to suffer perennial droughts, a situation that has increased pressure on the available water resources, both surface and underground. This has affected many economic activities including beekeeping leaving many beekeepers with managed colonies resorting to providing water points within their apiaries. Cases like the Western Cape, where drought affected many activities including agriculture with the City of Cape Town nearly reaching Level Zero, has led to other options being explored such as sinking boreholes in order to access ground water as well as desalination of sea water. Such cases have created urgent need for many countries in Africa to look at sustainable water management, including water harvesting.

The fires in Western Cape, South Africa that left many beekeepers counting their losses. The frequency of wild fires has now increased due to prolonged droughts - Photo: Johan van As

Massive deforestation and riverbank cultivation have seen accelerated rates of soil erosion, resulting in considerable number of water bodies being silted. Furthermore, commercial activities in catchment areas have left a number of rivers that were perennial to dry quickly. This has prompted some Governments to come up with policies banning cultivation activities along the river banks and encouraging sustainable agriculture that does not contribute to soil erosion leading to siltation of rivers and dams. Massive rehabilitation programmes on dams and silted rivers are being carried out now to ensure availability of water for domestic, industrial and commercial uses.

Beekeeping is now being used as an environmental protection strategy in order to protect massive clearing of forests and trees on account of charcoal and other commercial activities that have impacted the hydrological cycle. More land reclamation initiatives are being carried out with the help of Development Partners, planting bee-friendly trees so as to serve a dual purpose of reforestation and bee forage.

Due to serious lack of water in the desert areas, there is not much beekeeping happening with the examples of Namibia where many projects were initiated but with little success. However, there are significant beekeeping activities located around oasis areas where there are plants and some farming happening especially in the Sahara Desert.

The challenges with climate change have increased pressure on many Governments in Africa to engage in programmes that ensure sustainable use of both surface and underground water.

The remains of what used to be colonised hives after the fires in Western Cape, South Africa - Photo: Johan van As

Extensive savannah woodlands and water bodies that can support commercial beekeeping, Headlands, Zimbabwe - Photo: Robert Mutisi

Regional Commission for Oceania

Jodie Goldsworthy, President

Parts of the Oceania region such as Australia sit within some of the hottest and driest parts of the world where water is incredibly scarce and impacted by droughts and climate change. In some parts of Australia legislation requires beekeepers to ensure they supply water for their beehives as is the case in South Australia where beekeepers can be prosecuted if they do not ensure adequate water supplies for their bees.

Beekeepers in Australia are also heavily connected to water use for irrigated food crops which they pollinate and are noticing changes in water use and crops planted as a result of more sustainable approaches to water use and management.

7 AFFORDABLE AND CLEAN ENERGY

Less pollution will hugely benefit bees and biodiversity too.

Small-scale beekeeping can be performed with very little input of fossil energy, by using locally produced equipment and hand-driven honey extractors as well as solar wax melters to extract beeswax. The implementation of solar panels allows for the supply of electricity in remote areas and even helps large scale commercial beekeepers to reduce the use of fossil-based energy.

Solar energy is widely used in many countries: here examples of wax melters from Austria, New Caledonia, Namibia and Georgia
Photo 1, 2 and 4: Gilles Ratia / Photo 3: Riccardo Jannoni-Sebastianini

Scientific Commission for Pollination and Bee Flora
Alessandra Guidotti and Abram J. Bicksler, FAO

Beekeeping and pollinator operations do not require large sources of energy and can be a way to generate income, allowing farmers to buy the essential tools (such as photovoltaic panels) to achieve energy independence.

Scientific Commission for Beekeeping Technology and Quality
Etienne Bruneau, President

The beekeeping activity requires very little energy except in travel and for some work in the honey house (if electrical equipment is used). Since many beekeeping operations are being removed from urbanized areas, solar energy should be promoted to generate the necessary energy during the season. On a small scale, beekeeping consumes nothing and even the recovery of used frames can be done with the help of solar energy.

Scientific Commission for Bee Health
Fani Hatjina, President
Jeff Pettis, President of Apimondia and former President of the Commission for Bee Health

Beekeeping practice requires continuous monitoring and intensive beekeeping demands energy consumption. However, small scale beekeeping is more energy and environmentally friendly; at the same time, healthy bees can increase crop production of energy-generating plants. Therefore, indirectly, bees can also help on saving energy!

Regional Commission for Africa
David Mukomana, President

Lack of reliable and consistent supply of energy especially for heating and lighting has been a major challenge in many African communities. The pressure on the power grids across Africa and the challenges of fossil-driven power generation have seen many countries failing to supply power to rural communities, with a few countries making efforts to electrify these communities. Where power is available, the cost is out of reach for many households, including those living in towns and cities.

These are some of the daily pictures on many roads leading into towns in Malawi with young unemployed men carrying loads of firewood to sell for heating in order to earn a living, Mzuzu, Malawi - Photo: MacLeod Nhlema

Inevitably, this has fuelled cutting down of trees for charcoal and firewood as it is considered an affordable and available cheaper alternative. Although it is cheaper, the consequences are far-reaching as massive forests are being destroyed. Many indigenous forests are disappearing faster than they can regenerate due to the time taken for the indigenous trees to grow. We are losing massive bee habitat resulting in many colonies migrating and also becoming weaker due to lack of sufficient natural forage. Furthermore, massive forest clearing is adding to desertification of many parts of Africa contributing to climate change, a phenomenon that in turn is contributing to increased droughts and food insecurity.

Beekeeping is now on the agenda for many stakeholders as a solution to providing the communities with a reliable source of income they can use to access modern sources of energy for both domestic and industrial use.

Recently constructed oven for making charcoal in one of the forest areas in Zambia. Too many of such ovens will see Africa's forests disappearing in no time leaving a once heavily forested continent bare and barren. The majority of charcoal is bought by those in towns and cities where electricity is a challenge in terms of availability and/or affordability - Photo: David Mukomana

Beekeepers in our region are embracing the use of solar- and wind-generated electricity as an alternative to traditional energy. Beekeeping in Australia and New Zealand is migratory and fuel (diesel) costs make a high proportion of a beekeeper's costs. Beekeepers have to move their bees over large distances to follow the honey flows of the various diverse honey flora of our region. As a result of honey prices which are above the world average, it is possible for most beekeepers to use modern fuel-efficient trucks which reduce pollution and improve productivity and environmental outcomes.

Regional Commission for Oceania
Jodie Goldsworthy, President

8 DECENT WORK AND ECONOMIC GROWTH

Bees and beekeeping offer resilient livelihoods to many sectors of society: the beekeepers, manufacturers of tools, clothing and of secondary products as well as packers and traders all long the market chains.

Beekeeping does not generate pollution or waste, making it sustainable over time. It meets the requirements to generate jobs in the form of micro-businesses as well as large companies. In developing programmes, beekeeping offers opportunities for landless people selling their products in the local markets. The challenge is to protect local markets from the import of adulterated products.

Mexican trainees happy with their first beekeeping lesson
Photo: Gilles Ratia

Scientific Commission for Beekeeping for Rural Development
Nicola Bradbear, President

A honey trading business in Asmara, Eritrea - Photo: © Bees for Development

Because the sector's main outputs are pollination services, honey and beeswax - these have steady markets (though not necessarily with same prominence in every region). Reliable markets make the beekeeping businesses scalable, according to the time and interest of the beekeeper.

In industrialised countries honey is regarded as a health-giving, luxury food. As standards of living rise, honey consumption increases. Most industrialised countries import honey to meet the demand. This requirement provides exporting nations with a useful source of foreign exchange from honey and beeswax export. Because beekeeping does not use land, production of honey for export needs not conflict with crop growing for local consumption.

Scientific Commission for Pollination and Bee Flora
Alessandra Guidotti and Abram J. Bicksler, FAO

Oil seed crops need pollination by bees - Photo: Asger Søgaard Jørgensen

There is growing demand for many bee products worldwide (FAO, 2018), providing potential employment opportunities for youth, women and the elderly. Thanks to educational programmes (such as Farmer Field Schools and other traditional and non-traditional approaches), unemployed people can be involved in beekeeping and rearing activities and improve their economic conditions by starting small business enterprises and selling honey and other beekeeping products. This can extend beyond honey bees to other social bees and pollinators, including stingless bees.

Many of the producers and beekeepers involved in these programmes may come from remote areas of developing countries and have little negotiating power or access to capital and tools. For that reason, co-operative associations or label certification/niche marketing schemes could be a good opportunity

in order to ensure them a better negotiation position, fair prices for their products and a better economic development of their beekeeping activities. Beyond beekeeping for comb products, there is growing demand for pollination services, which in several parts of the world is more valuable than the honey and comb products (Bradbear, 2009).

There are all levels of companies in the beekeeping sector, ranging from a small source of complementary income, to microenterprises, enterprises, beekeeping co-operatives or even companies that work with beekeepers as in China or packers that employ more than a hundred people.

Scientific Commission for Beekeeping Technology and Quality
Etienne Bruneau, President

The fact that beekeeping is based on a totally sustainable activity makes it an activity of choice. The development of this activity in balance with its environment does not generate environmental degradation but on the contrary an improvement in pollination as well as in the quality of agricultural production.

Rearing queen bees - Photo: Micchalis Tsiggenis

The type of work and the rate of work in the hives is determined by the behaviour of the bees and therefore it constitutes a useful brake on the intensification or dehumanization of the activity, which thus remains very artisanal in the noble sense of the term. In addition, the size of the economic units is normally perfectly adapted to local market conditions. In Africa, it is small beekeepers who sell their products on local markets and in China it is large companies that mainly target the international market. Product prices largely follow world market prices, which greatly favours areas with low economic income. Local sales are made at very attractive prices linked to the qualities attributed by consumers to beehive products.

Working with beehives is a job that requires good know-how and ensures quality production, which is highly rewarding for the person who has to do the work. This is why it is so important to link the product directly to the consumer by setting up good traceability and developing labels that directly promote the quality of the harvested beekeeping products.

The development of the beekeeping sector must naturally take into account the local economic situation and real market opportunities. There is no point in developing an intensive apiary in an area of extensive agriculture and vice versa. It makes no sense to centralize production points linked to sometimes difficult and costly travel or to sell on a world market where prices are often a quarter of the price of products on the local market.

Selling honey in bulk - Photo: © Bees for Development

Beekeeping is an activity that can help to ensure full employment by providing work for part of the population interested in insects. However, it is necessary to consider local production and market realities while ensuring that the sustainability of this craft activity is preserved as far as possible. Local development agents (trainers) are very useful in improving local production conditions while ensuring that this objective is met.

Scientific Commission for Apitherapy
Cristina Mateescu, President

On the heights of Cuzco in Peru, children learn very early to extol the therapeutic virtues of honey to tourists - Photo: Gilles Ratia

Bees and beekeeping have contributed and still contribute to peoples' livelihoods in almost every country on earth. Bees have long been known by every society. There is a large diversity in bee species and in beekeeping practices which vary among regions. Important amounts of honey are still obtained from wild bee colonies, while modern beekeeping is practiced by professionals. Beekeeping is an ancient tradition and bees are critically important for the environment, sustaining biodiversity by providing essential pollination for a wide range of crops and wild plants. They contribute to human wellbeing directly through the production of honey and other food and feed supplies such as: pollen, beeswax for food processing, propolis in food technology, and royal jelly as a dietary supplement and ingredient in food. An extensive presentation is delivered in "The products of beekeeping" paragraph.

A sustainable economic growth requires conditions to allow people to have good jobs that stimulate economy but do not interfere by harming the environment. Such a growth can be offered by beekeeping with its special production of by-products, especially royal jelly and bee venom. Opportunities and decent working conditions are also required for men and women, boys and girls at working age.

Bee venom does not need to be processed, it can be prepared wherever bee venom therapy finds sufficient support. Production in small quantities is easy, as long as stringent sanitary controls and aseptic working conditions can be provided. The beekeeper has to work under extremely clean conditions, since most of the venom preparations will later be used for injections into humans or animals.

International training courses on Apitherapy, organised for several years in Cuba (Hospital Calixto García, University of Medicine), were attended by people from several Latin American countries (Mexico, Argentina, Venezuela, Chile, etc.) - Photos: Cristina Mateescu

The medicinal use of honey is probably its most widely known use, but such uses do not require special preparations. If not used in its natural form, it is mixed at home with other liquids such as hot milk, teas or other infusions, wine and other alcoholic beverages. More common is the use of honey in herbal and other traditional extracts.

Royal jelly production is possible, provided hygiene is strictly observed as in the case of bee venom. More beekeepers - women and girls - can be specialized in this activity through training. As consumption of royal jelly is still growing, fair jobs in the sale of bee products can also contribute to the economic growth.

For the food chain, training courses for introducing modern hives and modern processing and storage methods for bee products help to develop from home/farm scale into middle scale local industries to produce not only raw bee products but also food supplements based on bee products and other local natural resources, but also to teach and train about the way people can apply such products in health care.

Specialists in the Commission for Apitherapy can offer specialized training courses for nurses, medical doctors and healthcare providers.

Beekeeping is full of examples of people coming from very poor families or regions who could incorporate themselves not only in productive activities but also to achieve a complete social integration with other people who had better opportunities in their lives. Beekeeping not only provides decent employment but also assures social mobility.

Beekeeping has also allowed the retention of many young people in rural areas.

Scientific Commission for Beekeeping Economy
Norberto Luis García, President

Beekeeping is a sustainable form of agriculture that can be practiced on a local level without land ownership. It has very little start-up costs and the products (honey, wax, pollen, propolis, bee brood, etc.) can be sold locally. Beekeeping is open to all genders and ages and does not discriminate, you only need to respect the bees and some basic training to become a beekeeper. But beekeeping can be challenging due to the wide variety of pests and diseases that can impact hive production and even kill honey bee colonies.

The Commission for Bee Health works globally to provide information and awareness about bee diseases and pests and the most appropriate means to manage them, possibly at low costs. Healthy bees provide income and improve the lives of beekeepers and the community. Lastly, bees utilise local flowers and trees and thus promote better food production and a more diverse and stable environment that helps sustain local economies. Healthy bees ensure sustainable beekeeping so they are economically viable.

Scientific Commission for Bee Health
Fani Hatjina, President
Jeff Pettis, President of Apimondia and former President of the Commission for Bee Health

Beekeeping can fit everywhere and be productive and profitable! - Photos: Fani Hatjina

Africa has seen a massive increase in youths graduating from tertiary institutions with the hope of getting formal employment. Unfortunately, the global economic slowdown has resulted in less job opportunities being created for a number of years. This situation is getting worse with the aggressive take-over by machines through artificial intelligence and machine learning.

Yet, in Africa, the momentum has shifted from creating graduates that are looking for employment to graduates who are looking for opportunities to start small businesses they can grow into big companies.

