APPENDICES

Appendix A
Codex alimentarius information on honey

REVISED CODEX STANDARD FOR HONEY
CODEX STAN 12-1981, Rev.1 (1987), Rev.2 (2001)[42]

The Annex to this Standard is intended for voluntary application by commercial partners and not for application by Governments.

1. SCOPE

1.1 Part One of this Standard applies to all honeys produced by honey bees and covers all styles of honey presentations which are processed and ultimately intended for direct consumption. Part Two covers honey for industrial uses or as an ingredient in other foods.

1.2 Parts Two of this Standard also covers honey which is packed for sale in bulk containers, which may be repacked into retail packs.

PART ONE

2. DESCRIPTION

2.1 DEFINITION

Honey is the natural sweet substance produced by honey bees from the nectar of plants or from secretions of living parts of plants or excretions of plant sucking insects on the living parts of plants, which the bees collect, transform by combining with specific substances of their own, deposit, dehydrate, store and leave in the honey comb to ripen and mature.

2.1.1 Blossom Honey or Nectar Honey is the honey which comes from nectars of plants.

2.1.2 Honeydew Honey is the honey which comes mainly from excretions of plant sucking insects (*Hemiptera*) on the living parts of plants or secretions of living parts of plants.

2.2 DESCRIPTION

Honey consists essentially of different sugars, predominantly fructose and glucose as well as other substances such as organic acids, enzymes and solid particles derived from honey collection. The colour of honey varies from nearly colourless to dark brown. The consistency can be fluid, viscous or partly to entirely crystallised. The flavour and aroma vary, but are derived from the plant origin.

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3.1 Honey sold as such shall not have added to it any food ingredient, including food additives, nor shall any other additions be made other than honey. Honey shall not have any objectionable matter, flavour, aroma, or taint absorbed from foreign matter during its processing and storage. The honey shall not have begun to ferment or effervesce. No pollen or constituent particular to honey may be removed except where this is unavoidable in the removal of foreign inorganic or organic matter.

3.2 Honey shall not be heated or processed to such an extent that its essential composition is changed and/ or its quality is impaired

3.3 Chemical or biochemical treatments shall not be used to influence honey crystallisation.

[42] Secretariat Note: The Revised Codex Standard for Honey was adopted by the 24th Session of the Codex.

Alimentarius Commission in 2001. At the time of the adoption the Commission agreed that further work would be undertaken on certain technical issues, particularly the provisions concerning Moisture Content.

3.4 MOISTURE CONTENT

(a) Honeys not listed below - not more than 20%
(b) Heather honey *(Calluna)* - not more than 23%

3.5 SUGARS CONTENT

3.5.1 FRUCTOSE AND GLUCOSE CONTENT (SUM OF BOTH)

(a) Honey not listed below -not less than 60 g/100g
(b) Honeydew honey, -not less than 45g/100g blends of honeydew honey with blossom honey

3.5.2 SUCROSE CONTENT

(a) Honey not listed below -not more than 5 g/100g
(b) Alfalfa (*Medicago sativa*), Citrus spp., False -not more than 10g/100g Acacia (*Robinia pseudoacacia*), French Honeysuckle (*Hedysarum*), Menzies Banksia *(Banksia menziesii*), Red Gum *(Eucalyptus camaldulensis*), Leatherwood (*Eucryphia lucida*), Eucryphia milligani
(c) Lavender (*Lavandula spp*),Borage *(Borago* -not more than 15 g/100g *officinalis*)

3.6 WATER INSOLUBLE SOLIDS CONTENT

(a) Honeys other than pressed honey -not more than 0.1 g/100g
(b) Pressed honey -not more than 0.5 g/100g

4. CONTAMINANTS

4.1 HEAVY METALS [43]

Honey shall be free from heavy metals in amounts which may represent a hazard to human health. The products covered by this Standard shall comply with those maximum levels for heavy metals established by the Codex Alimentarius Commission.

4.2 RESIDUES OF PESTICIDES AND VETERINARY DRUGS

The products covered by this standard shall comply with those maximum residue limits for honey established by the Codex Alimentarius Commission.

5. HYGIENE

5.1 It is recommended that the products covered by the provisions of this standard be prepared and handled in accordance with the appropriate sections of the Recommended International Code of Practice - General Principles of Food Hygiene recommended by the Codex Alimentarius Commission (CAC/RCP 1-1969, Rev 3-1997), and other relevant Codex texts such as Codes of Hygienic Practice and Codes of Practice.

5.2 The products should comply with any microbiological criteria established in accordance with the Principles for the Establishment and Application of Microbiological Criteria for Foods (CAC/GL 21-1997).

[43] These levels will be established in consultation between the Codex Committee on Sugars and the Codex Committee on Food Additives and Contaminants as soon as possible.

