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How can we protect pollinators and promote their role in environmental and agricultural practices?



Collection of contributions received

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Topic note

Pollination is responsible for providing us with a wide variety of food, mainly horticultural crops. In fact, pollinators such as bees, beetles, birds and bats affect 35 percent of the world's crop production, increasing outputs of 87 of the leading food crops worldwide (FAO), as well as many plant-derived medicines. It is critical for food production and human livelihoods, and directly links wild ecosystems with agricultural production systems. Without this service, many interconnected species and processes functioning within an ecosystem could collapse.

Human activity has put a large pressure on pollinators by both increasing their demand while at the same time removing their habitat. Horticulture has rapidly expanded over the last decades, while the landscape has become more uniform due to intensive agriculture. Lack of pollination has increased awareness of the value and management requirements of this service. Effective pollination requires resources, such as refuges of pristine natural vegetation. Where these are reduced or lost, pollinators are becoming scarce and adaptive management practices will be required to sustain food production.

The main issues concerning pollinator services and food security are:

1. They increase food quantity

Bees and other pollinating insects are currently improving the food production of two billion small farmers worldwide, helping to ensure food security for the world's population. Research shows that if pollination is managed well on small diverse farms, with all other factors being equal, crop yields can increase by a significant median of 24 percent.

2. They increase nutrition

Foods richest in micro nutrients such as fruits, vegetables and seeds depend on pollination. If a plant has been well pollinated, meaning that it received quite a large amount of pollen, a larger and more uniform fruit will develop. Round apples for instance, would imply sufficient pollination, whereas misshaped apples would imply insufficient or imbalanced pollination. Generally, plants put more of their resources into pollinated fruits, increasing quality and taste.

3. Bees and pollinators need favourable environments to be productive

Pollinators need good foraging resources, places that are rich in flowers pollen and nectar. They need a place to nest and to eat, and a natural, non-toxic environment. One hundred years ago, small, diverse and pesticide-free farming systems proved very favourable for pollinators. Such environments can still be found today in developing countries such as Kenya.

4. Their biggest threats

The absence of an appropriate habitat for bees and other pollinators could lead to a continuous decline in pollination. Mono-cropping, pesticides, diseases and higher temperatures associated with climate change all pose problems for populations and, by extension, the quality of food we grow. Declining pollination can also pose an immediate threat to nutrition.

5. Protection measures for farmers and governments

For farmers:

Recommended practices include leaving some areas under natural habitat, creating hedgerows, promoting intercropping, reducing or changing the usage of pesticides, leaving nesting sites and planting attractive crops such as cassava around the field. The latter is often applied by farmers in Ghana and has yielded more than satisfactory results.

On a policy level:

Based on a report by the intergovernmental platform of Biodiversity and Ecosystem Service (IPBES), governments should support a more diverse agriculture and depend less on toxic chemicals in order to facilitate an increase in pollination, leading to improved food quality and a surge in food quantity.

Given the importance of pollination services for both environmental and agricultural benefits it is vital that active steps are taken to help protect pollinators.

Your experience will help us take stock of challenges faced by pollinators and, more importantly, of ways to protect their important role in providing us with food. A summary brief of the comments and inputs you share will be widely circulated in order to raise awareness and prompt further exchanges.

- 1. What activities are you aware of that are successfully promoting pollinator insects in your area? Share examples of best practice.**
- 2. What more needs to be done to encourage pollinator-friendly practices?**
- 3. What training, support or information do you need to take up pollinator-friendly practices?**

Thank you for your comments and look forward to learning more.

James Edge, Communications specialist

and

FAO's TECA Beekeeping Exchange Group

Contributions received

1. Demetrio Miguel Castillo Espinosa, Universidad Tecnológica de Santiago, Dominican Republic

Original contribution in Spanish

Aunque por su poca importancia relativa, el papel de los polinizadores son una columna en la producción de alimentos para el mundo. Un ejemplo de ello es la producción de miel y la empresa familiar de la miel que da comida a miles de familias en el mundo. En el nuestro debido a la creación de invernaderos estas han tenido que migrar de zona debido a que no encuentran flores para polinizar y han creado un problema fundamental de producción familiar y por lo tanto han hecho que cientos de familias que vivían de esas producciones hayan tenido incluso que emigrar a otras zonas por la ausencia de abejas y de miel en amplias zonas que antes se dedicaban a ese producto y vivían por su existencia algo que ha cambiado radicalmente.

English translation

Despite its relative unimportance, the role of pollinators is one of the pillars of global food production. An example of this is the production of honey and family beekeeping businesses that support thousands of people. Due to the development of greenhouses, bees have had to migrate to other areas because there are no flowers to pollinate. In this way, a very serious threat to family farming has been created, forcing hundreds of families even to migrate due to the absence of bees and honey in large areas that were once productive and allowed for a livelihood. Something which has now changed radically.

2. Emile Hougbo, Agricultural University of Ketou, Benin

Original contribution in French

L'agriculture, l'urbanisation et les activités industrielles, lorsqu'elles ne respectent pas certains principes écologiques, sont parmi les plus importants perturbateurs de la vie des pollinisateurs. L'important est donc de promouvoir une agriculture écologique (agroécologie) qui permet de produire sans trop désorganiser le fonctionnement des écosystèmes dont les pollinisateurs sont un élément indissociable. En particulier, les activités agricoles doivent être menées de manière à moins réduire la biodiversité. Les associations de cultures et l'agroforesterie sont par exemple des techniques agroécologiques favorables à la protection des pollinisateurs. Surtout, une attention particulière doit être accordée aux plantes qui donnent beaucoup de fleurs, surtout les plantes de la famille des asteracées et les légumineuses. J'ai particulièrement remarqué une corrélation entre l'activité des pollinisateurs et l'existence de *Tridax procumbens* dans un milieu donné. *Tridax procumbens* est une herbe (encore sauvage) qui accueille beaucoup d'abeilles, même s'il ne couvre pas une grande superficie. Il serait donc bon de veiller à entretenir cette herbe partout où elle pousse bien. Il faut lui créer des conditions pour son développement massif, notamment par l'arrosage, l'amendement du sol. L'usage des pesticides chimiques de synthèse, la destruction du couvert végétal et l'émission abondance de gaz toxiques ou à effet de serre sont des actes destructeurs des pollinisateurs. D'où, l'intérêt de privilégier les pesticides biologiques, tels que l'extrait aqueux des feuilles de *Hyptis suaveolens*, l'huile des graines de neem, etc; pour lutter contre les maladies et ravageurs des cultures.

English translation

*Agriculture, urbanization and industrial activities, when they do not respect certain ecological principles, are among the worst disrupters of the pollinators' life. The important thing is to promote an ecological agriculture (agro-ecology) which allows for production without jeopardizing the functioning of eco-systems of which pollinators are an intrinsic element. In particular, agricultural activities must be pursued so as to have least effect on biodiversity. The crop raising and agro-forestry associations are examples of agro-ecological techniques favorable to the protection of pollinators. Above all, particular attention must be paid to plants that provide many flowers, in particular to the plants of the asteraceae [sunflowers] and pulses. I have noticed particularly a relationship between the activity of pollinators and the presence of *Tridax procumbens* in a given area. *Tridax procumbens* is a plant (still wild) which attracts many bees, even if it does not occupy a large surface. It would, therefore, be worth ensuring the presence of this plant wherever it can grow well. Conditions for its widespread development should be created, principally by irrigation and soil improvement. The use of synthetic chemical pesticides, the destruction of vegetal cover and the emission of toxic or greenhouse gases are acts destructive of pollinators. Hence the interest in promoting the use of biological pesticides, such as the aqueous extract of the leaves of *Hyptis suaveolens*, the oil of neem seed [*azadirachta indica*], etc.; to fight against diseases and pests in crops.*

3. Vethaiya Balasubramanian, Freelance consultant, India

Populations of pollinating insects including honeybees is threatened by monocropping and use of intensive agricultural practices including rampant application of pesticides. A good example is the almond farms in California that require increasing import of pollinator honey bees from outside for proper pollination of almond flowers. What can be done to improve on on-farm biodiversity and to enhance the multiplication pollinator insects including honeybees? Allowing broad-leaf weeds and leguminous plants to grow in field boundaries; growing wild flowers in areas adjacent to crop fields; adoption of diversified cropping -- rotation of crops, intercropping, incorporation of trees in farms like in agroforestry systems; leaving live natural vegetation strips or hedge rows of shrubs and trees along the contour in large farms will all help in increasing diversity in farms and support the growth and development of pollinators and natural enemies of crop pests. Ecological intensification through conservation agriculture is the way forward to intensify food production and to enhance farm biodiversity.

4. Dhanya Praveen, Environment Protection Training and Research Institute, Hyderabad, India

I had the opportunity to be part of some of the Rapid Rural Appraisals on the Jasmine (*Jasminum sambac*, *grandiflorum*, *auriculatum*) farmer's fields of the states of Tamil Nadu and Andhra Pradesh, South India. Farmer's had an opinion that the common pollinators like dwarf bees and butterflies are found only in sizable counts nowadays due to dry spells and extreme heats conditions in their areas. They pointed out that the harsh scents of pesticides, could also be a reason behind this change. They have adopted intercropping with sesame, peanuts, and long beans was considered as the viable autonomous adaptation options by the farmers. There is training need for Sensitizing the farmers for maintaining Pollinator Friendly Farm lands through Farmers training Institutes or Krishi Vignan Kendras in order to sustain the ecological balance and hence attracting more pollinators.

It is very essential to take up more research activities and prioritize monitoring and evaluation of the impacts of climate change on pollinator distributions and their present status of pollinators in a scientific way and maintain Agriculture biological diversity especially a country like India which is a signatory for the Convention to Biological Diversity and in the context of thriving to achieve the 2020 Aichi Biodiversity Targets.

5. Kafui Appiah, Honey for Wealth Beekeepers Association, Ghana

I am currently experimenting the use of non-wood materials for making beehives. If it succeeds I will shift from overly depending on wood. I believe this can help in a small way to reduce tree cutting for making beehives.

6. Mithare Prasad, India

Pollinators play a vital role in agriculture crop production, they help in pollination in crops without which fruit production is impossible especially in cross pollinated crops. Honey bees, wasp bees, gaint bees, butterflies which are major pollinators among insect kingdom. Protection of pollinators has become a important aspects in modern agriculture due to use of heavy chemical fertilizers, pesticides,herbicides,growth harmones, which kill all the pests, on other side it also kill beneficial insects like pollinators so to protect these pollinators there are some precaution to be followed.

Ex.:

- 1) Reduce use of highly toxic/carcenogenic pesticides, herbicides on agricultural crops;
- 2) Use organic based plant protection which is eco friendly to environment as well as insect diversity;
- 3) practice a crop production which produce a yellow flower which attract bees like sunflower, safflower etc.;
- 4) increase honey bee hives about 10 hives/ ha land so it increase the bee population;
- 5) Avoide burning of crop residues in field, because residue burning will produce dark smoke which contains toxic gases it will affect the honey bee activity and destroy bee hives;
- 6) increase the jaggery production unit so it will attract pollinators and increase the population;
- 7) more important practices is plant forest tree species on border side of the field so that honey bees are likely to construct their hives in higher altitude on tree branches;
- 8) planting the ornimental plant species which is most attractive to pollinators etc...