One such case is the Singida Beekeeping Villages Initiative, a brainchild of a young graduate who, immediately after graduating, did not go on a job-hunt but went into beekeeping. The results are breath-taking. The Regional Commission President visited the initiative in June 2019 to appreciate the extent of the project and it is unbelievable! In February 2020, he was invited for a follow-up visit to appreciate the improvements done to the project and indeed this is a model project for sustainable growth in rural areas that can be adopted elsewhere in Africa.

This initiative has training facilities and part of the group that was attending training at the time of the second visit included young and old women, looking forward to starting their own beekeeping projects in their home villages.

Regional Commission for Africa
David Mukomana, President

Contributions from:
Singida Youth Entrepreneurs and Consultants Co-operative Society (SYECCOS)

Vincent Hakizimana, an expert beekeeper in Rwanda - all necessary resources for beekeeping are available locally - Photo: © Bees for Development

What was humbling was an interview with one of the trainees who runs a Tour Company that has more than eight hunting concessions in Tanzania. His idea is to partner with Beekeeping Villages Initiative to establish more apiaries in all the hunting concessions as a way of contributing back to the local communities. The aim is to mount at least 40,000 hives in ten regions of Tanzania. Imagine if such initiative can be adopted by the majority of those with hunting concessions in Africa! Not only will our communities benefit from sustainable exploitation of wild animals but they will create wealth through beekeeping. Communities will stop poaching and be actively involved in community policing of the natural resources in their communities thus ensuring not only creation of employment but conservation of the environment and wildlife for the benefit of future generations.

It is through such initiatives that Apimondia believes a lot of rural to urban migration can be reduced in Africa if the opportunities in these communities are converted into reliable sources of jobs and sources of income. Villages and rural communities can drive their own growth agenda and the rest of other services will follow, thus empowering communities to enjoy a better standard of living at community level.

Singida Beekeeping Villages (Singida, Tanzania) is part of the Model Initiatives adopted by the Regional Commission for Africa to trigger village and rural development in Africa.

Mr. Philemon Kiemi with part of his staff and the Regional Commission President at Iglansoni Forest Camp where beekeeping investors have mounted more than 10,000 hives and more investors are coming on board - Photo: Philemon Kiemi

Regional Commission for the Americas

Lucas Martínez, President

Avocado pollination in Peru - Photo: Efrain Valdivia - Iberoabeja, Peru

Beekeeping is a solid tool for the economic growth of a population, since it is inclusive of the marginal sectors that with few resources achieve a production that offers goods and services to the general population. By varying the level of apicultural development in the country, we can find large companies that provide crop pollination services, an activity that increases year by year due to the increment of areas planted with crops dependent on pollination, such as almonds and avocados, as well as small farmers, who integrate beekeeping with other livestock productions.

Beekeeping does not generate pollution or waste, making it sustainable over time. It meets the requirements to generate jobs in the form of micro-businesses as well as large companies.

Regional Commission for Europe

Róbert Chlebo, President

The imbalance in the European honey market as a result of the wholesale importation of adulterated low-cost honey has reduced the purchase price of honey in the European main producer countries (Ukraine, Romania, Spain, Hungary, etc.) and this continues to put European beekeepers in a difficult and detrimental position.

In 2015 Slovenia initiated the official recognition of 20 May as the World Bee Day declared by the UN. The idea was endorsed by FAO at its July 2017 Conference in Rome, whereby it was agreed that particular attention should be paid to the apicultural sector in terms of agriculture, plant protection and sustainable farming, as bees have a large impact on the ecological balance worldwide.

Honey tasting in an apitourism resort in Slovenia - Photo: Tomo Jeseničnik

The Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES), in its report adopted in 2016, as well as the International Union for Conservation of Nature (IUCN) in its Worldwide Integrated Assessments on systemic insecticides, have warned against the decline in pollinators.

Monoculture-based farming using crop varieties and hybrids with lower nectar and pollen yields and shorter flowering periods greatly reduces both biodiversity and the extent of the areas used for bee foraging grounds. The European NGO BeeLife is working for a brighter future for bees and pollinators, improving their protection and their positive impact on our agricultural system. They have prepared proposals for the future of the EU Common Agriculture Policy (CAP) regarding pollinators.

Regional Commission for Oceania

Jodie Goldsworthy, President

New Zealand leads the world in economic growth of their apiculture industry off the back of the success of manuka honey. Whilst the steep increase in hive numbers and new beekeepers is not without its challenges, the industry is well placed to continue to underpin economic growth for New Zealand and acts as an important case study in value creation from unique flora and its interaction with bees. Combined with manuka honey, bees in New Zealand are important in pollinating kiwi fruit, another product that New Zealand is famous for.

Young beekeepers practicing at the Beekeeping Promotion Centre of Boghen, New Caledonia - Photo: Etienne Bruneau

In Australia honey bees are set to underpin the massive growth in high value crops such as almonds through their pollination and be crucial to agriculture's goal of building a AU$ 100 billion agriculture industry by 2030. The returns for honey in Australia have been hampered by low-priced honey from parts of the world most affected by honey fraud and beekeepers now operate in a market where supply and demand are no longer fully functional. Imports of low-priced honey with poor traceability back to the beehive can always fill demand and create an artificially low floor price that Australian beekeepers with high operating costs must compete with.

In Pacific island countries such as Fiji the market for honey is still in its early stages of development, but collectives of beekeepers work hard to promote beekeeping as an alternative income source.


Einstein room
Level - Niveau 0
APIexpo
Level - Niveau 0
The bee, sentinel of the environment
API mondia 2009
API mondia 2009
The ORIGINAL
R J SHERRIFF
ŁYS
ikoinez
ANEL

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

Beekeeping is the perfect example of an enduring, resilient and wholly sustainable income-generating activity.

A major trend in beekeeping is the use of electronic information tools for monitoring and teaching but still respecting the indigenous local knowledge. Start-up of beekeeping requires only simple equipment available in any household. Social and economic growth can be achieved through innovative thinking. Growth out of the local market makes co-operation and business skills a necessity.

Beekeepers getting acquainted with the latest technologies applied to apiculture at the ApiExpo 2009
Photo: Gilles Ratia

Scientific Commission for Beekeeping for Rural Development
Nicola Bradbear, President

Once harvested, honey does not require further processing other than to ensure that it is free from debris introduced during harvesting. Honey processing requires only simple equipment as used in other forms of food preparation: bowls, sieves, straining cloths and containers, this means that small businesses can readily scale up.

Honey is an important source of food and income for rural people in North Macedonia - Photo: © Bees for Development

Scientific Commission for Pollination and Bee Flora
Alessandra Guidotti and Abram J. Bicksler, FAO

Honey and hive products are quite simple to process, since they do not require technological and expensive equipment to be harvested from the hive and then processed and marketed. Many types of local-style hives for honey bees and other social bees exist across the world and offer an entry point for the co-creation of knowledge between Indigenous and Local Knowledge holders and scientists and extension providers. Operations for hive processing may also be performed at the farm level and community level, without agri-food industry support or large capital investments.

At the same time, beekeeping is a sector where innovative and technological solutions can be easily applied. Recently, many innovative tools have appeared in the beekeeping sector: devices positioned inside the hive in order to monitor weight, temperature, humidity and a large number of data; global and regional databases which provide information on pollinators and flower phenology and mobile apps which enable an easier management of hives (e.g. HiveTracks). Much work can still be done on innovative monitoring for wild pollinators and their interactions with crops and ecosystems in general.

Scientific Commission for Beekeeping Technology and Quality
Etienne Bruneau, President

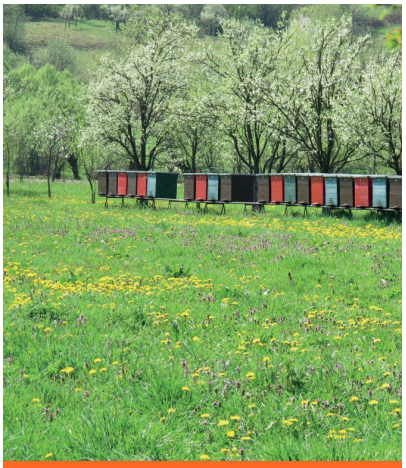
Beekeeping is one of the essential tools for the development of an agriculture that is more in balance with its environment. The development of one cannot be achieved without the development of the other.

As a sample collector, bees can be used as a very good tool for evaluating biodiversity improvement and pesticide reduction programmes. It can also play a role in monitoring the impact of climate change on the environment (change in the relationship between bees and flowers, etc.). Beekeepers should be trained to be able to respond with their colonies to this new need of our society.

In addition, to limit the number of interventions in the colonies in order to improve respect for bees and save energy, observation networks should be developed to help beekeepers to intervene appropriately in their colonies. The exchange of computer data among beekeepers would make it possible to launch alerts (probable honey flow, beginning of swarming period, etc.) and this, coupled with sensors placed on the hives, should greatly help them in managing their work.

Efforts must be made in production and packaging around the world, not forgetting less developed countries, to help them preserve the freshness and bioactivity of harvested products and offer local populations better quality hive products.

The TECA forum is a first tool for the dissemination of information in the beekeeping sector, among others, but this tool could be further enhanced by developing one or more international information management centres to relay the results of research and market developments or any other important information to as many beekeepers as possible, while ensuring that the information transmitted is adapted to the real needs of the recipients.



Apiary in Romania for pollinating fruit trees - Photo: Etienne Bruneau

Scientific Commission for Apitherapy
Cristina Mateescu, President

Investment in infrastructure is very important for sustainable development. Investment in electric power, water supply and sanitation is still scarce in many regions of the world. However, least developed countries have an immense potential to develop small scale industries especially in food and beverages. In beekeeping a good infrastructure for processing other products than honey makes it possible to have a good income, extra food for a better nutrition and, as a result, a better health condition. Honey does not need a sophisticated equipment for processing, beeswax as well requires simple techniques. Infrastructure is also the ground for a better education when people trained on the benefits and uses of the bee by-products can develop their own health products (food supplements as well as salves and ointments) thus creating a small business to help their communities.

Training has a positive effect on the trainee's performance. It is also a motivational factor to enhance the knowledge and the local community will be able to give better results in producing high quality bee products, innovative food supplements and healthcare or medicinal products using the local resources.

The project on "medicinal independence" carried out in Cuba by the Commission for Apitherapy proved out excellent results in using local honey and propolis in hospitals for burns and infected wounds care. An example is the Frank Pais Hospital where patients with serious nosocomial infections could benefit from the alternative treatments with honey, aromatic honeys (prepared with essential oils obtained from local vegetal resources) or propohoneys (honeys with propolis and essential oils). Through training, the local industry for producing essential oils from the specific wild flora of the country was also developed.

On a small scale, honey processing requires only simple equipment - as business grows, this can be scaled up - Photo: © Bees for Development

Scientific Commission for Beekeeping Economy

Norberto Luis García, President

In many developing countries, through liaising with local authorities and institutions, many beekeepers have set up co-operatives for the provision of inputs and trade of their products. Beekeepers' co-operatives or groups have also been successful in the organisation and sharing of honey extracting facilities, thus making possible the use of costly infrastructures. Furthermore, in several countries of South America there are many successful experiences of groups of beekeepers that have been trained on export procedures and currently export their products directly.

Scientific Commission for Bee Health

Fani Hatjina, President

Jeff Pettis, President of Apimondia and former President of the Commission for Bee Health

The management of healthy bees in a changing environment is based on resilient infrastructures; it gives access to small-scale and industrial enterprises and also promotes development of innovative solutions, such as methods to combat diseases, to monitor the health of the bees, to standardize the data, to improve health and survival as well as colony microclimatic conditions.

Electronic monitoring (digital apiculture - remote sensing) - Photos: Fani Hatjina

Innovation and beekeeping are closely related as keeping the health of bees at a given standard requires new ideas and solutions to be developed, especially in connection with the changes of the environment. Breeding local bees resistant to diseases is an innovation on its own. The Bee Health Commission also supports efforts on domestic technology development in favour of bees.

Beekeeping in Africa is based on the local-style African beekeeping systems that have been practiced for many generations. These include the use of local bee hives ranging from barks, logs, clay pots, reeds and gourds. With the demand for African honey surging as well as other environmental issues, the beekeeping industry in Africa needs to take into account modern practices that will enhance the honey production in a sustainable and environmentally friendly manner.

Regional Commission for Africa
David Mukomana, President

Contributions from:
Youth for Apiculture Initiative (YFAI)
Dr. Deborah Amulen - University of Makerere, Uganda

The Regional Commission is excited about the level of engagement of youths and other stakeholders in bringing on board innovation to the beekeeping sector for purposes of value-adding honey and other hive products. The Regional Commission has established Regional Working Groups (RWGs) with one "Hive Products Value Addition" hitting the ground running. The RWG is led by an innovative and energetic woman, Dr. Deborah Amulen from Uganda who has shown that there are no barriers which cannot be broken with beekeeping innovation. She has spearheaded value addition of propolis, coming up with a tea bag product with propolis that is already on the market in Uganda.

Value added products: tea bags with propolis developed in Uganda - Photo: Dr. Deborah Amulen

Such research and innovation are the way African apiculture is taking in order to create jobs for the youths and women who have been marginalised for a long time. The demand for African value-added products is very high given the amount of business that was made by some of the African exhibitors who attended the 46th Apimondia Congress in Montreal in September 2019. One of the exhibitors from South Africa who brought a few honey value-added products wished she had carried more because all her stock was sold out before the congress was over!

The determination for innovation in the apicultural sector has taken another dimension with youths getting into the sector with innovative ideas. Youth for Apiculture Initiative has set the agenda to work on value addition and other services that will make the apicultural sector move with technology. The ultimate vision for the initiative is to foresee a symposium whose main focus is on how the youths can exploit opportunities in the apicultural sector to levels of providing jobs and business opportunities attractive enough to discourage many of them from thinking of migrating to Europe for a better life.

Youths for Apiculture Initiatives - YFAI is a model initiative of the Regional Commission for Africa to spearhead youth participation in beekeeping and help create business opportunities through innovation. One of the innovative approaches youths have taken to effectively deliver the message on beekeeping through technology every fortnight

Regional Commission for Asia

Cleofas R. Cervancia, President

Hive made of coconut shells for a colony of stingless bees in Los Baños, Philippines - Photo: Filippo Jannoni-Sebastianini

Various hive designs for stingless bees have been developed depending on the availability of resources, purpose (pollination or honey production) and climatic conditions. Wooden hives are designed for pollination while coconut shell is used for backyard beekeeping. Stingless bee pollen and propolis driers are already available in the market. Bee training and product processing facilities have been established in various communities.

Stingless bees are being utilised in greenhouse pollination in Japan and the Philippines.