6. LABELLING

In addition to the provisions of the General Standard for the Labelling of Pre-packaged Foods (CODEX STAN 1-1985, Rev 2-1999), the following specific provisions apply:

6.1 THE NAME OF THE FOOD

6.1.1 Products conforming to Part One of the Standard shall be designated 'honey'.

6.1.2 For products described in 2.1.1 the name of the food may be supplemented by the term "blossom" or "nectar".

6.1.3 For products described in 2.1.2 the word "honeydew" may be placed in close proximity to the name of the food.

6.1.4 For mixtures of the products described in 2.1.1 and 2.1.2 the name of the food may be supplemented with the words "a blend of honeydew honey with blossom honey".

6.1.5 Honey may be designated by the name of the geographical or topographical region if the honey was produced exclusively within the area referred to in the designation.

6.1.6 Honey may be designated according to floral or plant source if it comes wholly or mainly from that particular source and has the organoleptic, physicochemical and microscopic properties corresponding with that origin.

6.1.7 Where honey has been designated according to floral or plant source (6.1.6) then the common name or the botanical name of the floral source shall be in close proximity to the word "honey".

6.1.8 Where honey has been designated according to floral, plant source, or by the name of a geographical or topological region, then the name of the country where the honey has been produced shall be declared.

6.1.9 The subsidiary designations listed in 6.1.10 may not be used unless the honey conforms to the appropriate description contained therein. The styles in 6.1.11 (b) and (c) shall be declared.

6.1.10 Honey may be designated according to the method of removal from the comb.

(a) Extracted Honey is honey obtained by centrifuging decapped broodless combs.
(b) Pressed Honey is honey obtained by pressing broodless combs.
(c) Drained Honey is honey obtained by draining decapped broodless combs.

6.1.11 Honey may be designated according to the following styles:

(a) Honey which is honey in liquid or crystalline state or a mixture of the two;
(b) Comb Honey which is honey stored by bees in the cells of freshly built broodless combs and which is sold in sealed whole combs or sections of such combs;
(c) Cut comb in honey or chunk honey which is honey containing one or more pieces of comb honey.

6.1.12 Honey which has been filtered in such a way as to result in the significant removal of pollen shall be designated filtered honey.

6.2 LABELLING OF NON-RETAIL CONTAINERS

6.2.1 Information on labelling as specified in The General Standard for the Labelling of Pre-packaged Foods and in Section 6.1 shall be given either on the container or in accompanying documents, except that the name of the product, lot identification and the name and address of the producer, processor or packer shall appear on the container.

7. METHODS OF SAMPLING AND ANALYSIS

The methods of sampling and analysis to be employed for the determination of the compositional and quality factors are detailed below:

7.1 SAMPLE PREPARATION

Samples should be prepared in accordance with AOAC 920.180.

7.2 DETERMINATION OF MOISTURE CONTENT[44]

AOAC 969.38B / J. Assoc. Public Analysts (1992) **28** (4) 183-187 / MAFF Validated method V21 for moisture in honey.

7.3 DETERMINATION OF SUGARS CONTENT[45]

7.3.1 FRUCTOSE AND GLUCOSE CONTENT (SUM OF BOTH)

Determination of sugars by HPLC - Harmonised Methods of the European Honey Commission, Apidologie – Special Issue **28**, 1997, Chapter 1.7.2

7.3.2 SUCROSE CONTENT

Determination of sugars by HPLC - Harmonised Methods of the European Honey Commission, Apidologie – Special Issue **28**, 1997, Chapter 1.7.2

7.4 DETERMINATION OF WATER-INSOLUBLE SOLIDS CONTENT

J. Assoc. Public Analysts (1992) **28** (4) 189-193/ MAFF Validated method V22 for water insoluble solids in honey

7.5 DETERMINATION OF ELECTRICAL CONDUCTIVITY[46]

Determination of electrical conductivity - Harmonised Methods of the European Honey Commission, Apidologie – Special Issue **28**, 1997, Chapter 1.2

7.6 DETERMINATION OF SUGARS ADDED TO HONEY (AUTHENTICITY)[47]

AOAC 977.20 for sugar profile
AOAC 991.41 internal standard for SCIRA (stable carbon isotope ratio analysis).

[44] These methods are identical.
[45] Subject to endorsement by CCMAS.
[46] Subject to endorsement by CCMAS.
[47] CCS noted that a screening method for the detection of cane sugar adulteration of honey was available.

ANNEX

This text is intended for voluntary application by commercial partners and not for application by governments.

1. ADDITIONAL COMPOSITION AND QUALITY FACTORS

Honey may have the following compositional and quality factors:

1.1 FREE ACIDITY

The free acidity of honey may be not more than 50 milliequivalents acid per 1000g.

1.2 DIASTASE ACTIVITY

The diastase activity of honey, determined after processing and/or blending, in general not less than 8 Schade units and in the case of honeys with a low natural enzyme content not less than 3 Schade Units.