Thanks.

Regards,
Mithare Prasad

7. Claro Ricardo, FAO, Chile

Original contribution in Spanish

Me complace participar en este Foro que se une a los esfuerzos y actividades para promover el conocimiento e importancia del servicio de la polinización y los polinizadores. Actualmente desarrollo una consultoria en Chile relacionada con la tematica y con los avances del trabajo para el país en cuanto a las preguntas del foro puedo decir:

1. Actividades que promueven los insectos polinizadores: Existe en ejecución un programa para aumentar la cantidad de flores melíferas a través de la restauración y suplementación de la diversidad floral con énfasis en especies forestales nativas, desarrollado por el Instituto Forestal de Chile. El país cuenta con dos Acuerdos de Producción Limpia, el primero que tiene por objeto introducir prácticas sustentables para la aplicación de plaguicidas en las empresas productoras de manzanos, almendros, kiwis, cerezos y paltos demandantes de servicios de polinización, de modo de favorecer la actividad de los agentes de polinización y el segundo Acuerdo, que incorpora en la producción primaria del sector hortícola de la zona central, medidas y tecnologías de Producción Limpia, que aseguren la inocuidad alimentaria y aumenten la eficiencia productiva, previniendo y reduciendo la contaminación generada por la actividad.

Las dos preguntas siguientes, me parece que la una responde la otra. Es decir, para fomentar prácticas respetuosas es necesario, formar o capacitar a actores directamente beneficiados del servicio de los polinizadores, informar a la sociedad en general de los beneficios del servicio que brindan los polinizadores y por último buscar apoyo estatal y privado para el fomento.

1. Qué formación, apoyo o información se necesita para adoptar prácticas respetuosas con los polinizadores?

- Información: Desde qué es la polinización, cuáles son los polinizadores, porqué es importante la polinización hasta como (sin importar quién eres o que haces) se puede contribuir a la conservación y protección del servicio de la polinización.
- Formación: Se puede decir que es necesario formar a los diferentes actores de los diferentes niveles en que las prácticas deben ser adoptadas y dependiendo de esto se determina que formación. Habrá formación técnica para el desarrollo de prácticas en campo, formación teórica para el planteamiento y propuesta de prácticas y formación de concienciación para el apoyo a la implementación de las prácticas.
- Apoyo: Primordial el apoyo de los tomadores de decisiones, quienes a la final exponen el tema en los escenarios donde se presupuestan y asignan los recursos necesarios para la adopción de prácticas, incluso para aquellas prácticas que no requieran recursos, puesto que si el tema no escala prioridades la adopción se hace más difícil. Por su puesto también se requiere el apoyo de la academia y los investigadores que contribuyen al planteamiento y validación de prácticas.

English translation

I am happy to participate in this forum which adds to the efforts and activities to promote awareness and the importance of pollination services and pollinators. I am currently working as a consultant in Chile on this field, and regarding the progress in my country as to the forum questions, I can say the following:

1. Activities that promote pollinators: There is a program being implemented to increase the amount of honey flowers through the restoration and supplementation of floral diversity, with an emphasis on native forest species, developed by the Forestry Institute of Chile. The country has two Clean Production Agreements. The first aims to introduce sustainable practices for pesticide application in farms producing apples, almonds, kiwis, cherries and avocado that are demanding pollination services, in order to foster the activity of pollination agents. The second Agreement wants to incorporate in the horticultural sector in the central area, measures and clean production technologies that ensure food safety and increase production efficiency, preventing and reducing pollution.

Regarding the next two questions, it seems to me that one answers the other. That is, to promote friendly practices is necessary to train the actors directly benefiting from pollinators services, inform the general public of the benefits of the services provided by pollinators and finally, seek state and private support for this promotion.

1. What training, support or information do you need to take up pollinator-friendly practices?

- *Information: Answering questions like: What is pollination? Which are the pollinators? Why pollination is important? How (no matter who you are or what you do) can we contribute to the conservation and protection of pollination services?*
- *Training: We can say that it is necessary to train different actors from different levels on different practices, and that depending on this, formation is determined. There will be technical training for the development of practices in the field, theoretical training for approaching and proposing practices and awareness training to support their implementation.*
- *Support: It is of foremost importance to have the support of decision-makers, who ultimately showcase the issue in the scenarios where the adoption of practices is budgeted and the necessary resources are allocated. Even for those practices that do not require resources, because if the issue does not receive priority, adoption becomes more difficult. Of course, the support of the academia and researchers -who contribute to the approach and validation of practices- is also required.*

8. Mignane Sarr, Université polytechnique de Thiès, Senegal

Original contribution in French

Dans le cadre de la protection des pollinisateurs des cultures un vaste programme de sensibilisation est essentiel à l'endroit du public et des acteurs potentiels de l'agriculture. Sans pollinisation pas de récolte et sans récolte la pauvreté et la malnutrition vont s'installer durablement. Sur ce, des efforts doivent être faits pour accompagner les producteurs dans l'utilisation contrôlée des pesticides qui causent beaucoup de dommage à la faune pollinisatrice. Au niveau du sahel aussi des efforts doivent être consentis pour lutter contre la désertification qui ne milite pas en faveur de la présence de la végétation. L'agriculture biologique est un élément qui réconcilie à cet effet la faune et la végétation au bénéfice de l'être humain. Les aménagements au niveau des villes doivent être repensés en intégrant le végétal dans cette dimension. Des paysages et des espaces verts ont leur import.

English translation

In relation to the protection of crop pollinators, a comprehensive awareness program aimed at the public and potential participants in agriculture is essential. Without pollinization there is no harvest and without harvests poverty and malnutrition will establish themselves for ever. So, efforts must be made to assist producers in the controlled use of pesticides that cause much harm to pollinating creatures. As for the Sahel, measures should also be agreed for the fight against desertification which is damaging to vegetation. Biological agriculture is an element that to this end reconciles fauna and vegetation for the benefit of the human being. Town layout arrangements must be thought through again by integrating them with green areas. Landscaping and green spaces are important.

9. Romano De Vivo, Syngenta, Switzerland

Pollinators are essential for the production of many crop species (>70% of the major food crops).

Their diversity and abundance has declined in agricultural landscapes over recent years. The reason for this are complex, but the lack of floral resources in modern farmed landscapes is a key driver.

Creating habitat in marginal and less productive areas on farm, such as field margins, corners, and buffer zones addresses this problem by providing pollen, nectar and nesting places.

Planting rich habitat on uncropped areas alongside fields and waterways generate interconnected ecological corridors and creates multifunctional opportunities to contribute to a healthy and resilient landscape.

10. Lal Manavado, University of Oslo affiliate, Norway

On Preservation and Increasing the Populations of Pollinators

The discussion note on the subject provides an excellent, inclusive framework on which we may formulate a holistic strategy to preserve the bio-diversity among the pollinators, and to increase their populations.

Even though the composition of plant-pollinator networks may show a considerable variation even within a comparatively small area, the interrelationship among plants and pollinators in different networks seems to be remarkably similar.

This is fortunate, because it would enable us to develop a common generic strategy, which may be easily fleshed out to suit the local implementation. I will first take up what might cause the problem, and then will go on to consider how it may be resolved, provided that the requisite political will obtains.

Other things being equal, the decline in pollinator populations arises from any one or more of the following causes:

1. A critical reduction of either the food supply of the adult species, or its larval state for such a period of time, as a consequence of which it may be difficult to restore the previous population of a pollinator found in an area.
2. Introduction of toxic substances or food items into a pollinator's habitat.
3. Increasing the exposure of a pollinator to its natural predators and/or pathogens.
4. Adverse climatic changes that may cause death.

Now, let us look at the human activities that seems to have brought about the four causes of population decline among pollinators. Critical food shortage may be directly or indirectly due to environmental degradation that reduces the number of types of plant species and/or their populations beyond the critical level necessary for the pollinators in the local plant-pollinator network to be sustained. First of these is a qualitative decline while the other is quantitative.

These two changes may be brought about by any one or more of the activities listed below:

- I. Land clearance representing removal of natural vegetation from an area by mechanical means including the drainage of marshlands and water meadows for agriculture, building sites, roads and highways, and uncontrolled exploitation of forests etc., in a manner that makes it impossible for the local flora to re-establish itself.

II. Environmental pollution that brings about the same results as I above due to the use of certain agro-chemicals, and irresponsible discharge of toxic substances into the ground, streams or air by industrial installations.

III. Introduction of either too few types of food crops, or non-indigenous species that may seriously disrupt the inter-relationship among the members of the local plant-pollinator network. Please note that this may be caused by pollinators' inability to recognise their flowers as a source of food due to their unfamiliarity.

IV. Adverse local climatic change due to denudation of plant cover, which renders it difficult for the local flora to re-establish itself.

As for the introduction of substances toxic to the pollinators, in addition to 1-II above, some plant species are known to produce nectar toxic to some pollinators (eg. some species of Linden to bees). Their introduction as foreign cultivars would be obviously detrimental to the local pollinators. Even more serious, since as early as 1999, pollen of a genetically modified variety of maize in the US has been known to be toxic to some pollinators.

While land clearance may promote the proliferation of pollinator pathogens because it may eliminate those species that helps to keep those pathogen populations under natural control, the changes in local climate that accompanies it may prove favourable to the proliferation of some pathogens, especially unseasonable spells of wet or humid weather.

Moreover, land clearance deprives pollinators of their protective plant cover, thereby making them more vulnerable to their natural predators, especially to the insectivorous birds.

I shall not suggest here how to resolve the deleterious effects of global warming on the pollinators. The former is an indirect result of the horrendous harm we have done to our environment by removing the indigenous plant cover from vast areas for things listed above, and our hardly rational emission of various greenhouse gases. Its resolution calls for a concerted world-wide effort outside our present brief.

The question then, is undertaking what generic strategic steps may enable us to halt, and reverse the current decline in pollinator populations as rapidly as possible. Let us begin at the highest level and proceed down to earth, where real action is to take place.

The policies:

I. The recurrent necessity here as well as elsewhere, is to ensure that all policies formulated by an authority at any level are congruent with reference to each individual goal they are intended to serve. For instance, a 'free trade' policy to 'improve' the economy that permits the import/manufacture and sale of none-selective biocides is not congruent with either a policy to protect pollinators or one on improving bio-diversity. In some cases, much may be done to protect pollinators by striving to achieve this objective.

II. Formulation and implementation of the problem specific policy concerned with---

A. Ascertaining the qualitative and quantitative extent of the problem

B. Ascertaining the ways and means needed to accord the problem an appropriate priority, design the optimal feasible solution and procuring the resources required for undertaking it.