Regional Commission for Europe

Róbert Chlebo, President

It is important to maintain and deepen dialogue and co-operation among all stakeholders (beekeepers, farmers, scientists, NGOs, local authorities, plant protection industries, the private sector, veterinarians and the general public) to co-ordinate research and to share all relevant collected data.

A common digital database for the exchange of information among beekeepers, researchers and all parties involved is needed to broaden and share beekeeping research topics and findings. Several research projects were linked with beekeeping, such as EFSA's project "Collecting and Sharing Data on Bee Health: towards a European Bee Partnership" that considers that greater private and public investment in technical and scientific know-how is essential and should be intensified, in particular on genetic and veterinary aspects and the development of innovative bee health medicines.

In recent years several European research projects have been trying to shed light on the principal factors influencing bee health and into the losses in managed honey bee colonies, wild bees and other pollinators in Europe and other countries, including H2020 projects Poshbee, B-Good, Hivepolis, Sams, Iobee, Warmhive, Beehome and Fog, as well as already completed projects like Smartbees, Swarmonitor, COLOSS, Super-B, Beedoc, Beeshop, BPractices, Alarm and Step.

Remote sensing to control weather conditions and hive development is widely used - Photo: Asger Søgaard Jørgensen

A global list of scientific/educational projects, open source and commercial projects on beehive monitoring and precise beekeeping is available on the hiveeyes.org and colonymonitoring.com web pages.

The European Food Safety Authority, in collaboration with several stakeholders dealing with bee health, created the EU Bee Partnership. Since 2012, the European Bee and Pollination Week is held every year at the European Parliament in Brussels.

Beekeepers should operate in a responsible and professional way and in close co-operation with farmers in order to tackle future challenges such as climate change, natural disasters, reduction of bee foraging grounds, attacks by wild animals and from species of migratory birds in some regions (beehives are greatly exposed to such predations as beekeeping is often practised in the open air).

Regional Commission for Oceania
Jodie Goldsworthy, President

The cultures within the Oceania region are highly innovative. Beekeepers in these parts utilise the most up-to-date technology, equipment and materials and are the source of some of the world's most important apicultural innovations. The Flow Hive was developed in Australia and is responsible for a global surge in interest in keeping bees and helping protect bees. New Zealand leads the way in digital technology, barcoding, traceability technology and units like hive weight monitoring devices which can be operated remotely saving considerable time and cost in travelling to where the hives are located.

Many of these inventions and innovations have been and will be implemented on a global scale in the future.


BEC

10 REDUCED INEQUALITIES

Whether beekeeping is practised by poor or rich, using simple or more sophisticated equipment, honey and beeswax - as created by bees - are pure and perfect. This makes beekeeping accessible to all.

Beekeeping offers opportunities for even the most poor, remote and disempowered people to harvest produce, honey and beeswax, that are of quality equal to those produced elsewhere. Apimondia works actively to establish international protocols in co-operation with the legal authorities to protect the quality and the national and international markets of beekeeping products.

Beekeeping is accessible to all
Photo: Hrvoje Pavlić

Scientific Commission for Beekeeping for Rural Development
Nicola Bradbear, President

Beekeeping offers one opportunity for even the most poor, remote and disempowered people to harvest produce, honey and beeswax, that are of quality equal to those produced elsewhere. Indeed, the clean, natural environments, where many of the world's poorest people live, enable them to harvest produce that is less contaminated than sometimes happens in industrialised regions.

Beekeeping presents an economic opportunity for even the most marginalised communities. For many households in south-west Ethiopia, honey is the primary source of cash (Endalamaw, 2005) and the number of hives is a wealth indicator, with anyone having 100+ hives considered rich. Unlike other wealth indicators, such as livestock, which the poor can rarely afford, many poor people do have small numbers of hives (van Beijnen et al., 2004).

Disability is a major predictor of marginalisation and exclusion in many developing countries and disabled people suffer disproportionately from chronic poverty. Yet, depending on the nature of the disability, beekeeping is more achievable than many other activities. In a scoping study on Beekeeping and Disability in Uganda undertaken in 2018 many respondents indicated the accessibility of beekeeping by explaining "I prefer keeping bees because they need less time to maintain and the returns from the enterprise are big" and "beekeeping is not laborious". One man without sight explained "Beekeeping is the only economic activity I can do to support my five children. My speciality is weaving beehives". This scoping study was followed up with a project to help more people with disabilities benefit economically from beekeeping.

Beekeeping is accessible to the rich and poor alike in SW Ethiopia. While those with access to family labour can keep in excess of 100 bee colonies, even the most disadvantaged person can keep some hives to earn money. These forest beekeepers near Masha are on their way to the forest to hang hives - Photo: © Bees for Development

Beekeeping can increase the level of education, the economic resources and women's and youth's empowerment even in the poorest and most remote areas of developing countries. As mentioned in previous paragraphs, beekeeping activities are not difficult to begin, since they do not require a large amount of capital or hard-to-find equipment, and bees can even forage from existing flora in existing ecosystems. Additionally, bees and other pollinators themselves can often be sourced locally from existing ecosystems and be reared in locally created hives. Thanks to beekeeping, rural communities with a lack of access to educational programmes and economic resources, can easily improve their conditions.

Scientific Commission for Pollination and Bee Flora
Alessandra Guidotti and Abram J. Bicksler, FAO

During 2019, the Apimondia Statement on Honey Fraud was released. This conceptual document intends to be a useful tool to defend the image of honey and to prevent the enormous economic damage, due primarily to the presence of honey adulteration, caused and is still causing to many developing countries. Honey fraud not only damages the beekeeping sector of many developing countries but also their food production capacities if bees are not available for pollination of crops.

The Apimondia Executive Council members are currently working in collaboration with *Codex Alimentarius*, ISO and the U.S. Pharmacopeia to update current international standards for honey which are fundamental tools to safeguard the purity and authenticity of the product.

Scientific Commission for Beekeeping Economy
Norberto Luis García, President

Bee health requires a global perspective, as well as similar and equal treatment of bees and beekeepers. Global problems require global solutions, although with a "local flavour". As bee health problems are global and are not restricted to one or few countries, solutions and practices need to be applied equally and similarly everywhere, with no differences among countries or nations, otherwise pests will spread and eventually prevail, as it has happened before, because also bee enemies have no borders.

Scientific Commission for Bee Health
Fani Hatjina, President
Jeff Pettis, President of Apimondia and former President of the Commission for Bee Health

Pests have no borders! *Vespa velutina* nest in France - Photo: © COLOSS Velutina Task Force

Regional Commission for Africa

David Mukomana, President

Given the quality of honey and beeswax from many African countries, beekepers are supposed to be living better lives than they are currently living. The agenda at the moment is using beekeeping to fight extreme poverty and hunger in the same communities where high quality natural honey and beeswax are in abundance, products that can fetch very good prices to support good living.

The Commission for Africa is working on programmes to provide stakeholders with the opportunity to engage in intra- and inter-regional trade in order to balance their unequal trade deficits. There are a number of African countries that are importing honey from outside the continent, thereby exporting foreign currency and creating markets for overseas honey when neighbouring beekeepers are struggling to find decent markets especially with the stringent conditions for African countries to access the single biggest honey market - the European Union. Intra- and inter-regional trade is part of the agenda for the African Union. The Union is seriously promoting trading relations among African countries and this should be extended to the honey sector.

Women at work putting together hives as part of the Village Markets Africa and Elephants Rhinos and People (ERP) initiatives in South Africa, helping bridge inequality between men and women - Photo: Portia Mmabatho Morudi

The Regional Commission has also put together a Working Group comprising industry players and specialists to start working on African Honey Characterisation in order to establish the scientific properties of African honey with the intention of value addition. This will greatly increase the value of African honey on the global market and thus directly contribute towards the accelerated development of communities from where the honey is produced as low prices are discouraging more investment in beekeeping due to low returns.

Regional Commission for the Americas

Lucas Martínez, President

The International Federation of Beekeepers' Associations - Apimondia is a reflection of the equality that a profession can provide. Today within Apimondia there are members from more than 100 countries that meet every two years at the International Apimondia Congress, where they are united by the same passion and profession: beekeeping.

This is not very common within agricultural productions, since these types of events are aimed at technicians and researchers; however, within the Apimondia Congresses one finds primary producers, technicians, scientists and marketers who, for several days, exchange information and can join a comprehensive social programme where the different actors of the sector come together regardless of their nationality. Beekeeping reduces inequality; all beekeepers are colleagues, not competitors.

Apimondia General Assembly: where Beekeepers' Associations meet to debate on current apicultural topics - Kiev, Ukraine, 2013 - Photo: 43rd Apimondia Congress Local Organising Committee

Regional Commission for Asia

Cleofas R. Cervancia, President

Through the Asian Apicultural Association (AAA) and Meliponine Group, the region has started gathering research data on the standardization of stingless bee honey. Each country has a representative and other stingless bee scientists outside Asia, like Dr. Tim Heard and Patricia Vit, are involved. Moreover, in 2018 AAA published a book "Asian Beekeeping in the 21st Century", Springer Nature, highlighting bee research and development in each country. The regular meetings of the AAA and Meliponine Group keep every country engaged in bees and beekeeping. There are on-going research collaborations between Thailand, Vietnam, Philippines and some European countries.

Effective protection of beehives lodged in the walls of some houses in Pokhara, Nepal - Photo: Gilles Ratia

Regional Commission for Europe

Róbert Chlebo, President

Annual consumption of honey is unsatisfactory: the average of 2.5 - 2.7 kg per person per year in West European Member States is more or less acceptable, but the figure for Hungary, for example, is just 0.7 kg per year, which is low. The intensive assistance for short supply chains in rural development programmes, to promote the local and regional sale of honey and particularly bio-honey, is needed. The European beekeeping sector deserves particular attention to be paid to its protection in negotiations on free trade agreements and honey and other bee products to be classified as "sensitive products".

Paradoxically, neither beekeepers nor consumers in both more or less developed countries benefit from unregulated free honey trade, as actually they are economic hostages in the hands of fraudsters manipulating honey pricing policy. Even beekeepers in developing countries would achieve higher prices for their production if they focus on local markets, specialities or selling honey to third countries exclusively through direct "fair trade" schemes.

Honey is not the main benefit of bee farming; countries cannot import/export pollination services, influencing the development of other agricultural sectors in their countries. Research conducted by the UN Food and Agriculture Organisation (FAO) shows that increasing the density and variety of pollinating insects has a direct impact on harvest yields and, as such, can help small-scale farmers increase their productivity by an average of 24% overall.

Regional Commission for Oceania

Jodie Goldsworthy, President

The Apimondia network is important in connecting the Oceania region with knowledge and information in relation to bees, beekeeping and food security. People from our region believe that it is this information exchange where local problems are solved by global solutions that will help to reduce inequality amongst nations. The Apimondia network needs to be acknowledged for its role in contributing to providing the forum, networks and organisational structure that allow this to occur.

11 SUSTAINABLE CITIES AND COMMUNITIES

People love to see wildlife in cities - bees and flowers make life better for everyone.

Interest has grown for urban beekeeping. It offers a way for urban people to have a connection with nature and acts as an incentive to make the cities greener by planting trees and creating flower-rich areas. Beekeeping offers a possibility to teach people about food production and pollination also in urban areas. Bees can act as a sentinel of the environment in the city.

Bee hives on the roof of the Art Gallery in Frankfurt set up for a fund-raising event for Bees for Development - Photo: © Bees for Development

Scientific Commission for Beekeeping for Rural Development
Nicola Bradbear, President

In recent years interest had grown for urban beekeeping. It is feasible and offers a way for urban people to have a connection with nature.

Urban beekeeping is not confined to the cities of industrialised countries such as London, Montreal or Paris. Beekeepers are also found in the Ethiopian cities of Bahir Dar and Gondar. In his urban apiary in Bahir Dar, beekeeper Mr. Bayligne maintains trees for fruit, timber and bee forage. He multiplies his colonies by keeping a mother colony in a small calabash - the smallness of this hive forces the colony to produce swarms and in 2012 he obtained five new colonies in this way. Mr. Tilahun Gebey of Bees for Development Ethiopia said "The advantage of beekeeping in town is the customer is right on the doorstep and this means there is no need for intermediate buying and selling. The beekeeper earns the full retail price by selling direct".

A beekeeper with his honey bee colonies at his home apiary in Chechnya - Photo: © Bees for Development

Scientific Commission for Pollination and Bee Flora
Alessandra Guidotti and Abram J. Bicksler, FAO

In urban areas, balconies, rooftops and gardens may be designed to promote pollinator biodiversity. Planting flower patches can also help provide food resources, and building nesting structures for solitary bees and social bees may contribute to promote biodiversity in urban landscapes and provide pollinators with resources, which may be poor in the surrounding environment due to intensive agriculture activities and land use change.

Moreover, thanks to educational initiatives and campaigns carried out by associations, schools and local municipalities, communities can reach the goal of increasing awareness on biodiversity loss and consequences of industrial agriculture.

Beekeeping in the city is a reality but will never replace beekeeping in rural or forest areas. That does not mean it is of any interest.

Beekeeping in the city has as a priority an educational mission. It is the contact with these insects that will allow the population to recreate links with the reality of nature and make many people understand what pollination means. The didactic beehives will thus have to be placed to meet this need for information for the population (see Urban Bees in London).

A second role of the urban beehives - that is just as important - is that of sentinel of the environment where it can be confronted with pollutants although the spectrum differs from that of the countryside (PAHs, heavy metals and less fungicides). They also give an idea of the real biodiversity of urbanized areas. If man needs the presence of nature for his balance, nature's biodiversity is vital to it. Excessive and unexplainable deaths of bee colonies can thus send an alarm signal to decision-makers. They can also provide information on the evolution of biodiversity if the projects are carried out over time. For this type of hives, weight and activity sensors can provide very useful information. The detailed analysis of the products is of course a very important element.

Educational sites with bees on the roofs should be linked to the greening of roofs or to other greening projects. Real honey gardens on rooftops are practical examples that can generate new policies for greening urbanized spaces. In both cases, digitalized beekeeping has more than ever its place here.

Scientific Commission for Beekeeping Technology and Quality
Etienne Bruneau, President

Urban beekeeping should be promoted as a means for food production in non-agricultural areas.

Beekeeping in urban areas has steeply increased during the last years. Not only bee products can be produced in urban environments and generate a nice income to producers, but also the pollination of fruit trees and vegetables in urban backyards can be sustained.

Scientific Commission for Beekeeping Economy
Norberto Luis García, President

Management of healthy bees is also very important for sustainable human settlement planning in urban areas, where urban beekeeping can be practiced, with no pesticides, no chemical treatments, no high density. Organic solutions are applied for disease treatment and the fate of bees in urban areas is highly connected with the healthy and safe environment of the cities. The health level of the bees and their survival in urban areas constitute also a monitoring tool for the health of the environment we live in.

