

# ANNEX 1

## ASSESSMENT OF THE POTENTIAL VULNERABILITY OF NATIONAL POLLINATOR LOSS TO CLIMATE CHANGE

### SUGGESTIONS OF IMPORTANT NATIONAL DATA:

#### Crop information

- Important crop species and cultivars
- Main system of farming; small scale versus large scale
- The value of pollinator-dependent crops by using FAO's tool for national valuation of pollination services at a national level (<http://www.internationalpollinatorsinitiative.org/jsp/documents/documents.jsp>)
- Number of hectares planted to pollinator dependant crops
- Pollen and nectar flowers
- Temperature sensitivity of the most important pollinator dependant crops obtained from <http://ecocrop.fao.org/ecocrop/srv/en/home>. The metric for the risk assessment: the number of of crops in the top 20 that have an upper max temperature of  $\geq 30^{\circ}\text{C}$ .
- Important environmental cues controlling the phenology of the crop plants (e.g. degree days, day length or other factors important in controlling flowering time)

#### Beekeeping

- Beehive stocks (FAO estimates)
- Honey bee subspecies
- Thermal tolerance of managed honeybees
- Data from scale hives

- Assessment of the potential of introducing alternative pollinators better suited for novel climates
- Understanding of the biology and ecology of alternative pollinators

### Wild/Native pollinators

- Knowledge of the most common wild pollinators of important crops
- Thermal tolerance of native pollinators derived from distributions ([http://www.discoverlife.org/mp/20m?act=make\\_map](http://www.discoverlife.org/mp/20m?act=make_map)). Upper and lower temperature averages for the locations where the wild pollinators have been collected
- Identification of groups of bees above and below the body mass limit capable of endothermic heating – 35 mg
- Important environmental cues controlling the phenology of the most important pollinators (e.g. degree days, day length, snow cover or other factors important in controlling insect activity)
- Periods of activity
- Status of surrounding vegetation, including diversity and abundance of alternative floral resources and nesting sites for wild pollinators
- Proximity to natural surroundings
- Parasites and diseases
- Trends in pesticide use

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Country:

RISK FACTOR	RISK FACTOR RATING	SCORE
<b>1</b>	<b>CROPPING SYSTEM CHARACTERISTICS</b>	
a	Diversity of crops	
High (>50 primary food crops)	1	
Med (20-50 primary food crops)	3	
Low (<20 primary food crops)	5	
Comment:		
b	Main system of farming	
Large	1	
Medium	3	
Small scale (<10 ha)	5	
Comment:		
c	Dependence of pollinators for primary crop production	
Low (0-20%)	1	
Medium (20-40%)	3	
High (>40%)	5	
Comment:		
d	% of agricultural land planted to pollinator dependant crops	
Low (0-20%)	1	
Medium (20-40%)	3	
High (>40%)	5	
Comment:		
e	Pollen and nectar flowers	
Well understood for specific crops, and not threatened	1	
Well understood for specific crops, threatened by env. changes or pressures	3	
Not well known, no known specific threats	4	
Not well known, threatened by env. changes or pressures	5	
Comment:		
f	Temperature sensitivity amongst the 20 most important pollinator dependent crops	
<5 have opt.max temp <30	1	
5-10 have opt. max temp <30	3	
>10 have opt. max temp <30	5	
Comment:		
<b>2</b>	<b>BEEKEEPING</b>	
a	Hive numbers	
Increasing	1	
Static	3	
Declining	5	
Comment:		

RISK FACTOR		RISK FACTOR RATING	SCORE
b	Honeybee subspecies with range of thermal tolerances		
Yes		1	
No		5	
Comment:			
c	Alternative managed pollinators		
1 or more used commercially, biology well understood		1	
1 or more used commercially, biology not well understood		3	
None		5	
Comment:			
<b>3</b>	<b>WILD/NATIVE POLLINATORS</b>		
a	Knowledge base of wild pollinators		
Well known		1	
Not well known		5	
Comment:			
b	Thermal tolerances of key pollinators		
Well known and "largely tolerant"		1	
Well known and "not largely tolerant"		3	
Not well known		5	
Comment:			
c	Environmental cues influencing phenology/periods of activity		
Well known and "largely tolerant" of CC		1	
Well known and "largely tolerant"		3	
Not well known		5	
Comment:			
<b>4</b>	<b>THREATS TO POLLINATORS</b>		
a	Perceived threat level to pollinators from habitat change/fragmentation		
Low		1	
Medium		3	
High		5	
Comment:			
b	Perceived threat level to pollinators from agrochemical use		
Low		1	
Medium		3	
High		5	
Comment:			
c	Perceived threat level to pollinators from pests and diseases		
Low		1	
Medium		3	
High		5	
Comment:			

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Climate change has the potential to severely impact ecosystem services such as pollination. As with any change, both challenges and opportunities can be expected. Recognizing that the interactions between climate, crops and biodiversity are complex and not always well understood, the Plant Production and Protection Division of FAO has coordinated this review of the potential effects of climate change on crop pollination.



GLOBAL ACTION ON **POLLINATION SERVICES**  
FOR SUSTAINABLE AGRICULTURE

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