III. Ensuring its optimal implementation in a way that allows its modification/revision in time.

Strategies:

The strategies one may resort to attain the policy objectives loosely outlined above require no lengthy description. I will not touch upon a strategy for achieving policy congruence because its resolution depends on political consensus whose achievement is beyond the scope of this discussion.

Identification of the qualitative and quantitative aspects of the problem:

Some evidence of the decline in the types and numbers of pollinators is already available, even though it seems to be somewhat fragmentary. However, we have been engaged in activities that disrupt plant-pollinator networks for more than two centuries.

While the study of those networks is comparatively new, we already have reason to believe that regeneration of a critically insulted plant-pollinator network may be extremely difficult.

Moreover, there is much we do not know both about already identified networks and other hitherto unidentified plant-pollinator networks in operation, which do not benefit food or ornamental plants, but which may provide some essential ecosystem service to one or more members of a useful plant-pollinator network. Hence, it is necessary to establish the status of plant-pollinator networks and their supporting networks, especially in the areas where they show a deterioration.

Once this has been established, we can design strategies needed to regenerate/expand plant-pollinator networks and their supporting networks with reference to the natural indigenous flora and fauna of a given area. The possibility of doing this, depends on our having a prior knowledge of what relevant plant and animal species have been indigenous to an area, and to the sizes of their approximate individual populations.

I think this information is vital in formulating a holistic approach to protect, regenerate and sustain robust plant-pollinator networks, but even in industrial countries it is hardly complete or accurate. Moreover, surveys undertaken now can only reveal what is left of such networks, and not what is constitutive of a robust sustainable ones. As such, they cannot provide a scientifically valid indication of what they should be constitutive of, if they are to be robust and sustainable.

Furthermore, there are large gaps in our knowledge of plant-pollinator networks and other bio-networks essential for the well-being of the former. The next area on which we need further information includes what long-term effect biocides currently in use including those of plant origin at high concentration, and the effect of nectar and pollen of non-indigenous cultivars and genetically modified ones on the plant-pollinator networks. Consequences of large-scale man-made mechanical topographical changes and industrial activity on them, are well known.

So, to provide ourselves with more complete information to enhance the general quality of our agriculture/environment policy---

1. Initiate and sustain the conduct of scientifically rigorous field surveys to ascertain the current composition and status of known plant-pollinator networks and to disseminate that data.

We may obtain a working idea of the ecology of many areas of the world from an environmentally more benign time through bibliographical research even though some important works may be out of print now. However, works of the great Alfred Russell Wallace, Alexander von Humboldt, H. W. Bates, etc. in reference libraries would amply repay one's efforts to reconstruct good deal of the ecology of many areas where pollinators have become scarce.

1. Much basic research remains to be done in the following four areas, which have a direct bearing on the robustness of plant-pollinator networks:

- I. Interaction among indigenous flora and the introduced cultivars, and the short- and long-term effects on latter's nectar and pollen on the local pollinators. When it involves genetically modified plants, such interactions could have highly undesirable results.

II. The optimal qualitative (in terms of species) mix of indigenous plants and pollinators that might be used to regenerate/improve the plant-pollinator network of an area.

III. Research in applied science to identify optimal means of introducing indigenous flora and pollinators to affected areas with a view to re-establish robust and sustainable plant-pollinator networks. Here, it may be possible to use some useful local crops that may successfully substitute a lost or a threatened source of nectar and pollen.

IV. Identify the crops, decorative plants and the indigenous flowering wild species whose flowering is sequential in a way that would ensure the local pollinators an adequate food supply during their adult stage. At the same time, it is important to ensure an adequate food supply to their larval stage.

2. Action at the ground level:

I think it might be useful to place the types of action I envisage I three broad groups, viz., general, sector-specific and finally, more or less individual. Let us begin with the general:

I. Dissemination of the available information to the general public on the seriousness of the situation and what everybody can and ought to do. As research described above becomes available, this information should be updated accordingly.

II. Rural population and some NGO's and other suitable volunteers may be of use in identifying the local flora and their flowering times, and pollinators.

The sector-specific action ought to include:

III. Incorporating the importance of understanding the local plant-pollinator networks into school syllabi at a suitable degree of completeness. It is best to begin as early as possible and extend it to the schools of agriculture.

IV. Policies to reward environment-friendly bulk transport of non-perishable items like grain, nuts and dried fruits, meats and vegetables, flour, etc., using inland waterways (canals and rivers), coastal shipping, and railways, while penalising their transport by lorries. This calls for an actually environment-friendly national transport policy to revamp the disused canals in many countries, and in nearly all countries to make an extended use of rail transport.

V. An agriculture policy to promote small-scale farming and extensive planting of mixed crops in larger production units. Moreover, a more rigorous control of biocide use is essential, while a moratorium on the spread of genetically modified plants and animals seems to be urgent in view of our lack of real knowledge about their long-term interaction with other organisms including man.

VI. Health sector could warn the public on the uncertainty about the results of long-term interaction between genetically modified food items and the humans, so that a possible re-run of the tobacco controversy may be avoided.

VII. Horticulture sector may contribute by promoting the cultivation of traditional wild-flowers as ornamental plants both in rural and urban settings.

VIII. Local authorities, especially in some rural areas could plant traditional wild-flowers along the roads, commons, etc., as a part of 'local beautification scheme'.

IX. Local authorities and NGO's could make a major contribution by engaging in small-scale re-forestation of the barren countryside with indigenous plant species, which is getting more and more important.

At the individual level, there is much we could do to ameliorate the problem both directly and indirectly. While those engaged in agriculture and forestry could make a greater contribution, the others could do more than what they might think possible with a little effort.

X. Halt the removal of hedges, and plant traditional hedge flora along the insides of barbed-wire and other types of fencing.

XI. Land owners could plant small woods in areas of poor soil in their holdings choosing local small trees that do not prevent the appearance of under-growth. When suitable, nut trees offers an excellent choice for this purpose.

XII. Planting pest repellent herbs among crops and areas that separate different crop types. Some herb flowers are very attractive to the pollinators, eg. Basil and Dill flowers.

XIII. Providing simple nesting sites to local pollinators using materials made of natural substances like old bricks and bits of masonry. For instance, a small stack of old bricks with 16 cm holes drilled in some of them would provide an ideal nest for several species of solitary bees. A few early blossoming wild flowers may be planted around such a stack to provide the newly-emerged bees a source of food until they are strong enough to range widely. Here, I deprecate the use of plastic nesting materials, because how plastic polymers and the secretions of pollinators may react, and what effects the products of such reactions may have on the developing larvae are unknown.

XIV. Those who have fences around their properties could substitute or supplement those with flowering fences. Here, it is important to use indigenous plants, and preferably those flower at different times of the year.

XV. Halting the use of biocides on lawns and other formal home gardens.

XVI. Introducing local wild flowers and flowering bushes and shrubs to improve the appearance of the environs of schools, and other public buildings when the space permits.

Now, we come to the question of funding, for some of the suggestions outlined here require a considerable outlay. I will leave this problem in the hands of those who are adept at wringing funds from decision-makers whose parsimony knows no bounds when funding involves non-glamorous projects, but hope this would be of some use.

Lal Manavado.

11. Amanullah Khan, The University of Agriculture Peshawar, Pakistan

The Swat valley in the Khyber Pakhtunkhwa Province of Pakistan is well known for its peach orchards. However, the peach plants introduced new pathogens and insects to the area. To restrain them the farmers using up to 20 sprays of toxic chemicals each year.

As a result, the once dominant insect of the area, the honeybee no longer exists there. The honey of the Swat valley that was sold at twice the price of regular honey is not available anymore.

We definitely need protection of the pollinator, the honeybee.

Thanks to FAO for their initiatives for the protection of pollinators.

Dr. Amanullah

12. Sumanth Chinthala, Indian Institute of Technology Delhi, India

Protecting pollinators like bees is not possible without involving various stakeholders in the mission. In the following example in south India, a women entrepreneur is training unemployed women to setup their bee farms so that the production of honey will provide income to them. The story of her success is shared in the following link:

<http://www.thebetterindia.com/65339/josephine-selvaraj-vibis-natural-bee-farm/>

13. Devinder Sadana, ICAR, India

There is a need for a simply written one or two page note - on importance of pollination, value of pollinators, present-day-felt reduction in their numbers, AND, how common people can help promote pollinators.

Reduced bearing of vegetables/ fruits in the kitchen garden are becoming obvious to common people. HOW COMMON PEOPLE CAN HELP raise awareness like telling the importance of diverse and the traditional/local flowers/cultivars can help; how reduced use of chemicals can help - should be highlighted in those two pages.

Detailed treatises for farmers or for policy are important - but those two pages are also important for the common people like us - to talk in our casual meets, common discussion groups because pollinators are so important!

-Sadana

14. Noemi Stadler-Kaulich, Predio Experimental de la Agroforestería Andina MOLLESNEJTA, Bolivia

Original contribution in Spanish

Aplicando la agroforestería para la producción de alimentos se asegura la población de los polinizadores (tanto las abejas como todos los otros insectos que polinizan). Esto es el resultado obtenido en el Predio Experimental de la Agroforestería Andina MOLLESNEJTA, ubicado en el Valle de Cochabamba/Bolivia.

Mientras que en la región de Aiquile los productores de Chirimoya deben polinizar las flores de sus árboles de Chirimoya (*Annona cherimola*) a mano, en el predio MOLLESNEJTA se produce esta fruta por polinización de insectos silvestres (no es la abeja *Apis mellifera*).

En la publicación:

http://www.proagro-bolivia.org/wp-content/uploads/2016/04/Libro_Sistemas-Agroforestales_2014.pdf

son descritos varios ejemplos de producción en sistemas agroforestales en la región semiárida del Depto Cochabamba en Bolivia. El predio MOLLESNEJTA siempre está recibiendo a todos los interesados en el ámbito agroforestal. Adjunto le mando una hoja de información.

Atentamente,

Dra. Noemi Stadler-Kaulich

Attachment:

[http://www.fao.org/fsnforum/sites/default/files/discussions/contributions/Informaci%C3%B3nMOLLESNEJTA Marzo%202016.pdf](http://www.fao.org/fsnforum/sites/default/files/discussions/contributions/Informaci%C3%B3nMOLLESNEJTA%20Marzo%202016.pdf)

English translation

Using agroforestry for food production protects pollinators (both bees and all other pollinating insects). This has been the case in the Experimental Farm of the MOLLESNEJTA Andean Agroforestry located in the Cochabamba Valley, Bolivia.

While in the Aiquile region the cherimoya producers must pollinate the flowers of their Cherimoya trees (Annona cherimoya) by hand, in the MOLLESNEJTA farm this fruit is produced through the pollination of wild insects (not the Apis mellifera bee).

In the following publication:

http://www.proagro-bolivia.org/wp-content/uploads/2016/04/Libro_Sistemas-Agroforestales_2014.pdf

several examples of agroforestry production in the semiarid region of the Cochabamba Department in Bolivia are described. The MOLLESNEJTA farm always welcomes everyone who is interested in the agroforestry sector. Kindly find attached an information sheet.