Scientific Commission for Bee Health
Fani Hatjina, President
Jeff Pettis, President of Apimondia and former President of the Commission for Bee Health

Bees surviving in a city show a healthy environment - Photo: Maria Tsitsiloglou

Regional Commission for Africa
David Mukomana, President

Contributions from:
Business Insider South Africa, 22 March 2018 (by Leanna Garfield)
Rene Fisher - Mashonaland Beekeepers' Association
World Economic Forum on Africa, 15 August 2019 (by Rosamond Hutt)

Massive clearance of forests across Africa is, on account of rapid industrial development, taking place due to discovery of minerals and establishment of factories. These rapid developments have seen many forests being replaced by concrete and tall buildings that have adversely affected the ecological balances within the environs of such development resulting in loss of natural habitat for many animals, including bees. Excessive air pollution caused by the industries has also contributed to more environmental damage, a situation that is now creating the need to come up with smart cities that are environmentally friendly.

A number of African cities have been planned in such a way that trees are part of the landscape to the extent that some of them are included in the statistics of cities that are highly forested in the world. Durban and Johannesburg are some of the African cities that are forested and, according to the South African Bee Industry Organisation and the South African Department of Agriculture, there is big business for bee removals in Johannesburg, a sign that beekeeping can be done in the cities with enough forage to support commercial beekeeping.

Beekeepers receiving training to check brood combs at an apiary site in the precincts of Harare, Zimbabwe - Photo: Rene Fisher

Apimondia is in the over-drive to engage stakeholders to consider urban beekeeping in order to contribute to environmental conservation. Interestingly, Harare, Zimbabwe has a very thriving urban and peri-urban beekeeping industry where jacaranda honey is produced. This honey has a very unique flavour that demand for such always outstrips supply. This has seen beekeepers within the city forming the Mashonaland Beekeepers' Association, whose members are contributing significantly to the beekeeping sector in Zimbabwe in terms of training and offering other support services.

And with the new concept of urban/vertical forests taking roots, one of the activities that should be included in the plans is beekeeping. The first vertical forest coming up in Africa is in Cairo, Egypt and hopefully it can provide a very interesting case for intensive urban beekeeping.

Regional Commission for Asia
Cleofas R. Cervancia, President

The University of the Philippines Los Baños Bee Programme has introduced beekeeping in some elementary schools as part of their subject in environment or biological sciences. The first step is to give seminars with *practicum* to the students. Stingless bees are used because they are safe to the children. There are four engagements during the school year. We visit every three months to inspect the colony, together with the students until honey harvesting. The hands-on activities facilitate the learning process.

We have also introduced urban beekeeping with stingless bees. Again, the stingless bees pose no hazards to human and pets, so it has gained popularity among enthusiasts. However, in all trainings, the importance of growing bee plants is always emphasized.

Regional Commission for Europe

Róbert Chlebo, President

New support schemes for beekeepers must be taken into account in Europe, in order to adequately reflect the ecological role of bees as pollinators as well as the specific needs of micro, small and medium-sized enterprises, including those that pursue their activities in outermost and mountainous regions and on the islands.

Urban beekeeping has gained in popularity in recent years and has the potential to increase awareness on nature and the benefits of beekeeping among a broader circle of citizens, including children, whereas the planting of flowering plants in gardens and urban areas by the public and/or local and regional authorities also helps to enrich pollinator dietary sources.

Even the smallest city garden can provide food for bees and berries for the owner - Photo: Asger Søgaard Jørgensen

A new European Citizens Initiative (ECI) is aiming at tackling some of the challenges of our modern agriculture. The "Save Bees and Farmers" initiative denounces the high impact that unsustainable agricultural practices have on our environment, sharply reducing biodiversity and even putting farmers and consumers at peril. Several civil society organisations have come together in creating this new ECI; signature collection began in November 2019.

According to the "Save Bees and Farmers" initiative, over the past ten years, on average, one farm had to give up business every three minutes. True to the motto "Grow or Die", more and more land is being managed by an ever-smaller number of businesses, focussing on yields and sales rather than on quality. Conversely, small-scale farms are struggling to survive. With their disappearance, Europe's rural areas lose jobs and their cultural heritage.

The solution is an agriculture that is able to thrive without toxic chemicals, an agriculture that - by relying on biodiversity and climate-friendly farming methods - will ensure the adequate nutrition of people not only today but also in the future, an agriculture that preserves the invaluable diversity of natural environments, food and rural traditions in Europe.

Regional Commission for Oceania

Jodie Goldsworthy, President

The keeping of bees in cities in our region is increasing. The Rooftop Hive phenomenon is very much established within the cities of Australia and New Zealand and helps to connect people within our cities in an inclusive, safe, resilient and sustainable way. Beekeepers, chefs, foodies, businesses, governments and landlords all see benefits in keeping bees in our cities.

Local government policies to assist the keeping of bees have evolved and the community embraces more beehives as a way of ensuring essential ecosystem services from bees. Bees have created a reason for people to take care of their backyards, parks, gardens and community spaces which all lead to better environmental outcomes and the closer connection of people with nature.


KONSERV ZAVODU" MMC

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

The perfect pattern: local bees producing local and nutritious honey for local people.

Beekeeping is a positive externality as it exploits natural resources like honey and pollen that otherwise would not be used. The inputs to the production can be very low. In local market contexts the need for packaging and transport is limited. Apimondia is promoting local production and consumption and has taken a strong position in fighting adulteration of the products as we are nowadays experiencing in the world market.

Honey is an important source of rural livelihood for millions of people - here, honey for sale by a roadside in Azerbaijan
Photo: © Bees for Development

Scientific Commission for Beekeeping for Rural Development
Nicola Bradbear, President

Beekeeping delivers attractive products and pollination of fruits - Photo: © Bees for Development

Honey can be produced and harvested wherever there are flowering plants, i.e. worldwide. However, honey bees are adversely affected by pest control products, and this is an area that demands focus, as we see tremendous decline in insect pollinator species. Our sector must strive to eliminate non-sustainable beekeeping practises and to encourage regenerative agriculture to restore biodiversity and bioabundance.

Scientific Commission for Pollination and Bee Flora
Alessandra Guidotti and Abram J. Bicksler, FAO

Loading seedlings of trees for habitat restoration and to ensure forage for bees in Amhara, Ethiopia - Photo: © Bees for Development

There are many types of honey available on the market. In order to support a more responsible consumption, customers can shop for local products and avoid industrial honey, which usually is poorest in nutrients and can be adulterated by dilution with syrup (rice, maize, sugar cane, etc.), artificial feeding of bees or by mislabelling the geographical and/or botanical origin of honey (Apimondia, 2019). On the other hand, local producers can strengthen their commitment in taking measures to make their pollinators' products more sustainable, for example by providing an environment rich in biodiversity and free from chemicals for the bees to forage, or by avoiding antibiotics.

Beyond honey and comb products from honey bees, in many parts of the world, many other local bees are reared and harvested for food, honey, comb, medicinal purposes, which can help to highlight and protect local biodiversity and the habitats that support the pollinators.

Beekeeping production is one of the few breeding operations that allows all products to be consumed without generating waste. Waste can possibly be produced depending on the packaging material that will be used and the packaging process of the products. An effort must be made at this level to promote the recycling of packaging if it has not already been done. Their production does not have a negative impact on health.

The development of organic beekeeping is currently hampered by the scarcity of available uncontaminated forage areas. In addition, beekeepers are increasingly aware of the need to stop using synthetic substances, including antibiotics. However, a major information effort remains to be made in some parts of the world that are less aware of these aspects than others.

It is important to avoid that developing countries take as an example intensive beekeeping models with intense moving of bees and the use of synthetic drugs for their development. It is really important to work at the local level by taking into consideration the local flora and combatting deforestation or biodiversity loss. Great care must also be taken to avoid the outbreak of forest fires (with related provision of specific training in high-risk areas).

Aid for the development of sustainable beekeeping integrated into its environment and respectful of biodiversity is rarely granted and would nevertheless be a good indicator of the direction to be followed for harmonious development.

Scientific Commission for Beekeeping Technology and Quality
Etienne Bruneau, President

Beekeeping in the Atlas region, Morocco - Photo: Etienne Bruneau

The advance of agriculture, the destruction of natural environments, the contamination of bee forage lands with pesticides and the appearance of new bee diseases make honey an increasingly scarce, difficult and expensive-to-produce natural food.

Bees are sensitive sensors of environmental contamination and have the capacity to raise the first alarms of contamination. In the same way, beekeepers, who learn from their bees, have a generalized sustainable behaviour and are very respectful about sustainable production patterns.

A recent collaborative study, in which Apimondia participated, showed that the motivation for beekeepers to turn to organic production schemes is driven by environmental, veterinary and consumer health concerns and not due to economic reasons. Beekeepers' conviction is strong enough to support even scarcely profitable business.

Scientific Commission for Beekeeping Economy
Norberto Luis García, President

One of the many beekeeping supply stores in Riyadh, Saudi Arabia - Photo: Gilles Ratia

Healthy bees, well adapted to local conditions, contribute to sustainable agricultural production and resilience of agricultural systems, by utilising and improving natural floral resources and without dispersing infections. Unhealthy bees on the other hand require more efforts, are not productive, use more chemical substances and they do not live in harmony with the environment.

Scientific Commission for Bee Health
Fani Hatjina, President
Jeff Pettis, President of Apimondia and former President of the Commission for Bee Health

Regional Commission for Africa

David Mukomana, President

Contributions from:
The Uganda National Apiculture Development Organisation (TUNADO)

The Regional Commission for Africa President having a discussion with the Batwa Community members about their quality honey during the Uganda Honey Week in August 2019 - Photo: David Mukomana

Honey consumption has been part of life in many African communities. The Batwa community in Western Uganda is known for striving to preserve its way of life in the forests with honey as part of their main diet. The Government of Uganda and other development partners are working to integrate them into programmes that make them adopt better beekeeping practices so they can help conserve the forests and also earn a living through honey sales. This has seen the creation of the Bwindi Mgahinga Conservation Trust (BMCT) which is doing tremendous work in South-Western Uganda.

The current consumption of honey in many African communities has been more associated to cultural reasons, including for marriage functions and in local brews. However, there has been an increase in awareness of the medicinal benefits of honey thus creating a surge in demand for honey.

The Regional Commission is working on creating awareness that will encourage honey consumption as part of the family diet including children, similar to programmes in Slovenia where school-going children have honey as part of their breakfast.

Regional Commission for the Americas

Lucas Martínez, President

Honey is produced in every country - honey samples for the international beekeeping contest at the Apimondia Congress 2011 - Photo: 42nd Apimondia Congress Local Organising Committee

The increase in demand for natural products is generating a new pattern of consumption, especially in the economic strata with greater purchasing power, which are the ones that often set the trends, which the low average economic strata will try to replicate as symbols of success.

It is becoming increasingly clear that the globally implemented agro-industrial model produces "food commodities" and not food, and that to do so they poison the environment and displace rural populations. Today agroecology is seen as a paradigm shift, not only producing in another way but with another concept of consumption and maintenance of natural resources. It is not necessary to invest large amounts of fossil fuels and synthetic products to produce and generate food. You have to take care of the land, the water and the air. In this sense, beekeeping is inserted as a strategic link in agro-ecological production.

We must generate new systems of how beekeepers and the rural population in general offer their products. Today the younger population uses online shopping; they no longer go to the markets to look for food, they purchase it through their smartphones with dedicated applications since they trust the quality of the products. In order to compete with processed products, we must train beekeepers and farmers to implement these technologies, otherwise the trends will always be manipulated by beautiful images of natural fruits and vegetables from the great intermediaries of food production, the supermarkets.

Regional Commission for Asia

Cleofas R. Cervancia, President

The presence of several species of honey-producing bees is an advantage; however, sustainable honey harvesting techniques for giant bees that are practiced in most Asian countries will ensure continuous productivity of the bees.

Regional Commission for Europe

Róbert Chlebo, President

Products of the hive, except honey, are not defined in the EU Honey Directive and this omission works against implementing an effective sectoral policy and impedes quality-based approaches and the fight against fraud and adulteration. It acknowledges the role of consuming locally-produced honey that can provide viability of honey producers, as they are unable to compete with global market prices.

Solutions for most of European countries include promoting the direct sale of honey at local markets, public honey tastings, workshops and other events, boosting local and regional sales of honey, in particular organic honey, support for short supply chains through their rural development programmes and promoting high-quality products based on geographical indication schemes.

Log hives in Poland - Photo: Fani Hatjina

Education and further training for beekeepers and fiscal policy incentives (e.g. tax exemption for beekeeping activities) would help beekeepers to thrive.

The European Landowners' Organisation (ELO), the European Agricultural Machinery Association (CEMA) and the European Professional Beekeepers' Association (EPBA) since 2014 promote the contest "The European Bee Award", highlighting innovative projects from all across Europe aiming at the protection of pollinators, among others in farmed environments. EU beekeepers, especially via EPBA, also promote a shift from chemical to digital plant protection schemes, which offer sustainable solutions also for small and medium food producers in Europe.

Regional Commission for Oceania

Jodie Goldsworthy, President

The question of human consumption and production of food is absolutely on the minds of policy makers and governments worldwide. Within the Oceania region, New Zealand leads the way in programmes such as "Trees for Bees" which help to make farms more bee-friendly and thereby help to build productivity for bees and farmers. These efforts are designed as a response to growing consumption and demand for food.

The Australian Government is investing in a more holistic ecosystem management approach through increased effort to plant more trees through its "Landcare" programme. Such programmes help to provide more bee flora and food and support bee populations essential to underpinning pollination.

A group of beekeepers attending their apiary in Papua New Guinea

So far, the issue of access to native forests for honey bees in Australia is a challenge and a matter of concern for beekeepers, as resource security threatens the growth of the industry and future pollination services. The Australian beekeeping industry is working hard to address this problem with policy makers and other stakeholders.

13 CLIMATE ACTION

Bees and trees are crucial parts of the solution for climate change.

Bees depend on a healthy environment with unpolluted flowering plants in agriculture and natural areas. Beekeepers are among the first to experience the negative consequences of climate changes through the massive destruction of forests and the changes in agricultural production patterns. Beekeepers around the globe and Apimondia are actively promoting sustainable production patterns and planting of forests with great diversity of species.

Setting fire may seem counter-intuitive. Yet this beekeeper is deliberately burning off patches of grass in the forest early in the season (June) whilst the grass has some moisture in it and the ambient temperature is still cool. This action keeps the fuel-load down and prevents hot burns later in the season (September-October) which can kill tree seedlings and saplings and it also prevents the melliferous flowers from being scorched during the nectar flow. This action protects the forest!
Photo: © Bees for Development

Scientific Commission for Beekeeping for Rural Development
Nicola Bradbear, President

Honey bees are essential for the restoration of degraded habitats, and policies must pay regard to ensuring support for the apicultural sector.

Some researchers estimate that bush fires make up 5 to 10 percent of annual global CO_2 emissions each year. Beekeeping has a role to play in reducing the incidence of forest fires.

Honey and beeswax exported from Africa come from forests, harvested via forest beekeeping systems. Forest beekeeping is a system which has developed spontaneously as an effective and practical way to harvest honey from floral resources in large forests and is an extensive (not intensive) natural resource management system which means that large forest areas are needed to produce one tonne of honey. In Zambia beekeepers protect their forest hive sites from late season fires through early burning. They do this to protect their hives from damaging late-season fires and to prevent the melliferous flowers from being scorched during the nectar flow; at the same time this action protects seedlings and saplings. Research done in Zambia suggests that beekeepers in Mwinilunga harvest 1,000 tonnes of honey, from perhaps 15,000 km^2 of forest, and in doing so reduce the incidence of bush fires in these forests (Lowore, 2018).

A forest regeneration project in El Salvador - Photo: © Bees for Development

Scientific Commission for Pollination and Bee Flora
Alessandra Guidotti and Abram J. Bicksler, FAO

Among the many threats affecting pollinators, climate change has a huge effect and the potential to badly impact the ecosystem services provided by pollinators: it can lead to changes in the phenology of plants and pollinators, disturbing and mismatching their usual interactions. The consequences of this altered balance are then reflected on the ecosystems and agro-ecosystems through loss of production, increased pests and diseases and higher fragility of ecosystem structures.

For this reason, it is important to ensure a diversity of pollinators and to encourage a holistic and comprehensive approach to the farming system and surrounding landscape with the aim of constructing more resilient systems that are less vulnerable to the impacts of climate change.

Scientific Commission for Beekeeping Technology and Quality
Etienne Bruneau, President

As bees are environmental insects, climate change has a very significant impact on their biological cycle, on the development of their pathogens, on their production both in quality and quantity.

It is mainly climatic events that have a direct impact on the colonies: of course, floods or fires can occur, which fortunately remain limited to relatively confined areas, but it is above all periods of cold, excessive heat, drought or continuous rainfall that will impact the bees, sometimes causing colony deaths. There are more and more shifts in the flowering of plants that are no longer in phase with their preferred pollinators. Honey bees, as a generalist present all year round, can then fill in these gaps. Beekeeping production, and more particularly honey, is even more variable than in the past and new honey varieties and the disappearance or regression of others are observed. In such a context, the honey market is particularly unstable, which generates price fluctuations on the markets, especially on the specific honeys harvest (acacia).

Specific training should be provided to help beekeepers cope with these new production conditions.

Beekeepers can no longer follow a relatively fixed schedule as in the past, but they must be able to react quickly depending on colony development, bee flying conditions and potential honey sources. This requires great adaptability and the ability to orient the production towards one product rather than another (honey, pollen, swarms). As a result, the traditional market channels must also be reviewed. The amount of work required is generally increased as well as the variability of the results, which makes professional farms very vulnerable.

It is urgent to be able to find new forms of insurance to at least cover extreme cases, especially if they are repeated, otherwise many people who derive their main income from beekeeping will disappear.

Scientific Commission for Apitherapy
Cristina Mateescu, President

The decline in bee populations is a very serious threat to a wide variety of bee- and insect-pollinated plants, critical to food resources and, as a result, to human well-being and livelihoods. Bee losses, due to many causes among which the use of new generations of pesticides and temperature differences due to climate change, can affect many nutritious crops like fruit and vegetables essential for a healthy nutrition.

When flora visited by bees is affected, the quality and the yields of bee products obtained can be reduced. Such a phenomenon can also affect human health, as the availability of good quality products for apitherapeutic applications can be severely affected as well. Honey bees need to be safeguarded in order to keep a healthy environment and, through its products, to help fighting against hunger, malnutrition and poor health condition.

Scientific Commission for Beekeeping Economy
Norberto Luis García, President

Apimondia, and all its associate members, constantly approach authorities to highlight the negative impact of some inadequate measures currently applied to industrial and agricultural development models.

It is well known that the main strategic value of beekeeping is not honey but pollination of both commercial and wild plant species. Through the maintenance of economically sustainable beekeeping operations, the pollination of many crops and the protection of plant biodiversity can be assured.

Scientific Commission for Bee Health
Fani Hatjina, President
Jeff Pettis, President of Apimondia and former President of the Commission for Bee Health

The Bee Health Commission works on raising awareness on the negative impact of adverse environmental conditions on the health and survival of bees and proposes corrective actions, also in collaboration with beekeepers. We also work on resilience of local adapted bees as they show better survivability and some signs of resistance to pests and diseases.

Keeping healthy bees does not require special inputs or equipment and, if indigenous races of bees are managed, the bees themselves can often fight the diseases. Bees adapted to local conditions as well as to climate change, should also be in connection with the adaptability changes of the plants.

Regional Commission for Africa
David Mukomana, President

Contributions from:
Apimondia Regional Commission for Africa Idai Cyclone Reports (Mozambique, Malawi and Zimbabwe)

The effects of climate change have been felt in the African Region in a devastating way with cyclone Idai that hit Mozambique, Zimbabwe and Malawi. Whilst there is not much that could have been done to avoid the catastrophe, measures can be taken to ensure the impact of such natural disasters is limited.

Trail of destruction, such is the impact of climate change. A picture taken from Chimanimani, Zimbabwe after cyclone Idai, showing the extent of damages caused by the cyclone in Zimbabwe, Mozambique and Malawi in 2019 - Photo: David Mukomana

Effects of climate change: after the flooding, Kenya - Photo: Ernst Muthomi

Part of a Game Management Area (GMA) in Zambia that has been set on fire destroying a huge portion of forest. One of the reasons for such is accidental fires starting from small fires started and left during honey hunting - Photo: David Mukomana

Of all the mitigation measures that can be taken, beekeeping is the best option to take given the fact that beekeeping, in its multiple dimensions, positively contributes towards improving the environment. These include planting of trees for additional forage for bees, discouraging cutting down trees and provision of fire guards. Apimondia, through the Regional Commission for Africa and the Scientific Commission for Beekeeping for Rural Development, made an appeal for assistance in order to help restore livelihoods to many beekeeping communities whose apiaries were impacted by the cyclone. Part of the intervention measure is providing training and tree seedlings to reclaim the damaged areas.

And probably the boldest step African governments need to take is the banning of commercial trade in charcoal!

Regional Commission for Asia
Cleofas R. Cervancia, President

A review of Aryal et al. (2020) indicates that the adoption of better soil, water, nutrient management practices and technologies has enormous potential to reduce GHG emissions from agriculture, thereby contributing to the mitigation of climate change. Many existing practices and technologies have the potential to improve both adaptation and mitigation in agriculture which can significantly contribute to complying with nationally determined contributions (NDCs) of South Asian countries. However, barriers to the adoption of GHG mitigating agricultural practices, mainly the financial and institutional barriers, need to be appropriately addressed to achieve the desired level of mitigation.

Regional Commission for Europe
Róbert Chlebo, President

The deterioration of the environment owing to the growing impact of human activity, the spread of intensive farming, the increasing use of plant health products and climate change are causing high mortality rates among bees and a drastic reduction in the number of bee colonies. Many of the predicted consequences of climate change, such as a temperature increase, a change in precipitation patterns and extreme or less predictable weather events, will have an impact on pollinator populations.

Lead causes of the global climate crisis are man-made and their solution requires rapid, far-reaching and unprecedented changes in all aspects of society. These include a radical shift in global energy production to renewable energy sources and a fundamental transformation of land use, especially in the way we produce our food.

Models based on agro-ecological principles promote biodiversity and bee-friendly practices. “Bee Friendly” is a European label that aims to identify and promote pollinator-friendly products and production systems. This label is developed, managed and secured by the Bee Friendly Association, created in 2011. Bee-friendly practices limit the use of pesticides to molecules that do not harm the bees, but also encourage farmers to

implement other practices beneficial to bees and pollinating wild fauna such as planting hedges, crop diversification and others.

Regional Commission for Oceania
Jodie Goldsworthy, President

Beekeepers in the Oceania region are referred to as the original conservationists. They have always acted to preserve and conserve forests for the benefit of mankind and honey bees. The beekeeping industry in New Zealand has been responsible for the conservation and regeneration of manuka trees which play such an important part of their industry.

Beekeepers also act to raise awareness on the importance of the forests as a source of nectar and pollen for their bees and help the public to understand that acting to conserve our ecosystems is important. They also play a role in protecting biodiversity for other pollinators and raising awareness on the impact of certain agricultural practices (e.g. pesticide use), biodiversity and other pollinators in addition to honey bees.

The beekeepers within Australia and New Zealand are well practiced in lobbying Government for better protection of our environment to support honey bees and underpin food security.

Australian beekeepers are active protecting the natural eucalyptus forests as they are vital to their honey production - Photo: Asger Søgaard Jørgensen

14 LIFE BELOW WATER

Restoration of coastal margins is essential - mangroves and other habitat types are useful for bees and bring welcome income opportunities.

Beekeeping offers an opportunity to create income from mangrove areas as in the case of the long tradition in the Sundarbans of India. In the Philippines, research has shown that more species of bees can be used with success to create income and improve pollination of mangroves, thus helping to incentive people to protect this important ecosystem.

Mangrove is excellent for beekeeping - here a beekeeper with one of his hives in Zanzibar
Photo: © Bees for Development

Scientific Commission for Pollination and Bee Flora
Alessandra Guidotti and Abram J. Bicksler, FAO

Terrestrial and aquatic ecosystems are linked through nutrient and energy cycling and are therefore indirectly linked by pollinator health, since 90 percent of wild flowering plant species depend, at least in part, on the transfer of pollen by animals (Potts et al., 2016) in order to reproduce and lead healthy lives.

Restoring mangrove - a newly planted seedling in Banda Aceh, Indonesia - Photo: © Bees for Development

Scientific Commission for Bee Health
Fani Hatjina, President
Jeff Pettis, President of Apimondia and former President of the Commission for Bee Health

Bees do not survive in the water or in the sea and they do not pollinate plants in the water. However, they do support the coast line vegetation by pollination. The close relationship between bees and the Mediterranean aromatic plants is well documented.

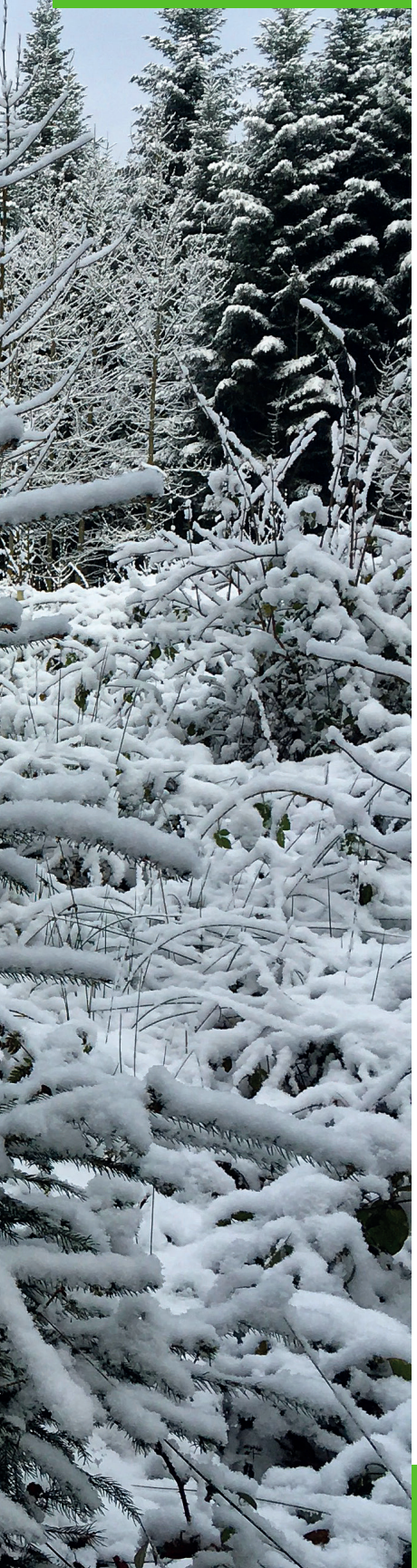
Hives near the sea for thymus honey, Greece - Photo: Gilles Ratia

Regional Commission for Asia
Cleofas R. Cervancia, President

In Krabi province, Thailand, beekeeping contributes to supporting sustainable livelihoods in mangroves and community-based conservation. The registered community enterprise was formed from the Khaokram Mangrove and Coastal Conservation Group. The group restored mangrove forests surrounding its village, and uses bees to assist with pollination. Currently, Nai Nang Apiculture Group has 51 members, of whom 40 men are beekeepers and 11 women are value-add honey product producers. A total of 318 constructed hives (with 216 hives that have been colonised) have been installed in the village orchards. Approximately 400 kilograms of honey were produced.

Beekeeping has also been established in a mangrove area in the Philippines since 2012. Almazol (2012) started with three species, *Apis mellifera, Apis cerana* and stingless bee *Tetragonula biroi*. The colonies were set up in strategic locations within the mangrove forest. They were observed for the pollen sources and adaptability. Results of the study revealed that 49 species of plants were foraged by the bees, 13 of which were classified as mangrove species. *T. biroi* is the most adaptive; it has the highest survival rates and the population multiplied three times in a year. Moreover, it visited more plants than *A. mellifera* and *A. cerana.* Pollen and nectar are the basic resources collected by the bees which can be utilised by man as a renewable, seasonal benefit through sustainable beekeeping management. It is also recommended that bees should be mass produced in the area as part of the mangrove ecosystem management and conservation of genetic resources.

15 LIFE ON LAND



Flowering forests are full of bees and can be full of beekeepers too: beekeeping gives people financial incentive to protect habitat - including forests.

Beekeeping is a sustainable form of agriculture which is not detrimental to the environment, and indeed provides economic reasons for the retention of native habitats. Forest beekeeping uses locally available and renewable resources and helps to involve the local people in the protection of the forest diversity. Apimondia is actively promoting the protection and the management of the environment in a sustainable way.

Snow-mantled hives in the Canton of Bern, Switzerland - showing the bee's adaptability to extreme weather conditions
Photo: Jeff Pettis

Scientific Commission for Beekeeping for Rural Development
Nicola Bradbear, President

Forest beekeeping in Ethiopia - Photo: © Bees for Development

Apiculture is a sustainable form of agriculture which is not detrimental to the environment, and indeed provides economic reasons for the retention of native habitats.