Yours sincerely,

Dr. Noemi Stadler-Kaulich

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Noemi Stadler-Kaulich

MOLLESNEJTA

Producir en armonia con la Madre Tierra

Landwirtschaft in Einklang mit der Natur

<http://mollesnejta.wordpress.com>

Attachment:

[http://www.fao.org/fsnforum/sites/default/files/discussions/contributions/Informaci%C3%B3nMOLLESNEJTA Marzo%202016.pdf](http://www.fao.org/fsnforum/sites/default/files/discussions/contributions/Informaci%C3%B3nMOLLESNEJTA%20Marzo%202016.pdf)

15. James Edge, facilitator of the discussion, FAO, Italy

Thank you all for the very interesting responses so far. It seems that that issues affecting pollinators is reasonably well understood – although more research is still needed on the precise interactions between human activities and pollinators.

Access to information and awareness-raising is a common theme. Although some countries have a lot of information available to the public and country pollinator strategies (such as the UK), many countries do not. More accessible information needs to be made available to the public on how they can help pollinators at a local level. Training should also be given to agricultural workers – and included in extension services and college course curriculum.

In terms of agriculture, many suggestions were made to create habitats, buffer zones, field margins and so on for pollinator species. This in addition to planting flowering plants suitable for the local populations of insects. Mithare Prasad from India provides a succinct summary of solutions, in particular in relation to honey bees.

Urban planning is also an area of concern – where green areas and landscaping need to be pollinator friendly. Urban agriculture is practiced by 800 million people worldwide – so is not an insignificant area that needs to be proactive.

The need for policies that promote pollinator friendly agriculture and practices was also highlighted by several respondents. Lal Manavado from Norway provides a nice summary of the issues and suggests that it is possible to create a common strategy that can be adapted to local conditions.

We look forward to reading more of your comments in the coming few days.

16. Eileen Omosa, We Grow Ideas, Canada

The need to promote pollinator insects becomes more critical as reductions in biodiversity occur. The more the world moves towards mono-cropping, the more pollinators will be lost. Fortunately, there is ecological farming to safeguard pollinators.

My contribution below is based on my two experiences; rural and urban

In my rural home in Kenya, households have realized that their indigenous crops, especially vegetables are not as productive as before, luckily enough social networks have enabled them to share information on the need to increase the variety of crops on farms. The new trend is that once households have extra financial resources, they pull down live fences and put up fences of posts and wire or concrete. Households need more encouragement to plant live fences with flowering plants within homes - can be done together with the wire or concrete fence.

One way to communicate the pollinator message effectively is to link the solution to challenges rural people are faced with. For example, households with sickly livestock or poultry or crops be encouraged to plant certain pollinator friendly plants as a way to prevent the frequent occurrence of some ailments.

" In my urban setting, the practice of "beautiful" farms, yards, roadways and more has led to loss of biodiversity. But nature has it's way of crying out; large and small scale farmers, especially honey producers are feeling the effect of loss of diversity/pollinators, resulting in ongoing aggressive media campaigns on the need to protect and promote pollinator insects. The "cry" on loss of pollinators seems to have been heard as government (national, provincial, municipal) has formulated policies in support of biodiversity conservation, hence pollinators:

Our city authority has devised ways to encourage households to grow green lawns and avoid use of chemical sprays as the way to manage unwanted plants/weeds. The message is for people to uproot undesirable growths, rather than spray them.

Neighbourhoods are known to hold beautification competitions mainly based on the planting of flowers whenever weather conditions allow. In the process, many front and backyards are filled with bright flowers; habitat for pollinator insects. The city has put together guidelines for residents who want to "go green" - http://www.edmonton.ca/residential_neighbourhoods/gardens-lawns-trees.aspx

Residents who have decided to "go green" can get a city lawn on their front yard with a message that they have gone green/bagless in tending to their yard. The trend is picking up, for once one neighbour

goes green with the lawn sign, a nearby neighbour who sprays to "control weeds" will see the sign and hopefully rethink their practice.

Urban gardening is also used to promote pollinator insects. The current EatLocal movements in my city have seen increases in urban farming (see photos of my summer harvest on my Google+ account). Cities are comprised of multicultural groups and as more and more city dwellers buy into the idea to grow their food, most will obviously plant ethnocultural foods - indigenous vegetables = increased biodiversity = attract variety of insects = pollinators. Community gardens seem to have increased as more city dwellers are in search of land to farm. To support urban farming activities, in 2016 the City formulated a policy to support farming activities http://www.edmonton.ca/city_government/urban_planning_and_design/urban-a... There are numerous on-going activities in support of pollinator insects.

Based on observations from my two homes in rural and city, I am tempted to conclude that the message on sustainability, eat local, protect pollinators seems to have taken a faster and positive effect in my urban city compared to my rural home. In the rural area, business messages advertising intensive use of farming chemicals still overwhelms messages on the need to protect and promote pollinators through ecological farming. Based on this observation, my suggestion is the need for more emphasis of the pollinator message in rural areas; the same places where households rely on pollinators to sustain a land-based livelihood.

Regards to my readers.

Eileen

17. Alemayehu Bayeta, Holeta Bee Research Centre, Ethiopia

Obviously, the current decline of pollinators is becoming a threat for food security. It is multifarious reasons why most pollinators have been reducing since recent decades. Less attention is given for the role of pollinators in food security particularly in developing countries like Ethiopia. As a result, unwise application of pesticides for agricultural production and floricultural industries has been identified as the causes for the massive deaths of pollinators including bees, beetles, butterflies...etc.

Therefore, all stakeholders including growers, beekeepers and policy makers should bring their attention to save the decline of pollinators in alarming rates. Government should support in the way to minimize the unwise use of agrochemicals and awareness should be created in all sectors involved to protect the loss of these beneficiary animals. Trainings at higher level is also required to provide technologies that will help to mitigate the situation between pesticide applications and protect pollinators.

Regards.

18. Alemayehu Bayeta, Holeta Bee Research Centre, Ethiopia (second contribution)

An attempt to kill mosquitoes appears to have killed a bunch of honeybees. <http://www.journalscene.com/20160829/160829780/residents-angered-over-honeybee-deaths->

best reading.

19. Priyanka Sanchania, Freelance, India

Honey as we know have many advantages both for health of people and for crops. I believe Honey production can be increased once it is linked to industry which is into marketing and distribution of these products at large scale and have good brand value.

In India, Dabur Honey which commands approx. 60% market share works with Beekeeping farmers in Madhya Pradesh and Bihar state. The firm trained these farmers on beekeeping thus to provide new stream of income for them and alleviate poverty.

Dabur then sells Honey under its brand within India and other countries.

Also as we know benefits of beekeeping on farms, we need to increase awareness of health benefits associated with eating honey in different forms.

Firms can introduce flavoured honey which can increase its offtake to consumers depending upon local taste which a consumer would like to have along with honey.

Once there is increase in demand of honey in consumers, the benefit will go down to industry and farms which would like to have more tie ups with beekeeping farmers.

So the good effect will be more and more beekeeping farms and increase in benefits associated to crops and farmers.

20. Bibhu Santosh Behera, Ouat Bhubaneswar, Odisha, India

Dear UNEP /FAO Members

Greetings

I am going to present a conceptual FFS Exposure visit of Green college farmers and participants to learn FFS Methodology, process, mixed cropping and gender involvement. Here in organic way we can save our pollinators by using organic and good agriculture practices. Please go through it for your learning and knowledge.

Regards

Bibhu Santosh Behera

Principal

Green College, Muniguda, Rayagada, Odisha, India

Attachment:

<http://www.fao.org/fsnforum/sites/default/files/discussions/contributions/Exposure%20Visit%20Report%20-%20Copy.docx>

21. Michele Baron, Kyrgyzstan

I have developed and supported the use of Mobile Garden Carts (MGC) projects as we have lived in various nations and climates around the globe. These Mobile Garden Carts can be constructed wholly of recycled/reclaimed materials, or of new-use materials (and portions of proceeds used to help provide MGCs to in-need (landless, homeless, refugee, other) populations, consisting of wheeled platform(s) and pipe/vertical elevations used to support additional container-plantings, water

supplies, optional composting, small-animal (rabbit/fowl) housing, seed propagation and/or drying racks, and protective netting/sheeting (plastic 'greenhousing').

When MGC gardeners are not allergic to bees, or in risk-prone areas, however, in addition to, or instead of small animal/fowl housing, these carts can be outfitted with small apiaries, much like those used at field edging or on rooftop gardens, to hive bees within the Mobile Garden Cart system itself.

Mobile Garden Cart plantings can always include pollinator-friendly fruits, vegetables, herbs and flowers. However, when food-supply is less a priority than pollinator protection, MGCs can be planted entirely with pollinator-friendly herbs, flowers, and other plants. In mega-city, refugee-city and other densely-inhabited zones where bee, butterfly, and pollinating insect/bird populations have been threatened or all-but-obliterated, these carts can encourage a resurgence in pollinator numbers, as well as providing marketable herbs, flowers, and potentially sustainable quantities of honey.

Such MGCs can also promote citizen interaction, education, inclusion, rehabilitation and recuperation--especially if climate-stable hives with clear acrylic sides are possible (allowing viewing/increased understanding of the industry of the bees). MGCs can be designed to fit doorways/elevators and move from living space to sidewalk, roadside to rooftop, refugee-settlements, homeless shelters, parks, museums, evacuation shelters and civic centers, and be located inside dwelling spaces, airport terminals, shopping centers, sports stadiums, hospital 'open zones,' special needs and age-differentiated centers, or anywhere else plants can conceivably be included, and awareness of the irreplaceable contributions of bees/pollinators to our life systems raised.

Here is a link to one example of [Mobile Garden Cart inclusion, in Barcelona, Spain, 2010](#). The specific project is no longer in operation, but [Global Giving foundation](#) provides links to many ongoing projects.

22. Amanullah Khan, The University of Agriculture Peshawar, Pakistan (second contribution)

I have noticed in my recent studies that inter-cropping of legumes (peas, Fababean) and canola in winter cereals (wheat, barley) have more attraction of honey bees (pollinators) as compared to no honey bees in sole wheat and barley crops.

Likewise, more honeybees/pollinators were noticed when summer legumes (pigeon pea or mungbean) were inter-cropped in summer cereals (sorghum or millets) and no honey bee was found on sole cereals crop.

I conclude from my studies (2015-2016) that the cereal based cropping system decrease the number of honey bees in any climatic zone. I therefore recommend that in the cereal based cropping systems in the world (e.g. wheat-maize, wheat-rice, wheat-millet, wheat-sorghum, or simply I will say cereal-cereal based cropping system or monocot crops based system) significantly reduced the number of no honey bees per unit area. In other words, I will say that giving proper space to di-cot crops especially grain legumes (pulse crops, eg. chickpea, lentil, peas, cowpea, fababean, kidney bean, pigeon pea, mung bean, mash bean) and forage legumes (shaftal, berseem and alfalfa etc.) or introduction of oil-seed crops (canola, sunflower, soybean, sesame, groundnut etc.) could significantly increase the population of pollinators and beneficial microbes in the soil. In conclusion I could say the replacing the cereal based cropping system (mono-cot crops only) with suitable cropping system (having both mono-cot and dicot crops) could improve the soil and environmental quality, thanks.