The people who live in tropical forests are amongst the poorest in the world and depend on shifting cultivation for their food, and wood as their fuel source. If tropical forests are to be conserved, then local people must be assured of sources of food and income which are sustainable without being environmentally harmful. Beekeeping fits this category perfectly: using locally available, renewable resources; forest beekeeping is perhaps the most environmentally-sound, income generating activity. Conservationists understand that habitats cannot be protected without the interest and involvement of local people. By ensuring that beekeepers are supported and have access to good markets for their products, people will be encouraged in local conservation efforts; for example, Lake Tana Biosphere Reserve, Nilgiri Biosphere Reserve.

There is growing evidence of the link between beekeepers and the maintenance of forests. Nshama (2003) reported that beekeepers in Tanzania were aware of the importance of sustaining biodiversity and bee fodder plants, and Lalika and Machangu (2008) found beekeepers protected the forest around their hives and actively discouraged people from cutting timber.

Endalamaw (2005) reports that Ethiopian beekeepers know the best tree species for foraging bees and make efforts to maintain the ecosystem that supports the whole process of beekeeping. His research showed that 97% of beekeepers were involved in at least one form of forest enhancement activity ranging from protecting and preserving big trees, tending and protection of younger trees and tree planting. 34% of beekeepers reported that they work for the conservation of the forest by lobby, local discussion and, in some cases, by reporting free riders to officials and in some areas beekeepers entered into local agreements to reduce the causes of bushfires (Endalamaw, 2005). Of particular interest is the beekeeping-based customary tenure system called kobo - a system where beekeepers claim ownership of part of the forest.

"In kobo ..... trees are properly managed and promising trees that could be a good nest tree will be tended and protected from damage. Beekeepers remove less vigorous trees to avoid competition on potential hive hanging trees. Maximum protection is made to avoid damage to standing trees while felling trees for hive making or other purposes" (Endalamaw, 2005:51).

Kyrgyz herb rich pasture provides abundant forage for bees - Photo: © Bees for Development

In the world there are about 200,000 species of pollinators: not only bees, but also beetles, flies, butterflies, little mammals such as bats and mice, and birds. Regarding bees, there are over 25,000 different species, all with distinctive characteristics (FAO, 2008). The honey bee is certainly the most popular, but the majority of these species are solitary bees that nest in the ground or in tree cavities. There are also other social bees, such as the stingless bees, particularly common in the tropics and whose diversity is essential for ecosystem health, crop pollination and livelihoods.

Biodiversity of food sources for bees - Photos: Fani Hatjina

Pollinators are key instruments for the maintenance of biodiversity since they provide the essential ecosystem services which allow the stability of the ecosystems through the reproduction of plant species and the production of food, natural fibres, fuel and wood. Pollinators have the potential to serve as a proxy for overall ecosystem health and to monitor biodiversity losses.

Scientific Commission for Pollination and Bee Flora

Alessandra Guidotti and Abram J. Bicksler, FAO

Scientific Commission for Beekeeping Technology and Quality
Etienne Bruneau, President

Today, when we talk about the development of beekeeping, we must be very attentive to the maintenance of biodiversity and the balances in place in the environment. The implantation of colonies should always be linked to a prior study of the area's melliferous potential and to an assessment of the impact that the implantation of too many colonies could have on other pollinators. Similarly, breeding programmes should take into account the importance of maintaining a high biodiversity of the local gene pool by limiting the use of genetically reduced lines (fertilisation with a limited number of males or with brother males) for research purposes.

Scientific Commission for Beekeeping Economy
Norberto Luis García, President

The greatest contribution of bees and other insects is pollination. In the community of pollinators, the honey bee stands out as the most economically valuable pollinator of crop monocultures worldwide; yields of some fruit, seed and nut crops decrease by more than 90% without these pollinators.

Apis mellifera carnica pollinating *Aster alpinus* - Photo: Peter Kozmus

The cultivated area of pollinator-dependent crops is expanding more rapidly than the area of pollinator-independent crops. Over the past 50 years, the amount of crops that depend on pollinators (i.e. fruit, vegetables, seeds, nuts and oilseeds) has tripled. The annual global production of food that depends directly on pollination has been estimated to be worth between USD 235 and 577 billion.

In terms of ecosystem health, approximately 90% of wild plants rely on pollinators that support wider biodiversity. Therefore, the protection of the economic sustainability of beekeeping operations is a food security issue, thereby determining the capacity of countries to provide their own food.

Scientific Commission for Bee Health
Fani Hatjina, President
Jeff Pettis, President of Apimondia and former President of the Commission for Bee Health

Recent colony losses have been attributed to human disturbances to the environment such as intensive agriculture, deforestation, soil degradation, loss of biodiversity, whereas honey bees as well as non-managed bees are the ones that provide support to the ecosystem, maintain floral biodiversity and ensure sustainable agriculture.

Beekeepers, fighting for healthy bees and searching for nutritious food sources for them, act as protectors of the environment; they help in the restoration of the forests, woodlands and wetlands and try to collaborate with farmers for lesser use of pesticides and improving the natural habitats.

The bees themselves do support the ecosystem and increase biodiversity of plants by their foraging behaviour. Healthy and well adapted bees do prefer and support the survival and reproduction of local plant biodiversity and not of alien species.

UN SDG 15 makes every sense in Africa especially with the need to protect and conserve the natural forests that are under serious threat from a number of factors including agriculture, mining and urbanisation. Many countries in Africa have regulations protecting natural forests. Countries such as Malawi and Zambia have Game Management Areas (GMAs) where commercial activities including human settlements are prohibited. Other countries have these large tracks of land under government control through the National Parks. However, these forests are under threat from neighbouring communities who feel have been marginalised from benefitting from their natural resources and wildlife in these protected areas.

There is increasing pressure on governments to reconsider the land-use for these protected areas so as to allow beekeeping initiatives by the neighbouring communities. A classic example is the initiative in Tanzania where one forest in Iglansoni has been demarcated for commercial beekeeping where investors buy pieces of land to put their hives. The Regional Commission President recently attended a follow-up meeting in Dodoma with Savings and Credit Co-operative (SACCO) that has passed a resolution to invest in 1,000 acres (405 hectares) for beekeeping and is at an advanced stage to conclude land-use approval with the Government of Tanzania. This came as a result of one of the society members attending the 46th Apimondia Congress in Montreal, Canada in September 2019 to confirm the viability of beekeeping. The value in beekeeping, as a strategy to sustainably manage forests, is paying off with other surrounding district councils now resolving to look for investors to invest in beekeeping in forests under their control so as to curb deforestation.

This is what Apimondia and the Regional Commission for Africa is pushing many communities to do in Africa as a way of managing forests in a sustainable manner. With more partnerships, especially with stakeholders that are in the environmental conservation space, Apimondia has confidence in Africa being the major producer of honey.

Regional Commission for Africa
David Mukomana, President

Contributions from:
Solidaridad - Zambia Office
Tanzania Mentors' Association (TMA)
Savings and Credit Co-operative (SACCO)

A picture at one of the roadside honey shops along the Dodoma - Mwanza Highway (Tanzania) taken by the Regional Commission President in February 2020 when he had a stopover to discuss with the roadside honey traders. The words in Kiswahili mean "Conserve forests to get honey". Such positive but simple campaigns are encouraging especially when done by community members - Photo: David Mukomana

Roadside honey stalls - Photo: David Mukomana

There is no production of food closer to nature than beekeeping. The environment is the great foundation factor of beekeeping; bees are the first monitors of the presence of agrochemicals, they change their behaviour and become sensitive because they are part of the ecosystem, like many other insects, which do not have beekeepers to take care of them.

There is no more effective way to not only stop the loss of biodiversity, but to increase it, than keeping bees - both native as well as those introduced several decades ago - which lead us to debate whether they are as adapted as native bees.

As stated in the previous objective, agroecology and, within it, beekeeping regenerate deteriorated environments.

Regional Commission for the Americas
Lucas Martínez, President

Queen rearing station in Chile - Photo: Riccardo Jannoni-Sebastianini

Regional Commission for Asia
Cleofas R. Cervancia, President

As-One Tree Planted's projects across Asia are helping rebuild the habitat of critically endangered species like orangutans, tigers and more than 1,700 species of birds and bees. These projects are creating jobs and providing sustainable, long-term income for communities so people and forests can live together in harmony.

Continuous education on the role of bees in biodiversity maintenance, sustained information dissemination on reforestation and bee pasture development in agricultural areas is crucial. The majority of the Asian countries are harnessing the potential of native bee species for pollination and production of valuable hive products. This strategy improves the pollination efficiency. We hypothesize that native plants are best pollinated by native pollinators. A milestone in Asian beekeeping is the development of stingless bee technologies for large scale pollination of high value crops - such as mango, lansones and rambutan.

Apiary in Hubei Province, China - Photo: Dr. Wei Shi

The health benefits of honey are well recognized. In less developed countries in Asia, honey can be a substitute for the expensive pharmaceutical products. It is therefore important to produce authentic honey. Through the Asian Apicultural Association and TECA - FAO moderated discussions, we have developed the Standard for Tropical Honey. The major amendment from *Codex Alimentarius* Standard is the moisture content of 23% for wild honey.

Bee pasture development has been promoted in an agro-ecosystem and disaster-hit areas. We observed the return of the pollinators with the increase in pasture. The pasture sustains the pollinator population when the crops are not in bloom.

Sourcebook and reference materials for Asian bee and beekeeping are available. These are "Asian Beekeeping in the 21st century" (Chantawannakul et al., 2018) and "The Pollination of Cultivated Plants: A Compendium for Practitioners" (Roubik, 2018). Several books on stingless bees were published by Abu Hassan Jalil (2014).

We have crafted a project proposal on Asian pollination (APM) for sustainable food security and biodiversity maintenance. At least three countries in Asia will be involved in this project.

A beautiful nest of *Apis dorsata* in central-east Malaysia - Photo: Gilles Ratia

The tropical regions of Asia enjoy high pollinator diversity. Its rich vegetation and mild climate support the population of pollinators. Solitary and social bees are among the important pollinators that contribute largely to species richness in the tropics. Particularly with bee pollination, the probability of reproductive isolation between plant populations is greatly increased with resultant increase in speciation rates (Dressler 1968, Dodson et al. 1969). Increased speciation rates will produce greater species diversity in tropical regions where the proportion of animal pollinated plants is highest (Price, 1997). The proportion of animal-pollinated species rises from a mean of 78% in temperate-zone communities to 94% in tropical communities (Ollerton et al., 2011). The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES, 2016) assessed the values, status and trends in pollinators and pollination and drivers of change, risks and opportunities, and policy and management options for pollinator conservation.

Despite the importance of pollinators in agriculture, data regarding pollinators in the Asian region, including native bee species, have been scant and estimated using widely varying methods. In order to bridge this gap, it is necessary to survey the state of pollinators in the region (on a country-by-country basis), their

diversity and relative abundance using harmonized methods of assessment. This project then aims to showcase a model for Asian pollination with consideration of pollinator diversity and threats. The specific objectives are as follows: 1) to create a database on pollinator species and their relative abundance, 2) to identify vulnerable scenarios for pollinators, 3) to study the pollination biology of selected crops and 4) to craft conservation strategies for pollinator conservation.

Regional Commission for Europe
Róbert Chlebo, President

Honey bees, wild bees and other pollinators perform fundamental ecosystem and agricultural services by pollinating flowers, including crops, without which European agriculture, in particular the cultivation of entomophilous plants (plants pollinated by insects), would not exist. Strengthening of biodiversity is beneficial not only for the bees' continuous existence and repopulation, but also for crop yields.

Crop pollinators, including honey bees, pollinate over 80% of all crops and wild plants and contribute at least Euro 22 billion each year to the European agricultural industry.

A small productive beeyard in the forest - Photo: Asger Søgaard Jørgensen

Plant biodiversity is fundamental for the health and wellbeing of bees, providing them with foraging grounds and natural and semi-natural habitats along with extensive permanent pastures. Gradual disappearance of valuable bee fodder plants - such as cornflowers, vetches, thistles or white clover - is caused by the inappropriate use of plant protection products, the decrease in the use of grassland for grazing and the increased use for hay production; this results in a lack of pollen and causes malnutrition in bees, which contributes to the decline in bees' health and their increased susceptibility to pathogens and parasites.

The Common Agricultural Policy (CAP) of the EU is supporting beekeeping and also potentially improving the environment and biodiversity through various tools, such as crop diversification measures, ecological focus areas (EFAs), Natura 2000, organic farming, other agro-environmental measures which help to establish bee colonies and climate protection measures of the European Innovation Partnership.

Mutual early warning systems among farmers and beekeepers, foresters, scientists and veterinarians on spraying periods and other insecticide applications, prevention and control of diseases, technologies that are not harmful for bees and plant protection methods that minimise pollinator mortality should be promoted.

Agricultural policies that were one-sidedly geared towards increasing yields by increasing the use of toxic agrochemicals have brought the ecosystem to the brink of instability. The EU has introduced temporary restrictions on the use of four neonicotinoid insecticides (clothianidin, thiamethoxam, imidacloprid and fipronil) in order to mitigate the impact on bees; however, it is also necessary to eliminate the impact of other pesticides. The European Citizens' Initiative "Save Bees and Farmers" calls on the European Commission to support an agricultural model that allows farmers and biodiversity to thrive in harmony.

16 PEACE, JUSTICE AND STRONG INSTITUTIONS

The honey bee colony provides us with a wonderful example of cooperation for a cohesive society.

Apiculture and the formation of beekeeping associations and co-operatives help to generate self-reliance and can bring a valuable source of income to poor communities. Contacts among people are encouraged and beekeepers working co-operatively are able to access larger and more distant markets that individuals may not be able to reach. At international level, Apimondia is active in promoting and establishing contacts among beekeepers, scientists and international organisations.

Technical tour in Colonía Ortiz Basualdo of INTA: the perfect occasion for beekeepers to learn about local apicultural practices
Photo: 42nd Apimondia Congress Local Organising Committee

Scientific Commission for Beekeeping for Rural Development

Nicola Bradbear, President

Beekeeping helps to generate self-reliance and can bring a valuable source of income to poor communities. The formation of beekeeping associations or co-operatives encourages contacts between people, and beekeepers working co-operatively are able to access larger and more distant markets than may be possible for individuals.

Teaching how to build a clay hive in Vietnam - Photo: Asger Søgaard Jørgensen

Scientific Commission for Pollination and Bee Flora

Alessandra Guidotti and Abram J. Bicksler, FAO

Rogers Wasibi and Community Beekeeper Trainer Juliet Namono in Mbale, Uganda - Photo: © Bees for Development

Use and stewardship of pollinators can provide opportunities to strengthen ecological justice and strong institutions, especially among smallholders, indigenous communities and local peoples. As many Indigenous and Local Knowledge holders related to pollinators include indigenous and local peoples dependent on diverse ecosystems for their livelihoods, pollinator stewardship offers entry points for just land management and the strengthening of common property regimes in harmony with biodiversity increasing practices (Lyver et al., 2015). In addition, many cultures assign cultural and spiritual values to bees and pollinators, offering a chance to assign value to pollinators and the roles they provide that moves beyond a functional value.