Regards

23. Elizabeth Mpofu, Zimbabwe Smallholders Organic Farmers Forum (ZIMSOFF), Zimbabwe

The knowledge of the importance of pollinators is within the food producers although we know that the food producers do not always pay attention to these pollinators all the time.

We just think that the bees are the only pollinators forgetting all kinds of butterflies and insects which contribute quite a lot to our plants.

First and foremost there is need to document the disappearance of pollinators and their importance. Campaign against use of chemicals and less use of pesticides is also important and campaign against use of GMOs and use of agro-toxics. It is very important to encourage the growing of natural trees which flowers and not dangerous. Growing crops such as sunflowers, watermelons, pumpkins and pulses are of added value to attract these pollinators.

24. Salomeyesudas, Nalla Kerai (Good Greens) Executive Director, India

During 1995 to 2005 I worked at Deccan Development Society - Farm Science center (KVK) in search of alternatives to chemical agents both for soil nutrition and pest and disease management as team all the scientist of the center were involved in documenting the methods, procedures and practices that were followed in Zaheerbad region of Medak district of Telagana. Many farmers both men and women shared their extraordinary knowledge and skills with us. under the leadership of Dr. B Suresh Reddy all the practices were tested and and most efficient practices were summarized into a beautiful visual tool. These practices increased the life in Soil and in Air.

Thank you Sincerely,

Salomeyesudas

Attachment:

http://www.fao.org/fsnforum/sites/default/files/discussions/contributions/NPM_options.pdf

25. Andrew MacMillan, Formerly FAO, Italy

Friends,

As an amateur beekeeper and agronomist, I have found this discussion to be of great interest.

I often think, especially when tending my bees, about how little we really understand about the multiple connections between humans, insects (including insects with other insects), plants, bacteria and viruses – and yet how easy it is for us to upset and destroy the foundations of the many elements of symbiosis that occur in “nature” and, in one way or another, may affect humanity’s continuing ability to feed itself.

The greatest risk of undermining these delicate relationships seems to come from the release onto the market of new pesticides on the basis of flimsy and narrow information on their health and ecological impacts. Instead of requiring the inventors of products to provide hard proof of their safety, those who perceive possible negative impacts are required to prove the harmfulness of the products in question, but are not provided with either the means or time required to do this. One of the main messages emerging from this “pollinator” discussion is that there is a huge need for increasing the scale of

publicly funded research on the relationships not just between pollinators and crops but also on the other links in the “ecological chain”, in order to create a much better evidence basis for understanding the impacts of technology changes in farming. The regulatory bodies should be given ample resources to commission any additional independent research required to prove the safety of potentially damaging products before approving their large-scale use or extension of use.

This danger of promoting over-simplistic solutions, such as those for creating pollinator habitats on less productive areas of a farm as advocated by Romano de Vivo (in this discussion on 30/08/16), are evident from a recent paper in *Nature Communications* (<http://www.nature.com/articles/ncomms12459>) entitled “Impacts of neonicotinoid use on long-term population changes in wild bees in England”, published on line on 16th August.

The very idea of creating special habitats for pollinators is a tacit admission that pesticide treated crops are damaging to populations, but it ignores the fact that honey bees will travel over 3 km to forage for nectar and pollen. If systemic insecticides are used on a crop such as oilseed rape or sunflower which is attractive to bees of various species and end up in the pollen or nectar, it seems pretty obvious that the proposed creation of pollinator habitats will achieve little reduction in the intake of the contaminated products of foraging unless they are far away from the crops in question.. Field hedges will also be exposed to the risk of pesticide drift during applications.

A useful discussion of this issue is provided in article by Ian Fitzpatrick http://sustainablefoodtrust.org/articles/science-versus-politics-neonicotinoid-saga/?utm_source=SFT+Newsletter&utm_campaign=2ba23a2d7a-Newsletter_07_10_2014&utm_medium=email&utm_term=0_bf20bccf24-2ba23a2d7a-105097533, entitled “Science versus politics in the neonicotinoid saga”, quoted in a recent issue of the newsletter of the Sustainable Food Trust.

Andrew MacMillan

26. Romano De Vivo, Syngenta, Switzerland

The overwhelming majority of scientific opinion on pollinator health confirms that this is a complex issue.

Threats are multiple and include land-use change, intensive agricultural management and pesticide use, environmental pollution, invasive alien species, pathogens, and climate change.

Emerging and re-emerging diseases are a significant threat to the health of honeybees, bumblebees and solitary bees especially when managed commercially.

There is a need of moving towards more sustainable agricultural practices and reversing the simplification of agricultural landscapes.

The Assessment on Pollinator of Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) confirms both the complexity and the multifaceted nature of this issue.

The analysis of Le Conte (2010) is very clear to this regard; even the European Commission on the main causes of bee mortality, according to beekeepers, shows 13 different threats. Some of these threats are dealing with beeking practice (according to COLOSS hobby beekeepers report higher losses).

Attachment:

<http://www.fao.org/fsnforum/sites/default/files/discussions/contributions/EU%20Commission%20-%20bee%20mortality%20according%20to%20beekeepers.pdf>

<http://www.fao.org/fsnforum/sites/default/files/discussions/contributions/Bee%20stressors%20according%20to%20Le%20Conte%20et%20al.%202010.pdf>

27. Assan Ngombe, UNDP – Global Policy Centre on Resilient Ecosystems and Desertification, Kenya

Dear facilitator,

On the question of what more needs to be done to encourage pollinator friendly practices - I would like to give a generic answer on the need for more work to be done in the collection of information, data, case studies and research to understand the extent of human activities that affect pollinators. This information needs to be analysed and used to develop context specific solutions for those that produce food (farmers) and those that perform activities that affect pollinators and the pollination process - industry, town planners, and many other sectors. The issue is complex and requires a multi sectoral approach. The work being undertaken reflects this complexity and it is commended.

Thanks

28. Bibhu Santosh Behera, Ouat Bhubaneswar, Odisha, India (second contribution)

Dear All FAO/UNEP members

Warm greetings

I have developed a FFS Session and Activity note as attached below for the sustainability of farmer Fraternity. Please have a look on it to strengthen your farmers.

Regards

Bibhu Santosh Behera

Independent Scientist

Attachment:

<http://www.fao.org/fsnforum/sites/default/files/discussions/contributions/Farmers%20Field%20School%20latest%20-%20Copy%20%282%29.docx>

29. Frank Eyhorn, HELVETAS Swiss Intercooperation, Switzerland

Reducing the use of agrochemicals plays a key role in protecting and promoting pollinators. This, however, is a joint responsibility of farmers, scientists, businesses, policy makers, retailers and consumers. Various measures have been identified to reduce the use of pesticides in agriculture, including agro-ecological farming system design, crop rotations and mixed cropping, setting conducive policies and promoting organic farming (for details see the briefing paper: Reducing pesticide use and risks - What action is needed?[http://assets.helvetas.org/downloads/briefing_paper_pesticide_reduction ...](http://assets.helvetas.org/downloads/briefing_paper_pesticide_reduction...)).

A very promising approach is to replace pesticides by biocontrol means. Recently there have been major developments in this sector (see <http://www.ibma-global.org/>). In a panel discussion with representatives from the biocontrol industry, civil society, retailers and policy makers we look at the potential of biocontrol to reduce pesticide use, and how to further enhance its use (see www.helvetas.ch/pesticides). Check the site for updates on this topic!

Regards,

Frank Eyhorn

Senior Advisor Sustainable Agriculture

HELVETAS Swiss Intercooperation

30. James Edge, facilitator of the discussion, FAO, Italy

Thank you everyone who has taken part in this interesting discussion on the role of pollinators and promoting their role in environmental and agricultural practices. Responses were received from all over the world – pollination is clearly an issue that is widespread and topical. The result is a diverse range of priorities and practical solutions to promoting pollinators in agriculture – many of which can be adapted to a range of local conditions.

Information about how we can protect pollinators seems to be available, but more work needs to be done to raise awareness, answering questions such as What is pollination? Which species are pollinators? Why is pollination so important?. In addition, more training and support is needed to promote pollinator-friendly practices. These issues, and, in particular, the question how we can tackle the human-induced challenges to pollinator species – especially the use of pesticides, habitat loss and climate change – need to be raised at policy level.

These lessons will be shared through FAO networks and remain online as a valuable resource.

Thank you again for all your contributions.

James Edge

31. Juan Carlos Plaza González, Chile

Con el crecimiento explosivo de la población humana mundial, los polinizadores, en general, y las abejas de la especie *Apis mellifera*, en particular, son parte fundamental de la oferta de alimentos de excelente calidad nutritiva para esta población humana que crece exponencialmente, contribuyendo a la inexistencia de grandes problemas de salud pública mundial. En tal sentido, la preocupación por los polinizadores debe ser considerada como una de las políticas públicas esenciales del mundo contemporáneo.

La salud de las abejas, a diferencia de las otras especies pecuarias de importancia económica para el hombre, está afectada tanto por factores internos a la apicultura como factores externos a ella. Solo siete son las enfermedades de las abejas: loque americana (*Paenibacillus larvae*), loque europea (*Melisococcus pluton*), nosemosis tipo A (*Nosema apis*), acariosis traqueal (*Acarapis woodi*), varroosis (*Varroa destructor*), nosemosis tipo C (*Nosemosis ceranae*) y el pequeño escarabajo de las colmenas (*Aethina tumida*). Las virosis debemos considerarla como enfermedades oportunistas por estar muy asociadas a varroosis.

La irrupción de varroosis (*Varroa destructor*) como una panzootia mundial desde mediados del siglo XX es el principal problema interno de la apicultura. La prescindencia de la dependencia obligada a los tratamientos antivarroa es el mayor desafío que posee las ciencias veterinarias contemporáneas desde que se crearon las primeras escuelas de medicina veterinaria en el mundo occidental a partir de mediados del siglo XVIII, en Europa.

De acuerdo a análisis api-epidemiológicos la solución de varroosis está más cerca que lejana lo cual la mirada está dirigida a los factores externos a la apicultura que afectan a la salud de las abejas donde la pérdida de hábitat por la deforestación y la contaminación del medio ambiente por los agroquímicos y las malas prácticas en su uso son los más importantes.

Un aporte para proteger a las abejas melíferas es poner en práctica a uno de los cinco objetivos de la Organización Mundial de la Salud Animal (O. I. E.), el Bienestar Animal, que desde el año 2004 ha comenzado a aplicarse en animales terrestres y acuáticos donde cuya definición hace mención a la protección y seguridad que deben tener los animales como uno de las características para hacer frente a su entorno. La deforestación trae consigo un déficit nutricional de las abejas y los agroquímicos desprotegen y no le dan seguridad a las mismas.

http://www.oie.int/index.php?id=169&L=2&htmfile=chapitre_aw_introduction.htm

Attachments:

<http://www.fao.org/fsnforum/sites/default/files/discussions/contributions/Las%20abejas%20y%20la%20cadena%20alimentaria.pdf>

<http://www.fao.org/fsnforum/sites/default/files/discussions/contributions/Las%20abejas%20y%20eliminacion%20de%20neonicotinoides.pdf>

<http://www.fao.org/fsnforum/sites/default/files/discussions/contributions/Las%20abejas%20en%20la%20cuerda%20floja.pdf>

<http://www.fao.org/fsnforum/sites/default/files/discussions/contributions/Las%20abejas%20y%20Mafalda.pdf>

32. Aqleem Abbas, The University of Agriculture, Peshawar, Pakistan

Bees are no doubt, the important and useful insects as they are acting as pollinators. They are in danger because of certain human activities. Today agriculture land in developing countries is depleting, as urbanization continuously dominating because of weak policies of their leaders. More vehicles, more fuel and more smoke, so the bees will be moving away from the agricultural lands, thus there would be drastic effect on pollination process of plants and farmers will get low yield. The more problem, as I think are conflicts among the nations, from the world war 1, up to now, countries are bombing on one another. In my opinion, useful insects like bees are in danger because of smokes coming out from fireworks, bombs and nuclear bombs. These bombs are more dangerous to every organism. The radiations coming out from these bombs are actually mutating the honey production potential of bees. Climate change is also because of human activities. All what we see extinction, is because of human activities. About three centuries ago, we could say because of nature. Now humans are using diesel, water vehicles, small-scale earthquakes because of nuclear bomb experiments, all these activities are polluting our environment as well as weakening the upper surface of earth. The world leaders are gathering annually to discuss climate change. Why not they reduce their nuclear weapons?? In my opinion, every bullet having chemical is mutagen for any organism. There is no solution, we cannot protect bees, to discuss such topic here seem to be futile, the only solution is use

water as a fuel, stop preparation of nuclear bombs or other lethal bombs, everything will be ok. Use wind or water energy as a source for electric city, every organism even bees will be safe.

33. Adolfo Hurtado, Nicaragua

Para una solución duradera a la situación de los polinizadores, es necesario una respuesta global vinculada a un desarrollo territorial más incluyente, integrado y sostenible, y un sistema alimentario sostenible, como señala ADHAC Centroamérica.

Por lo que, para fomentar las prácticas respetuosas con los polinizadores, podría ser pertinente:

- Desarrollar prácticas productivas respetuosas con el medio ambiente, donde el resultado sea: + biodiversidad + cobertura forestal + agua - temperatura - contaminación = +a biomasa útil para humanos y otros (polinizadores ...);
- Desarrollar una economía rural construida sobre la gestión de la biodiversidad con cobertura forestal en los sitios críticos como laderas y cuencas;

Concienciándonos que somos parte de la tela de la vida y lo que nos rige es igualmente válido para el resto de la vida, y viceversa.

Esto demanda una producción y fortalecimiento de la gestión de conocimiento para:

- Comprender el deterioro de la biodiversidad como un deterioro en la estabilidad intra anual de disponibilidad alimentaria para los polinizadores, igual que los humanos;
- Comprender el deterioro de la cobertura forestal como degradación (reducción de disponibilidad y estabilidad) de fuentes de agua e incremento de temperatura, y con ello, un acelerador del deterioro anteriormente mencionado;
- Comprender el monocultivo y malas prácticas intensivas en agroquímicos como pérdida de la calidad alimentaria (poca diversificación alimentaria e inocuidad comprometida) para los polinizadores, igual que los humanos;
- Desarrollar conocimientos técnicos económicos para cadenas de valor apoyadas en la gestión de la biodiversidad;
- Fortalecer una cultura alimentaria, de consumo responsable, gestora de la biodiversidad y su estacionalidad

34. Bill Butterworth, Land Research Ltd, United States of America

A useful contribution to the debate on pollination globally is made in the book “the Urban Bee Keeper – a Year of Bees in the City” by Steve Benbow, ISBN 978 0 22 408689 9.

35. France, sent through the permanent representation of France to the Rome-based UN Agencies

Objet : FAO / FSN Forum : Comment pouvons-nous protéger les pollinisateurs et souligner leur importance dans les pratiques environnementales et agricoles ?

La France, de par sa grande diversité de paysages et de climats (atlantique, montagnard, méditerranéen, ...), accueille une variété d'insectes pollinisateurs exceptionnelle (abeilles, papillons, mouches, scarabées floricoles,...). On constate depuis quelques années un déclin de ces espèces. Ce sont globalement la dégradation de leurs conditions de vie et d'habitat, et la diminution de la ressource et de la diversité florales pour leur alimentation qui sont responsables de ce déclin. La pollinisation permettant la reproduction du vivant, le déclin des insectes pollinisateurs entraîne une perte regrettable de la biodiversité (appauvrissement d'écosystèmes et de diversité génétique). Il convient de rétablir l'enchaînement favorable suivant : augmentation de la ressource florale, accroissement de la diversité des insectes pollinisateurs sauvages qui à son tour contribue à la diversité florale, rétablissement du service écosystémique de pollinisation au service de l'homme et de la biodiversité.

1. Activités ayant démontré leur capacité à promouvoir les insectes pollinisateurs

1.1 Les outils de la PAC déclinés en France qui visent notamment à préserver les insectes pollinisateurs

1.2 Plusieurs plans pour favoriser les pollinisateurs dans le cadre du projet agro-écologique pour la France : Ecophyto / Plan ambition bio / Apiculture durable /

1.3 L'action collective au service de la préservation des pollinisateurs : l'exemple des GIEE

1.4 Un outil au service de la connaissance et de la mobilisation : l'Observatoire Agricole de la Biodiversité

1.5 La mise en réseau des organisations professionnelles agricoles, des instituts techniques agricoles et de la recherche : le RMT agriculture et biodiversité

1.6 L'intégration dans les signes de l'origine et de la qualité de principes agro-écologiques favorables aux pollinisateurs

1.7 La plan pollinisateur sauvage

1.1 Les outils de la PAC déclinés en France qui visent notamment à préserver les insectes pollinisateurs

Les politiques agricoles évoluent pour prendre en compte la préservation des insectes pollinisateurs.

Plusieurs dispositifs du second pilier de la PAC favorisent la prise en compte de la biodiversité et des pollinisateurs, parmi lesquelles les mesures agro-environnementales et climatiques, les mesures pour la conversion et le maintien de l'agriculture biologique, les aides en faveur de l'agroforesterie et en faveur d'actions dans les zones Natura 2000.

La France, forte de son expérience en matière de mise en œuvre de mesures agro-environnementales et climatiques, souhaite mettre en avant des exemples concrets de mesures qui ont démontré leur efficacité sur le terrain en faveur de la biodiversité.

Les mesures agro-environnementales et climatiques sont des aides financières, négociées dans le cadre de la Politique agricole commune (PAC) au niveau européen, qui ont pour objet :

d'accompagner le changement des pratiques agricoles afin de répondre à des pressions environnementales identifiées à l'échelle des territoires ;

de maintenir les pratiques favorables sources d'aménités environnementales, là où il existe un risque de disparition ou d'évolution vers des pratiques moins vertueuses.

Elles rémunèrent des engagements, qui vont au-delà des pratiques rendues obligatoires par la réglementation. Ces engagements sont souscrits volontairement pour une durée de 5 ans.

Plusieurs mesures sont importantes pour la préservation des pollinisateurs :

- * « COUVER 07 » : création et entretien d'un couvert d'intérêt floristique et faunistique ;
- * « HERBE 07 » : maintien de la richesse floristique d'une prairie permanente ;
- * « PHYTO 02 » : absence de traitement herbicide ;

La mesure « Maintien de la richesse floristique d'une prairie permanente » (herbe 07)

L'objectif de cette opération à obligation de résultat est le maintien des prairies permanentes riches en espèces floristiques qui sont à la fois des habitats naturels et des habitats d'espèces produisant un fourrage de qualité et souple d'utilisation. La préservation de leur biodiversité passe par le non-retournement des prairies, une fréquence d'utilisation faible (1 à 2 fauches annuelles et 2 à 3 passages du troupeau), une première utilisation plutôt tardive et une fertilisation limitée.

Intérêts de la démarche :

- * cette mesure agro-environnementale et climatique (MAEC) reconnaît la technicité et le rôle des agriculteurs dans la préservation de la diversité biologique.
- * elle met en avant la valeur de la biodiversité des prairies pour les exploitations agricoles. Tout l'enjeu est de conduire les agriculteurs à "trouver une articulation entre les surfaces à gestion extensive, où la biodiversité peut être valorisée, et intensive, nécessaires à l'économie de l'exploitation."
- * L'agriculteur s'engage sur un résultat (la présence sur sa parcelle d'au moins quatre espèces de plantes parmi une liste de référence) sans qu'il n'y ait de pratiques imposées. L'objectif est la préservation d'une flore riche et variée. (<http://agriculture.gouv.fr/prairies-fleuries-concilier-agriculture-et-biodiversite>)

Les modes d'exploitations peuvent varier d'une région à l'autre ou d'une année à l'autre. Cette opération permet aux exploitants d'adapter leurs pratiques à ces spécificités locales et aux variations annuelles tout en garantissant le maintien de la richesse biologique.

Cette opération vise plus spécifiquement des territoires de projets agroenvironnementaux et climatiques portés par des parcs naturels régionaux, parcs nationaux ou conservatoires régionaux d'espaces naturels ou dont l'opérateur s'adjoint l'aide de telles structures pour l'animation du projet.

Par ailleurs, certaines dispositions du premier pilier visent à prendre en compte la biodiversité. Par exemple, le verdissement des aides comporte l'obligation pour les agriculteurs d'avoir au moins 5 % de surfaces d'intérêt écologique sur les surfaces arables. Le maintien de SIE, accompagné des bonnes pratiques (notamment en termes d'usage de pesticides) vont dans le sens de la préservation des pollinisateurs.

1.2. Plusieurs plans pour favoriser les pollinisateurs dans le cadre du projet agro-écologique pour la France

Depuis 2012, le Ministère chargé de l'Agriculture (MAAF) a défini un nouveau projet pour l'agriculture visant à concilier la performance économique et la performance environnementale tout en prenant en compte la dimension sociale des exploitations agricoles. Ce projet agro-écologique vise ainsi à produire

autrement en repensant nos systèmes de production afin qu'ils soient favorables à l'environnement et à la biodiversité notamment.

Pour cela, un plan d'action globale couvrant les différents domaines (recherche, développement, formation, accompagnement des agriculteurs, soutiens financiers, etc.) a été défini en co-construction avec l'ensemble des partenaires en 2014.

Le projet agro-écologique est également constitué de programmes d'action, qui contribuent tous plus au moins directement à la mise en place de pratiques agricoles favorables à la conservation et à l'utilisation de la biodiversité (Plan ecophyto, Ecoantibio, Ambition bio, semences et agricultures durables, protéines végétales).