Scientific Commission for Bee Health

Fani Hatjina, President

Jeff Pettis, President of Apimondia and former President of the Commission for Bee Health

Developing of beekeeping requires the strengthening of national institutions as well as international co-operation and strong data bases. In order to accomplish all the above, the Bee Health Commission of Apimondia works with beekeepers globally to provide information and training, in all aspects. One example is the international survey on toxicity records.

The democratic societies of the Oceania region showcase beekeeping as an important tool for inclusiveness. The growth in non-commercial beekeeping and the mentoring of new beekeepers by established commercial beekeepers help to build citizens who make a contribution to cultures founded on peace and justice. Our beekeepers are supported by governments and institutions that are based on accountability, transparency and inclusivity. The beekeeping industry structures are a training ground for building skills and knowledge in working collectively for the common good and a place where democratic processes build skills and experience important to a well-functioning peaceful and respectful society.

Regional Commission for Oceania
Jodie Goldsworthy, President

17 PARTNERSHIPS FOR THE GOALS

Apimondia - always working hard to ensure good connections between beekeepers and their associations.

Apimondia and its Commissions actively co-operate with many international scientific and normative institutions. On account of its vision for a sustainable development and benefitting from its membership from all over the world, Apimondia holds adequate capacity, network and expertise to engage in global partnerships with national and international organisations sharing the same values.

Opening ceremony of the 41st Apimondia Congress in Montpellier, France 2009 - the Apimondia International Congresses have been promoting the connectivity among beekeepers from all over the world since 1897
Photo: Gilles Ratia

Scientific Commission for Beekeeping for Rural Development
Nicola Bradbear, President

Beekeepers and their representatives meet in North Macedonia - Photo: © Bees for Development

Beekeeping is an environmentally friendly activity from which people create incomes and enjoy their interrelationship with nature. Good international networks exist, that foster sharing of knowledge and global partnerships, with young people increasingly interested and involved in engaging with this sector.

Scientific Commission for Pollination and Bee Flora
Alessandra Guidotti and Abram J. Bicksler, FAO

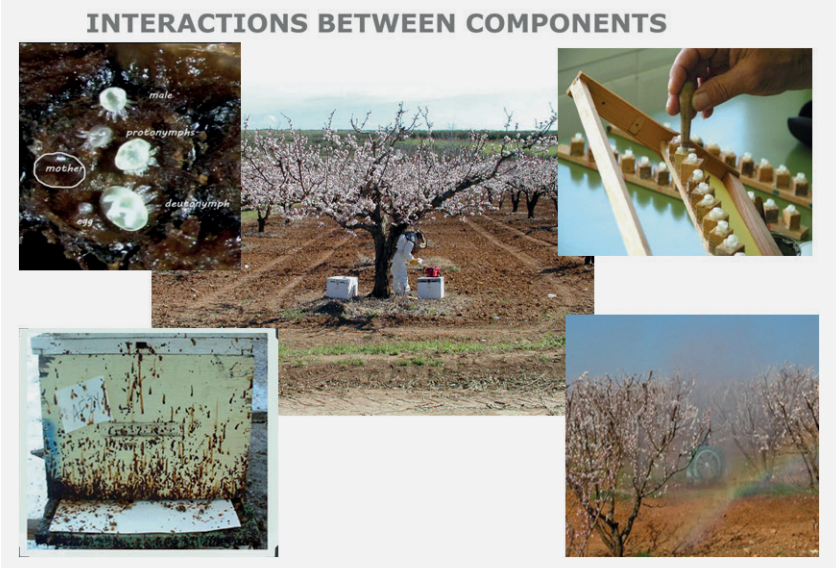
Partnership for the goals. From the Apimondia Congress 2009, Montpellier, France - Photo: Asger Søgaard Jørgensen

Currently there are several national and international networks and associations working at international, national and regional levels, which aim to promote the sharing of knowledge about pollinators, the conservation and the preservation of pollinators' biodiversity, a more sustainable approach to agriculture and a more sustainable production and consumption system. Included in this approach is the co-creation of knowledge among producers, Indigenous and Local Knowledge holders, local traders, academia, researchers and governance actors to develop more holistic ways to manage pollinators and the ecosystems (including agro-ecosystems) of which they are a part and to which they contribute.

Since 2000, the Food and Agriculture Organisation of the United Nations (FAO) has worked on the International Pollinators Initiative (IPI). The first phase of the IPI took place from 2002 to 2015 with the purpose of monitoring declines of pollinators, gathering taxonomic information, assessing economic values and the impact of decline of pollination services, and promoting conservation, restoration and sustainable use of pollinator diversity in agriculture and related ecosystems. The second phase was launched in 2018 and will continue until 2030 with the aim to promote co-ordinated worldwide action to enable policies and strategies, support field-level implementation, engage civil society and private sector actors, and promote monitoring, research and assessment for the conservation and sustainable use of pollinators (CBD, 2018).

The Bee Health Commission of Apimondia is very active in collaborating with different world organisations, such as EFSA and COLOSS, by participating as a stakeholder in the revision of the Bee Guidance Document and, through its members, in the development of the ApisRAM model for risk assessment.

Scientific Commission for Bee Health
Fani Hatjina, President
Jeff Pettis, President of Apimondia and former President of the Commission for Bee Health



Interactions of stressors taken in consideration in the ApisRAM model for risk assessment - Photos: Fani Hatjina

Furthermore, the Bee Health Commission, by forming a team of experts around the world, promotes the well-being of bees and humans as well as sustainable, inclusive and improved economic growth all around the world.

The global network of the Scientific Commission for Bee Health

Sustainable development in the beekeeping sector in Africa requires partnerships among many stakeholders at local, national, regional and international level. Though there has been a lot of support in the beekeeping sector in Africa, considerable resources are lost due to duplication of efforts and lack of proper co-ordination.

Regional Commission for Africa
David Mukomana, President

Apimondia in partnership with FAO can provide the basis on which proper and structured beekeeping co-ordination can be done at both resource mobilisation and execution level based on the experience and expertise at their disposal. Thus, a Memorandum of Understanding between Apimondia and FAO can create a solid basis on which other regional partnerships can be harnessed and channelled towards bringing the level of development in beekeeping to the point of contributing to the attainment of the Sustainable Development Goals (SDGs) in Africa as envisioned by the United Nations.

Regional Commission for the Americas
Lucas Martínez, President

The implementation of actions of international organisations in the region, in most cases, is carried out through the governments themselves, which at times fail on having established policies or tend to respond more to other interests and generate the problems they intend to combat. That is why the resources are never enough, since the interest and commitment do not respond to the objectives proposed in the SDGs.

The strategic alliance between international organisations and a network of beekeeping entities that share most of the concepts will strengthen the means to directly implement the proposed actions. If we start from the same interest, it is very likely that we can walk the same path and reach the same goal.

Apimondia Congresses: the perfect forum for beekeepers coming from every corner of the world - Photo: 42nd Apimondia Congress Local Organising Committee

The Apimondia International Congresses are a clear example of local development policies, since they generate an interaction among governments (national, provincial and local), international organisations (Apimondia, FAO, etc.) and private organisations (groups of local, regional, national beekeepers, equipment manufacturers, laboratories, exporters, etc.).

When an Apimondia Congress is organised, governments collaborate with private organisations so that companies or beekeeping organisations can show at their stand the products or services they can provide. At the same time, beekeeping organisations participate in scientific, technical and social activities, generating an interrelation among the different components of the sector.

A very unique case occurs when a country is the seat of an Apimondia Congress, since the interrelation and collaboration to serve visitors reaches its peak. On such occasions, greater local visibility of the beekeeping sector is achieved, which in turn generates growth and development since the exchange of scientific knowledge as well as social experiences can be put into practice.

In 2011 the 42nd Apimondia International Congress was held in Argentina. In the preparatory stages, the local entity (Sociedad Argentina de Apicultores) worked with the national government (through the Departments of Agriculture, Industry, Tourism, Interior, the Chancery), the governments and departments of the provinces, the technical and research organisations for the scientific programme of the Congress, the inspection agencies, the government of the host city, general and specialized media, international organisations - such as IICA and OIE, local governments where technical visits were hosted. All these entities worked with the same objective: not only for the Argentinian beekeeping sector, but for the whole environment where it took place.

Apimondia creates the best platform for stakeholders to partner and develop strong relationships that deliver value to the global economy

After the Apimondia Congress, beekeeping had a revival in the country. Many provincial governments had a real vision of what beekeeping is, what it can generate at social level as well as the technical needs involved in the production of genuine honey. This situation was not only positive for the host country, but also for the neighbouring ones such as Uruguay, Brazil, Chile, Paraguay, Bolivia and Peru, since it allowed the latter ones appreciate the importance of developing exchanges with visitors from different parts of the world.

Regional Commission for Asia
Cleofas R. Cervancia, President

Knowledge sharing on developed technologies is carried out during regular regional conferences. Collaborative researches among Asian countries have been forged and implemented. Asia also collaborates with Europe and the USA.

Regional Commission for Oceania
Jodie Goldsworthy, President

The apicultural scientific community and beekeepers from our region are well entrenched within global networks and are good at building global partnerships which help to support these sustainable development goals. Our region very much embraces global collaboration to solve problems and many successful international travels, both formal and informal, help beekeepers and scientists connect with others from around the world.

The Apimondia Congress held every two years is essential in supporting these global partnerships for our region and we are indeed grateful for the work of many around the world in maintaining and supporting this organisation and its connections with other important institutions. This region looks forward to working to help Apimondia transition to a better resourced organisation that can grow to build on its excellent foundations and play an even greater role in supporting global partnerships and these goals into the future.

References Cited

SCIENTIFIC COMMISSION FOR BEEKEEPING FOR RURAL DEVELOPMENT

Bradbear, N. 2009. **Bees and their role in forest livelihoods, a guide to the services provided by bees and the sustainable harvesting, processing and marketing of their products.** FAO, Rome

Bees for Development Journal, editions 1-136 **Focus on beekeeping for rural development world-wide**

Bees for Development Resource Centre: www.beesfordevelopment.org/resource-centre/

SCIENTIFIC COMMISSION FOR POLLINATION AND BEE FLORA

Apimondia. 2019. **Apimondia statement on honey fraud**
https://www.apimondia.com/docs/apimondia_statement_on_honey_fraud.pdf

CBD. 2018. **The International Pollinator Initiative Plan of action 2018-2030**
https://www.cbd.int/sbstta/sbstta-22-sbi-2/sbstta-22-ipi-draft.pdf

FAO statistics: http://www.fao.org/faostat/en/#data

FAO. 2018. **Why bees matter. The importance of bees and other pollinators for food and agriculture**
http://www.fao.org/3/i9527en/i9527en.pdf

FAO. 2008. **Rapid assessment of pollinators' status.** http://www.fao.org/3/a-i1046e.pdf

Klein, A.-M., Vaissière, B. E., Cane, J. H., Steffan-Dewenter, I., Cunnigham, S. A., Kremen, C., Tscharntke, T., 2007. **Importance of pollinators in changing landscapes for world crops.** Proceedings of the Royal Society 274, 303–313

Lyver, P., Perez, E., Carneiro da Cunha, M., Rou, M. (eds). 2015. **Indigenous and Local Knowledge about Pollination and Pollinators associated with Food Production.** Paris, France, United Nations Educational, Scientific and Cultural Organisation

Ollerton J, Winfree R, Tarrant S. **How many flowering plants are pollinated by animals?** Oikos. 2011;120(3):321–326

S. G. Potts, V. L. Imperatriz-Fonseca, H. T. Ngo, J. C. Biesmeijer, T. D. Breeze, L. V. Dicks, L. A. Garibaldi, et al. (eds). 2016. **Summary for policymakers of the assessment report of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services on pollinators, pollination and food production.** Bonn, Germany, Secretariat of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). 36 pages

Viuda-Martos, M., Ruiz-Navajas, Y., Fernández-López, J., Pérez-Álvarez, J.A. 2008. **Functional properties of honey, propolis, and royal jelly.** Journal of Food Science, 73: 117-124

Wendee, N. 2015. **Pollinator Power: Nutrition Security Benefits of an Ecosystem Service.** Environmental Health Perspectives, 123: A210–A215

SCIENTIFIC COMMISSION FOR APITHERAPY

Ajibola et al., 2012 - **Nutrition & Metabolism** volume 9, Article number: 61 (2012)

Hrncir, M., Jarau, S. & Barth, F.G. **J Comp Physiol A** (2016) 202: 597
https://doi.org/10.1007/s00359-016-1117-9

F.C. Lavinas, E.H.B.C. Macedo, G.B.L. Sá, A.C.F. Amaral, J.R.A. Silva, M.M.B. Azevedo, B.A. Vieira, T.F.S. Domingos, A.B. Vermelho, C.S. Carneiro, I.A. Rodrigues. **Brazilian stingless bee propolis and geopropolis: promising sources of biologically active compounds** Rev. Bras. Farmacogn. (2019), 10.1016/j.bjp.2018.11.007

Lowore, J. **How our organic honey changes lives**
https://thelondonhoneycompany.co.uk/blogs/news/organic-september-tree-top-honey

Guilherme Rabelo Coelho, Ronaldo Zucatelli Mendonça, Karina de Senna Vilar, et al., **"Antiviral Action of Hydromethanolic Extract of Geopropolis from Scaptotrigona postica against Antiherpes Simplex Virus (HSV-1)"** Evidence-Based Complementary and Alternative Medicine, vol. 2015, Article ID 296086, 10 pages, 2015 https://doi.org/10.1155/2015/296086

Salatino A., Pereira L.R.L., Salatino M.L.F. **The emerging market of propolis of stingless bees in tropical countries.** MOJ Food Process Technol.2019;7(1):27–29. DOI: 10.15406/mojfpt.2019.07.00215

Salles et al., **Nutrients**. 2014 Dec; 6(12): 5500–5516
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4276980/

Sanz ML, Polemis N, Morales V, Corzo N, Drakoularakou A, Gibson GR, Rastall RA., **J Agric Food Chem.** 2005 Apr 20;53(8):2914-21 https://www.ncbi.nlm.nih.gov/pubmed/15826039

SCIENTIFIC COMMISSION FOR BEE HEALTH

Apimondia - **International online survey on honey bee toxicity events**
https://docs.google.com/forms/d/1rg-24GTQuKeh9Z93ilkTgdxGcbWUlehuTWkBDCF47aQ/viewform?c=0&w=1

Apimondia - **Results from the international online survey on honey bee toxicity events (2014-2016)**
https://www.apimondia.com/docs/awg/AWG_9_toxicity_events_results_2014-2016.pdf