Plan Ecophyto

L'objectif de ce plan est de réduire de 50% le recours aux pesticides en France en dix ans et s'inscrit dans une prise en compte globale de la biodiversité par l'agriculture. La réduction de l'utilisation, des risques et des impacts des pesticides demeure nécessaire, au regard de l'évolution des connaissances depuis 2008 sur leurs effets sur la biodiversité, mais aussi sur l'environnement et les services écosystémiques qui en dépendent, par exemple les pollinisateurs, et sur la santé humaine. C'est sur la base de recommandations d'un bilan d'un premier plan, et par la consultation des parties prenantes du plan ainsi que du public, que le plan Ecophyto II a été élaboré¹.

Le plan mise notamment sur le développement des solutions de biocontrôle, aujourd'hui peu nombreuses, permettant de maîtriser les adventices, dont les espèces envahissantes à enjeu pour l'agriculture, la biodiversité et la santé. Le suivi des effets non intentionnels (ENI) des traitements sur la biodiversité seront renforcés, y compris en étendant le réseau d'observation des ENI existant. La stratégie nationale de recherche et d'innovation s'appuiera sur les connaissances tirées de l'écologie, avec les interactions entre les plantes cultivées, leurs bioagresseurs et les autres composantes des agroécosystèmes. Parmi ces composantes, le plan vise spécialement la biodiversité des sols. Les moyens alloués à la recherche et à l'innovation seront renforcés, en particulier sur le développement de solutions innovantes moins impactantes pour l'environnement.

La maîtrise de l'ensemble des risques liés à l'utilisation des pesticides sera placée au cœur du plan Ecophyto II, avec la volonté de réduire les risques aussi sur les différents compartiments de l'environnement et la biodiversité. Un dispositif de phytopharmacovigilance sera mis en œuvre, avec pour objet la surveillance des effets indésirables des produits phytopharmaceutiques sur l'homme, sur les animaux d'élevage, dont l'abeille domestique, sur les plantes cultivées, sur la biodiversité, sur la faune sauvage, sur l'eau et le sol, sur la qualité de l'air et sur les aliments, ainsi que sur l'apparition de résistances à ces produits et l'alerte des autorités compétentes lorsque des effets indésirables semblent nécessiter des mesures de gestion particulières. Les indicateurs de risque et d'impact élaborés dans le plan Ecophyto I seront mis en œuvre afin de mieux mesurer la toxicité des pesticides, à savoir avec leurs impacts sur la biodiversité ou encore le développement d'espèces nuisibles ou envahissantes.

Le plan Ecophyto 2 met en avant une action volontariste de sensibilisation qui sera menée par la France auprès des autres Etats-membres de l'Union européenne, pour leur faire partager la nécessité de renforcer les restrictions d'usage et de retirer au plus vite les produits contenant des substances dont la dangerosité pour la santé humaine ou pour la biodiversité (notamment cancérogènes, mutagènes et reprotoxiques, perturbateurs endocriniens) est avérée ou fortement suspectée. Le plan Ecophyto 2

¹ Plan disponible sur <http://agriculture.gouv.fr/ecophyto-les-nouvelles-orientations-du-plan>

s'intéresse aussi à la biodiversité en ville et vise également à accompagner les collectivités et les autres acteurs publics ainsi que les jardiniers amateurs vers les restrictions d'utilisation prévues par la loi.

En matière de gouvernance, le plan Ecophyto 2 installe un copilotage entre les ministères en charge de l'agriculture et de l'environnement, permettant une meilleure prise en compte de la biodiversité.

Plan de développement de l'agroforesterie

L'année 2015 a été l'année de préparation du plan de développement de l'agroforesterie qui a été lancé par le Ministre chargé de l'agriculture le 17 décembre 2015. S'ajoutant aux 6 autres plans d'actions du projet agro-écologique pour la France, ce plan quinquennal (2015-2020) inscrit ainsi l'agroforesterie parmi les leviers majeurs de la transition agro-écologique des territoires. Décliné en 5 axes et 23 actions, ce plan entend donner une impulsion décisive au développement de l'agroforesterie en France : mise en place d'un observatoire de l'agroforesterie, renforcement de la recherche, pilotage d'un réseau de fermes agroforestières-pilotes, cadres réglementaire et juridique et appuis financiers (PAC, etc.), modules de formation spécifiques, réseaux de conseillers, développement des filières, promotion de l'agroforesterie au niveau européen et national, etc.

L'agroforesterie est l'association d'arbres et de cultures ou d'animaux sur une même parcelle ; de nombreuses formes existent en France, certaines très anciennes et d'autres plus récentes : bocages, prés-vergers (vergers sur prairies pâturées en élevage), prés-bois, alignements de peupliers, plantations de noyers ou d'autres essences à l'intérieur des parcelles, etc. Ces pratiques sont aujourd'hui mises en avant car elles combinent de nombreux avantages agronomiques et environnementaux : régulations micro-climatiques et hydriques, stockage du carbone, résilience au changement climatique, interface avec le sol, limitation du ruissellement, ou encore réduction des besoins en intrants. En termes de biodiversité, les arbres et les haies permettent une diversité des espèces et des habitats, ce qui est aussi favorable aux auxiliaires des cultures et pollinisateurs. Les avantages sont multiples et importants. De plus, les arbres ont la capacité d'absorber le CO₂ et, durant leur phase de croissance, de stocker le carbone. Ils participent donc à atténuer les effets du changement climatique par enrichissement du sol en matières organiques, et stockage du carbone par les différentes parties des arbres associés aux cultures ou à l'élevage. L'agroforesterie contribue également à l'initiative « 4 pour 1000, les sols pour la sécurité alimentaire et le climat » lancée lors de la COP 21 de la Convention-cadre des Nations-Unies sur les changements climatiques, le 1er décembre 2015 par le Ministre chargé de l'agriculture.

Le Plan de développement durable de l'apiculture³

Des climats différents, une géographie, des cultures diverses : la France a les atouts pour être un grand pays apicole. Cependant, aujourd'hui, la production nationale correspond à moins de la moitié du miel consommé en France. Pour répondre à la demande, il faudrait un million de ruches et 3000 apiculteurs supplémentaires. Or, les taux de mortalités observés sur les colonies d'abeilles dans le monde se sont fortement accrus, dépassant parfois les 30 % par an. Agressions chimiques, parasites, infections, insuffisance de ressources alimentaires, frelon asiatique... Il est dorénavant établi qu'il n'y a pas une cause unique de mortalité.

Suite à ce constat, le ministre de l'agriculture, de l'agroalimentaire et de la forêt a lancé le 8 février 2013 un plan de développement durable de l'apiculture (PDDA), qui aborde de façon globale les différentes

² Plan disponible sur <http://agriculture.gouv.fr/stephane-le-foll-presente-le-plan-national-de-developpement-de-lagroforesterie>

³ Plan disponible sur <http://agriculture.gouv.fr/plan-de-developpement-durable-de-lapiculture-0>

composantes de la crise que l'apiculture traverse pour y apporter des réponses adaptées et pertinentes. Ce plan, qui mobilise 40 millions d'euros sur trois ans, élaboré en concertation avec les acteurs de l'amont à l'aval, constitue un engagement sans précédent.

Le premier enjeu concerne le maintien des populations d'abeilles et la santé des colonies. Résorber le problème de mortalité des abeilles, et, plus généralement, recréer des conditions environnementales et sanitaires favorables à l'abeille constitue une priorité. La mobilisation concertée et coordonnée des acteurs a permis d'obtenir des avancées, tant au niveau européen qu'au niveau national dans le domaine sanitaire : fortes restrictions d'utilisation de trois néonicotinoïdes en usage phytosanitaire, refonte complète de la procédure d'évaluation des produits phytosanitaires par l'autorité européenne de sécurité des aliments, mise en place au niveau national d'un d'observatoire des résidus de pesticides, soutien à la recherche, retrait de l'autorisation de mise sur le marché du Cruiser OSR sur colza, classement du frelon asiatique en danger sanitaire et interdiction de son introduction sur le territoire national.

Ajouter que la loi pour la préservation de la biodiversité, de la nature et des paysages (promulguée le 8 août 2016) prévoit l'interdiction des néonicotinoïdes à partir de 2018 (dérogations possibles jusqu'en 2020)

Le second enjeu vise à inscrire la filière économique dans une perspective durable de développement, tant pour augmenter la production de miel et de produits de la ruche, dont la France est un importateur net, que pour garantir le rôle fondamental que jouent les colonies dans la pollinisation. L'installation de nouveaux apiculteurs, mais également la formation initiale et continue des apiculteurs et des techniciens et vétérinaires travaillant à leurs côtés sont une composante essentielle de ce développement. Le PDDA accompagne en outre l'organisation de la filière, et notamment la structuration de l'élevage pour assurer le maintien et le développement des cheptels. Ces actions visent à assurer le rayonnement de l'apiculture française et contribuer à faire de la France l'un des premiers producteurs apicoles en Europe.

Le PDDA a fait l'objet d'un nouveau point d'étape présenté par le ministre le 19 juin 2015. Avec 70 % des actions mises en œuvre en trois ans, le PDDA est pérennisé pour deux ans et réorienté sur les actions nécessitant la mobilisation des acteurs de la filière et les outils de formation.

Par ailleurs, les réflexions se poursuivent pour optimiser les aides du programme apicole européen (PAE), notamment en visant une amélioration des conditions de production de miel, et pour consolider les entreprises du secteur. Pour la période 2014-2016, la France a obtenu une enveloppe de 10,6 millions d'euros, soit 3,53 millions d'euros par an. Le paiement de ces crédits communautaires nécessite par ailleurs la mobilisation de crédits nationaux en contrepartie pour un montant équivalent, soit 7,05 millions d'euros par an au total pour la filière apicole française. Le PAE constitue le principal instrument financier pour améliorer les conditions de production et de commercialisation des produits de l'apiculture. Ce programme finance des actions de lutte contre le varroa, des aides directes pour les apiculteurs, la recherche sur la mortalité apicole et la recherche génétique, l'assistance technique, du conseil aux apiculteurs, et la majeure partie des actions de l'institut technique de l'abeille. Il permet également de financer des analyses de miels et des stations de testage génétique.

Plan ambition Bio 2017

Ces mesures concourent globalement à la préservation des insectes pollinisateurs, en particulier toutes les mesures prises pour le développement de l'agriculture biologique si on considère que l'utilisation de pesticides est une des premières causes de risque.

Des programmes d'actions quinquennaux pour le développement de l'agriculture biologique ont été mis en place depuis les années 2000. Le programme Ambition bio 2017⁴ élaboré dans le cadre d'un large travail de concertation avec l'ensemble des acteurs, a été lancé par le ministre en charge de l'agriculture en 2013 et il a pour objectif de donner un nouvel élan au développement équilibré de toutes les filières de l'agriculture biologique : "du champ à l'assiette", de la production à la consommation, en passant par la transformation et la commercialisation.

Les grandes orientations du programme

- Un objectif général de doublement de la part des surfaces bio d'ici 2017 (passer de 4 à 8%), associé à un objectif ambitieux de développement à tous les stades de la production, de la transformation, de la distribution et de la consommation
- Un nouvel élan à la structuration des filières
- La mise en place d'une nouvelle gouvernance, reflet de l'implication des acteurs concernés aux niveaux régional et national et renforcement du rôle de l'Agence bio
- Un programme d'actions, articulé autour de 96 axes, s'inscrivant dans le projet agro-écologique pour la France

Les principales actions réalisées ou en cours

Axe 1 – Développer la production

Mise en place des dispositifs d'aides à la conversion et au maintien dans le cadre du 2ème pilier de la PAC

Prolongation du crédit d'impôt

Mesures pour le maintien des terres en bio et pour favoriser l'accès au foncier dans la LAAF

Mise en place d'une action thématique transversale « agriculture biologique » pour les instituts techniques agricoles

Accompagnement d'actions pour le développement de la bio dans les zones à enjeux eau

Axe 2 – Structurer les filières

Renforcement du fonds avenir bio (4 millions d'euros/an)

Mise en place d'actions pour favoriser l'émergence de projets (guides, forums, club des financeurs ...)

Axe 3 – Développer la consommation

Mise en œuvre d'un nouveau programme de communication par l'Agence bio

Mise en place d'outils et actions pour favoriser le développement de la consommation bio en RHD (guides, séminaires, brochures à destination des hôpitaux, de la restauration commerciale)

⁴ Programme disponible sur <http://agriculture.gouv.fr/ministere/programme-ambition-bio-2017>

Axe 4 – Renforcer la recherche, son pilotage et la diffusion des résultats

Définition de 9 enjeux prioritaires de recherche

Implication des différents acteurs dans l'élaboration des projets de recherche (convention INRA-ITAB, séminaires INRA impliquant tous les acteurs)

Renforcement du rôle et des missions du CSAB

Travail en cours de l'ITAB sur les références en AB

Étude en cours sur les aménités de la bio

Axe 5 – Former les acteurs agricoles et agroalimentaires

Mise en œuvre du plan « enseigner à produire autrement » dans le cadre du projet agro-écologique, en lien avec le réseau Formabio

Travail avec le ministère de l'éducation nationale pour introduire des spécificités bio dans les référentiels des métiers de bouche (notamment boulanger-pâtissier, boucher-charcutier)

Travail en cours avec les établissements de l'enseignement supérieur

Axe 6 – Adapter la réglementation

Meilleure prise en compte des spécificités de la bio dans la réglementation générale (substances de base, plan semences durables, travail en cours sur la phytothérapie, identification des produits bio dans les flux d'échanges avec la mise en place des certificats électronique en cours)

Amélioration de la réglementation spécifique bio (discussions en cours dans le cadre de la révision réglementaire, autorisation automatique des substances de base, facilitation de l'utilisation des mélanges fourragers, mise en place d'un catalogue national de sanctions....).

1.3 : l'action collective au service de la préservation des pollinisateurs : l'exemple des GIEE

La loi d'avenir pour l'agriculture, l'alimentation et la forêt du 13 octobre 2014 a introduit dans le code rural une définition des systèmes de production agro-écologiques fondés sur l'utilisation des services écosystémiques, en particulier ceux fournis par la biodiversité. Cette loi a créé les groupements d'intérêt économique et environnemental (GIEE). L'objectif est de reconnaître des groupements d'agriculteurs volontaires qui s'engagent dans un projet collectif d'amélioration ou de consolidation de leurs pratiques pour tendre vers un système agro-écologique.

Un exemple de GIEE impliqué dans la préservation des pollinisateurs

Le projet de l'association Api-Soja31 (GIEE 2016), comprenant 22 agriculteurs, se met en place dans un territoire de grandes cultures du sud-ouest de la France (région Midi-Pyrénées). Dans le contexte actuel d'augmentation du taux de mortalité des colonies et de forte diminution de la production de miel et autres produits de la ruche, ce projet ambitionne de faire évoluer les pratiques agricoles vers des pratiques plus favorables aux insectes pollinisateurs. Il s'appuiera pour cela sur des actions de sensibilisation, d'information et de formation, sur des expérimentations, ainsi que sur le développement des échanges entre agriculteurs et apiculteurs.

1.4 Un outil au service de la connaissance et de la mobilisation : l'Observatoire Agricole de la Biodiversité

L'observatoire agricole de la biodiversité est un dispositif de sciences participatives, réservé aux agriculteurs, qui a été mis en place en 2009 (par le ministère de l'agriculture, le Muséum national d'histoire naturelle et l'Assemblée permanente des chambres d'agriculture) et comporte 4 protocoles distincts, dont deux visent directement la protection des pollinisateurs : le protocole « abeilles solitaires » consiste pratiquement à observer l'évolution de nichoirs, et le protocole « papillons » consiste à compter les papillons (et à les déterminer) le long d'une parcelle agricole. Les résultats de l'observatoire agricole de la biodiversité pourraient permettre, prochainement, de contribuer à l'élaboration d'un indicateur de biodiversité intégrant parfaitement le rôle et l'importance des pollinisateurs.

<http://observatoire-agricole-biodiversite.fr/>

1.5 La mise en réseau des organisations professionnelles agricoles, des instituts techniques agricoles et de la recherche

- une plate-forme d'échange et de capitalisation des pratiques favorables à la biodiversité (Réseau mixte technologique Biodiversité) regroupant une centaine de partenaires. Son site internet vient d'être lancé et permet de capitaliser les expériences⁵.

<http://www.rmt-biodiversite-agriculture.fr>

1.6 L'intégration dans les signes de l'origine et de la qualité de principes agroécologiques favorables aux pollinisateurs

L'objectif est de renforcer l'approche agro-écologique au sein des signes de l'origine et de la qualité, confortant les démarches entreprises par les professionnels depuis plusieurs années. Il s'agit notamment d'intégrer dans les cahiers des charges certaines exigences en matière notamment de préservation et de développement de la biodiversité, la limitation de l'usage des pesticides.

1,7 Le plan pollinisateur sauvage

Le premier Plan national d'actions en faveur des abeilles et des insectes pollinisateurs sauvages, « France, terre de pollinisateurs », paru en février 2016, est déployé sur l'ensemble du territoire métropolitain. Il vise à enrayer le déclin des insectes pollinisateurs et à préserver le service qu'ils rendent.

Le plan national d'actions « France, terre de pollinisateurs » cherche à susciter la mobilisation et l'implication de tous et notamment des gestionnaires d'espaces. Ce plan comporte 20 actions, dont 6 prévoient une consolidation de la connaissance de ces espèces d'insectes, indispensable à la mise en œuvre de mesures opérationnelles en leur faveur. 6 actions visent la sensibilisation d'un large public. 7 actions incitent les différents gestionnaires d'espaces à mettre en œuvre de bonnes pratiques pour améliorer les conditions de vie des pollinisateurs.

Chacun, à son niveau, peut en effet prendre part à la reconquête de la pollinisation, aussi bien les pouvoirs publics (services de l'Etat, collectivités territoriales et leurs établissements publics) que les

⁵ <http://www.rmt-biodiversite-agriculture.fr>

acteurs du monde rural (agriculteurs, utilisateurs de semences, apiculteurs), les fabricants de pesticides, les entreprises, les gestionnaires d'espaces ou le particulier.

Il est en tout état de cause important que les gestionnaires de territoires dont la ressource florale peut être développée et enrichie s'impliquent afin d'adopter et de déployer des pratiques favorables aux pollinisateurs sauvages : espaces ruraux, forêts, dépendances vertes des infrastructures de transport et des terrains industriels, espaces verts non industriels, espaces naturels protégés.

L'agriculture, du fait de sa dominance territoriale et de son impact sur les paysages et les écosystèmes, du fait de ses obligations en termes de besoins alimentaires des populations, et du fait de ses propres besoins en matière de pollinisation, est un secteur d'activité prépondérant.

Le plan national d'actions « France, terre de pollinisateurs » est complémentaire du Plan de développement durable de l'apiculture.

le lien informatique vers le pna pollinisateurs est le suivant :

<http://www.developpement-durable.gouv.fr/Un-plan-national-d-actions-France.html>

2. Que devrait-on faire d'autre pour encourager des pratiques respectueuses des pollinisateurs ?

Les politiques publiques ont pour ambition de porter l'essentiel des mesures qui, à terme, porteront leurs fruits pour atteindre tous leurs objectifs.

A ce stade, les politiques publiques visent donc à maintenir et à développer les mesures mises en place dans le cadre du projet agro-écologique pour la France, en insistant en particulier sur les domaines nécessitant des actions à long terme, entre autres les secteurs de la recherche et de l'éducation.

3. Quels sont les besoins de formation, de supports ou d'informations pour adopter des pratiques respectueuses de l'environnement ?

Plan Enseigner à produire autrement

Le plan Enseigner à produire autrement décline pour l'Enseignement technique agricole le projet agro-écologique pour la France. Lancé le 03 avril 2014 pour la période 2014-2019, il est composé de 4 axes:

1. Rénover les référentiels des diplômes et les pratiques pédagogiques ;
2. Mobiliser les exploitations agricoles et ateliers technologiques ;
3. Renforcer la gouvernance régionale (gestion par la sous-direction Recherche, Innovation et Coopération Internationale ;
4. Former les personnels et accompagner les établissements dans leurs projets « enseigner à produire autrement » (gestion par les sous-directions Recherche, Innovation et Coopération Internationale et des Établissements, des dotations et des compétences et par la Mission d'appui au pilotage et des affaires transversales.

Axe 1 : les référentiels de différents diplômes ont été rénovés afin de prendre en compte les nouvelles notions introduites par l'agro-écologie : BTSA Analyse et conduite des systèmes d'exploitation (ACSE) et Développement de agriculture des régions chaudes (DARC) pour la rentrée 2014, CAPA du secteur de la production agricole pour la rentrée de 2015 et Bac professionnel et Brevet professionnel Conduite et gestion de l'exploitation agricole pour la rentrée 2016.

Axe 2 : les exploitations agricoles et ateliers technologiques des Établissements publics d'Enseignement et de Formation Professionnelle agricole (EPLEFPA) ont été fortement mobilisées pour prendre en compte les différents plans du projet agro-écologique pour la France dans leurs orientations stratégiques. Trois appels à projets « Transition agro-écologique des exploitations agricoles et ateliers technologiques de l'enseignement agricole », lancés en 2014, 2015 et 2016 et financés par le CASDAR, ont permis de soutenir 42 projets sur une période de 3 ans à hauteur de 20000 € par projet.

Axe 3 : chaque région a proposé fin 2014 un programme régional de mobilisation de l'enseignement agricole pour l'agro-écologie.

Axe 4 : 135 référents « Enseigner à produire autrement » ayant des profils différents (enseignants bénéficiant d'une décharge horaire de 2 heures/semaine, membres d'équipe de direction, ...) ont été nommés à la rentrée 2014 afin d'accompagner les établissements dans la mise en œuvre de leur projet dans le cadre du programme régional.