REGIONAL COMMISSION FOR AFRICA

Mukomana D. - **Detailed reports on the impact of cyclone Idai in Malawi, Mozambique and Zimbabwe**
https://www.apimondia.com/docs/cyclone_idai_report_malawi.pdf
https://www.apimondia.com/docs/cyclone_idai_report_mozambique.pdf
https://www.apimondia.com/docs/cyclone_idai_report_zimbabwe.pdf

REGIONAL COMMISSION FOR ASIA

Harvesting Honey from Giant Honeybees in Cambodia
https://www.youtube.com/watch?v=kyNR7ek65vE

Almazol A.E. **Paper presentation during the 11th Asian Apicultural Association Conference and ApiExpo at Kuala Terengganu, Malaysia on September 28-October 2, 2012**

Amanina Ahmad Safri, Nadia Izzati Nordin, Ummi Nasrah Talib, Siti Amrah Sulaiman, Mahaneem Mohamed, Mohd Zulkifli Mustafa (University Sains Malaysia)

Aryal, J.P., Rahut, D.B., Sapkota, T.B. et al. **Climate change mitigation options among farmers in South Asia.** Environ Dev Sustain 22, 3267–3289 (2020) https://doi.org/10.1007/s10668-019-00345-0

Asian Apicultural Association (AAA) - **Standard for Tropical Honey**
http://www.asianapiculture.org/newsshow.asp?id=1228&big=1

Beekeeping contributes to supporting sustainable livelihoods in mangroves and community-based conservation in Krabi province, Thailand

Chantawannakul P. (2018) **Asian Beekeeping in the 21st Century**

Dodson C.H., Dressler R.L., Hills H.G., Admas R.H., Williams N.H. (1969) **Biologically active compounds in orchid fragrances.** Science 164: 1243-1249

Dressler R.L. (1968) **Pollination in euglossine bees**. Evolution 22:202-210

IPBES (2016): **Summary for policymakers of the assessment report of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services on pollinators, pollination and food production.** S.G. Potts, V. L. Imperatriz-Fonseca, H. T. Ngo, J. C. Biesmeijer, T. D. Breeze, L. V. Dicks, L. A. Garibaldi, R. Hill, J. Settele, A. J. Vanbergen, M. A. Aizen, S. A. Cunningham, C. Eardley, B. M. Freitas, N. Gallai, P. G. Kevan, A. Kovács-Hostyánszki, P. K. Kwapong, J. Li, X. Li, D. J. Martins, G. Nates-Parra, J. S. Pettis, R. Rader, and B. F. Viana (eds.). Secretariat of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, Bonn, Germany. 36 pages

Jalil A. H., Shuib I. (2014) **Beescape for Meliponines: Conservation of Indo-Malayan Stingless Bees** One Fullerton: Partridge Publishing, Print

Jalil A. H., Shuib I. - **Indo-Malayan Stingless Bees**
https://www.academia.edu/35574550/Indo-Malayan_Stingless_Bees

Ollerton J., Alarcon R., Waser N., Price M., Watts S., Cranmer L., Hingston A., Peter C., Rotenberry J. (2009) **A global test of the pollination syndrome hypothesis** Ann Bot (2009) 103 (9): 1471-1480.doi: 10.1093/aob/mcp031

Roubik D. (2018) **The Pollination of Cultivated Crops.** A Compendium for Practitioners FAO

REGIONAL COMMISSION FOR EUROPE

Jacques A, Laurent M, EPILOBEE Consortium, Ribière-Chabert M, Saussac M, Bougeard S, et al. (2017) **A pan-European epidemiological study reveals honey bee colony survival depends on beekeeper education and disease control.** PLoS ONE 12(3): e0172591
https://doi.org/10.1371/journal.pone.0172591

TECA, FAO

TECA: http://www.fao.org/teca/en/
Beekeeping category: http://www.fao.org/teca/categories/beekeeping/en/
Beekeeping Forum: http://www.fao.org/teca/forum/Beekeeping/en/

Who is who in Apimondia

PRESIDENT

Dr. Jeff Pettis
USA
pettis.jeff@gmail.com - president@apimondia.net

VICE-PRESIDENT

Dr. Peter Kozmus
Slovenia
peter.kozmus@czs.si

SECRETARY-GENERAL

Mr. Riccardo Jannoni-Sebastianini
Italy
apimondia@mclink.it

PRESIDENTS OF THE SCIENTIFIC COMMISSIONS

Beekeeping Economy

Dr. Norberto Luis García
Argentina
norgargir@yahoo.com.ar - n.garcia@nexco-sa.com.ar

Bee Biology

Prof. Geraldine Wright
United Kingdom
geraldine.wright@zoo.ox.ac.uk

Bee Health

Dr. Fani Hatjina
Greece
fhatjina@gmail.com - fhatjina@instmelissocomias.gr

Pollination and Bee Flora

Dr. Lucas Alejandro Garibaldi
Argentina
lgaribaldi@unrn.edu.ar

Beekeeping Technology and Quality

Mr. Etienne Bruneau
Belgium
bruneau@cari.be

Apitherapy
Dr. Cristina Mateescu
Romania
cristina.mateescu@apicola.eu

Beekeeping for Rural Development
Dr. Nicola J. Bradbear
United Kingdom
nicolabradbear@beesfordevelopment.org

PRESIDENTS OF THE REGIONAL COMMISSIONS

Africa
Mr. David Mukomana
Zimbabwe
dmukomana@gmail.com

Americas
Mr. Lucas Martínez
Argentina
presidente@sada.org.ar

Asia
Prof. Cleofas Rodriguez Cervancia
Philippines
dorsata1@yahoo.com - cleocervancia@yahoo.com

Europe
Dr. Róbert Chlebo
Slovakia
robo.chlebo@gmail.com

Oceania
Ms. Jodie Goldsworthy
Australia
jodie@beechworthhoney.com.au

DEAN OF THE HONORARY MEMBERS
Mr. Gilles Ratia
France
gilles@apiservices.com

APIMONDIA GENERAL SECRETARIAT
Corso Vittorio Emanuele II, 101
I-00186 Rome - RM
Italy
apimondia@mclink.it

The Commissions of Apimondia

SCIENTIFIC COMMISSION FOR BEEKEEPING FOR RURAL DEVELOPMENT

The mission of the Scientific Commission for Beekeeping for Rural Development is to provide a forum for sharing information on how apiculture contributes to the development of sustainable livelihoods, worldwide. Beekeeping is a unique form of agriculture that is beneficial to the environment and provides economic reasons for people to look after their local habitats. It provides people with valuable sources of income and nutrition, yet the input costs can be very low.

The Commission is a network that provides unique opportunities for people to meet, share information and learn. We meet at Apimondia Congresses and Symposia, as well as by e-mail communication between events. These events are attended by many beekeepers and also by development professionals and academics who contribute to our knowledge of bees, beekeeping and development worldwide. In addition to the large Apimondia Congresses, the Scientific Commission for Beekeeping for Rural Development also organises smaller, regional meetings and joins with other Commissions to organise meetings.

Beekeeping for rural development is a cross cutting issue, and many topics covered by other Commissions are important for promoting beekeeping for development. The Commission gives attention to the role and value of beekeeping within rural development and best practise for promoting beekeeping, with special reference to the following aspects: how best to encourage and support beekeeping for people with few financial resources, extensive beekeeping and honey hunting practises, issues of sustainability, utilisation of indigenous species and/or local races of honey bees, sustainable utilisation and conservation of honey and stingless bee populations, organic and social certification of beekeeping enterprises - for example fair trade, apiculture projects: their successful management and delivery, organisation of producer groups and co-operatives, trade and marketing issues and trade criteria, cultural aspects of apiculture, beekeeping as part of non-timber forest production, government and trade policies that have consequences for beekeeping within rural development, the role of beekeeping within issues of food security and poverty alleviation.

SCIENTIFIC COMMISSION FOR POLLINATION AND BEE FLORA

The Scientific Commission for Pollination and Bee Flora works to achieve the general objectives of Apimondia along two major lines:

- the role of bees as necessary pollinators for agricultural crops and natural flora,
- the importance of plants as food sources - mainly pollen and nectar - for bees.

Concerning the function of bees in pollination, the Commission carries out in-depth studies on the pollinator essentials in order to improve the production of traditional crops and other crops that offer important new perspectives. The Commission deals with *Apis* bees, but looks also into the specific role that is played by non-*Apis* bees, for example bumble bees.

The Commission also works on building and sharing knowledge concerning special characteristics of honey types from certain regions and on analysis of the botanical origin of honeys, pollen and even propolis. It is active in the identification and study of pollen grains (Melissopalynology) of bee-food plants and honey producing plants in different countries. The Commission shares the view that due attention must be given to the crucial role bees play as pollinators of the natural environment.

SCIENTIFIC COMMISSION FOR BEEKEEPING TECHNOLOGY AND QUALITY

The Commission for Beekeeping Technology and Quality covers most of the practical aspects of beekeeping, namely beekeeping and the various related aspects such as: good beekeeping practices, queen rearing and production of biological material, transhumance, animal welfare, hive products and their quality, bee products definition - quality and characterisation based on their composition and biological activity, bee products contamination and adulteration, technologies and equipment used for apiary activities in temperate, cold and tropical climates, both for honey production and other additional products: wax, pollen, beebread, royal jelly, propolis, venom and larvae, impact of climate change on beekeeping activities. The management of colonies in the face of environmental problems is also the subject of ongoing attention.

The mission of the Commission is to seek to collect, process and disseminate the scientific information available in order to help beekeepers at international level to enable them to adapt to new environmental constraints (honey environment, market, society) in a spirit of sustainability. Particular attention is also paid to the international legal framework in order to preserve the quality of hive products (establishment of definitions and quality criteria that make it possible to limit adulteration and ensure the harmonious development of the beekeeping sector).

Consultations for the enhancement of the bee products within the framework of the norms are carried out with various organisations such as *Codex Alimentarius*, ISO, WHO, FAO, FEEDM, IHC, HIPA, European Union, etc.

SCIENTIFIC COMMISSION FOR APITHERAPY

The mission of the Commission for Apitherapy is to define, construct and reinforce the structure of Apitherapy as Natural Medicine, to promote the knowledge and the recognition of beehive products to the medical, paramedical world and to the general public in order to secure alternative food sources, to ensure a safe and healthy nutrition and a complementary health care system, in line with the World Health Organisation Strategy of promoting traditional and complementary medicines (CAM) all over the world.

Its main goals are: defining the legitimate place of apitherapy (legislation, medical practice, medical education, scientific substantiation) among natural therapies (traditional, complementary and alternative medicines - TCAM); setting up quality and safety standards/criteria for beehive products with medicinal destination; creating recognized treatment indications and clinical protocols allowing comparison of treatments for efficacy and safety and thus to map the relation of apitherapy to classical medicine and to define its therapeutical limits; assisting in developing a natural Api-pharmacopoeia working together with FAO for the SDGs; adapting treatment possibilities harmonising various countries' resources with their medicinal needs, thereby increasing their autonomy from industrial medicine as well as creating new categories and opportunities of work.

SCIENTIFIC COMMISSION FOR BEEKEEPING ECONOMY

The mission of the Commission for Beekeeping Economy is to promote the development of beehive products and all kinds of commercial activities linked to bees. It seeks to contribute to the welfare of mankind, through our health, the health of our environment and the improvement of the alimentary resources in the world.

The domains covered by the Commission are: management (apiaries, industry), products (quality, commercialisation), markets (domestic, international trading), sales promotion, new products and new businesses, environment (natural, economic), history, education, sector organisations (for the strengthening of beekeeping economy), communication.

In order to engage in this mission, the Commission is active in the above-mentioned domains, to follow the policies that have been defined.

SCIENTIFIC COMMISSION FOR BEE HEALTH

The aim of the Commission is to give the proper attention as well as to find solutions to all aspects that may endanger honey bee health. Its main objective is the support and enhancement of all scientific and technical developments or initiatives related to guarantee honey bee health.

The Commission gives attention on bee health, including the following aspects: Good Beekeeping Practices (GBPs) and Biosafety Measures in Beekeeping (BMBs), diagnosis of pests/pathogens, treatment of pests/pathogens, prevention methods or practices of infestations/infections by pests/pathogens, predictive bee health, breeding for tolerance on bee pathogens and for resilience to climate change, economical and legislative aspects of bee pests/pathogens, imports and exports of bees and bee-products in relation to health issues, bee nutrition and its relation to bee health, impact of phytosanitary products and other environmental stressors on bees' health, legal framework of pesticides authorisation, global relationships between farmers and beekeepers.

It also supports projects and activities for: protecting the consumers' health, guaranteeing the quality of hive products, avoiding resistance to medicines and chemical substances administered to the bees, improving tolerance against bee diseases, strengthening of bee colonies by natural management systems and environmental conditions, increasing protection goals against the use of phytosanitary products.

Furthermore, the Commission for Bee Health is very active in collaborating with different world organisations, such as FAO, OIE, EFSA, COLOSS and EU Commissions.

SCIENTIFIC COMMISSION FOR BEE BIOLOGY

The mission of the Scientific Commission for Bee Biology is to give attention to the current state of research on bee biology.

Its main activity covers the following fields which are of particular importance for beekeeping practice: bee biology in cold, temperate and tropical climates; bee physiology; bee genetics; conservation of bee races; selection and breeding; artificial insemination; physiology of nutrition; biology of *Apis mellifera*, *A. cerana*, *A. florea*, *A. dorsata* and other *Apis*-species; biology of stingless bees; biology and breeding methods of bumble bees.

The actual state of matters is presented to beekeepers and scientists on the occasion of the International Apimondia Congresses and Symposia.

REGIONAL COMMISSIONS FOR AFRICA, AMERICAS, ASIA, EUROPE AND OCEANIA

The Regional Commissions are effective tools to help beekeepers and their bees worldwide.

Each President of these Commissions has precise duties:

- providing support to national beekeeping associations with their governments and/or regional entities,
- assuring a better co-operation with regional beekeeping associations,
- offering help to local organisations and promoting Apimondia congresses and symposia as well as other regional events,
- co-chairing the round tables during the Apimondia Congresses,
- co-ordinating the activities of the existing Working Groups with the Scientific Commissions and proposing new Working Groups on crucial problems,
- establishing and maintaining databases (institutes, journals, suppliers, etc.) for the Apimondia website,
- promoting beekeeping amongst the general public,
- being the key representative for journalists, TV programmes, questions arriving from the General Secretariat, etc.,
- encouraging the creation of national beekeeping associations in the developing countries,
- analysing the needs of the local beekeeping communities and co-ordinating the relief actions in case of natural or human disasters,
- attracting new members,
- raising funds for the Federation.

Beekeeping contributes to achieve the **Sustainable Development Goals**