1.3 HYDROXYMETHYLFURFURAL CONTENT

The hydroxymethylfurfural content of honey after processing and/or blending shall not be more than 40 mg/kg. However, in the case of honey of declared origin from countries or regions with tropical ambient temperatures, and blends of these honeys, the HMF content shall not be more than 80 mg/kg.

1.4 ELECTRICAL CONDUCTIVITY

(a) honey not listed under (b) or (c), and blends of these -not more than 0. 8 mS/cm honeys

(b) Honeydew and chestnut honey and blends of these -not less than 0.8 mS/cm except with those listed under (c)

(c) Exceptions : Strawberry tree (*Arbutus unedo)*, Bell Heather (*Erica*), Eucalyptus, Lime (*Tilia spp*), Ling Heather (*Calluna vulgaris*) Manuka or Jelly bush (*Leptospermum*), Tea tree (*Melaleuca spp*).

2. METHODS OF SAMPLING AND ANALYSIS

The methods of sampling and analysis to be employed for the determination of the additional compositional and quality factors set out in Section 1 of this Annex are detailed below:

2.1 SAMPLE PREPARATION

The method of sample preparation is described in section 7.1 of the Standard. In the determination of diastase activity (2.2.2) and hydroxymethylfurfural content (2.2.3), samples are prepared without heating.

2.2 METHODS OF ANALYSIS

2.2.1 DETERMINATION OF ACIDITY

J. Assoc. Public Analysts (1992) **28** (4) 171-175 / MAFF validated method V19 for acidity in honey

2.2.2 DETERMINATION OF DIASTASE ACTIVITY

2.2.6.1 AOAC 958.09

or Determination of diastase activity with Phadebas - Harmonised Methods of the European Honey Commission, Apidologie – Special Issue **28**, 1997, Chapter 1.6.2

2.2.3 DETERMINATION OF HYDROXYMETHYLFURFURAL (HMF) CONTENT

AOAC 980.23

or

Determination of hydroxymethylfurfural by HPLC - Harmonised Methods of the European Honey Commission, Apidologie – Special Issue **28**, 1997, Chapter 1.5.1

2.3. LITERATURE REFERENCES

Bogdanov, S., Honigdiastase, Gegenüberstellung verschiedener Bestimmungsmethoden, *Mitt.Gebiete Lebensmitt. Hyg.* **75**, 214-220 (1984).

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DIN-NORM 10750 (July 1990): Bestimmung der Diastase-Aktivität.

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Determination of Diastase with Phadebas, *Swiss Food Manual*, Chapter 23A, Honey, Bern,1995.

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Wedmore, E.B. (1955), *Bee World*, 36, 197.

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Harmonised methods of the European Honey Commission, Apidologie - special issue, **28**, 1997.

NOTE: CCS asked CCMAS to consider retaining only those essential references.

Appendix B
EU regulations for organic honey

This text is intended for voluntary application by commercial partners and not for application by Governments.

1. ADDITIONAL COMPOSITION AND QUALITY FACTORS

Honey may have the following compositional and quality factors:

1.1 Free Acidity

The free acidity of honey may be not more than 50 milliequivalents acid per 1 000 g.

1.2 Diastase Activity

The diastase activity of honey, determined after processing and/or blending, in general not less than 8 Schade units and in the case of honeys with a low natural enzyme content not less than 3 Schade Units.

1.3 Hydroxymethylfurfural Content

The hydroxymethylfurfural content of honey after processing and/or blending shall not be more than 40 mg/kg. However, in the case of honey of declared origin from countries or regions with tropical ambient temperatures, and blends of these honeys, the HMF content shall not be more than 80 mg/kg.

1.4 Electrical Conductivity

(a) honey not listed under (b) or (c), and blends of these honeys (not more than 0.8 mS/cm)
(b) Honeydew and chestnut honey and blends of these except with those listed under (c) (not less than 0.8 mS/cm)
(c) Exceptions : Strawberry tree (*Arbutus unedo)*, Bell Heather (*Erica*), Eucalyptus, Lime (*Tilia* spp), Ling Heather (*Calluna vulgaris*) Manuka or Jelly bush (*Leptospermum*), Tea tree (*Melaleuca spp*).

2. METHODS OF SAMPLING AND ANALYSIS

The methods of sampling and analysis to be employed for the determination of the additional compositional and quality factors set out in Section 1 of this Annex are detailed below:

2.1 Sample preparation

The method of sample preparation is described in section 7.1 of the Standard. In the determination of diastase activity (2.2.2) and hydroxymethylfurfural content (2.2.3), samples are prepared without heating.

2.2 Methods of analysis

Determination of acidity

J. Assoc. Public Analysts (1992) **28** (4) 171-175 / MAFF validated method V19 for acidity in honey.

Determination of diastase activity

2.2.6.1 AOAC 958.09
or
CODEX STAN 12-1981 Page 6 of 7
Determination of diastase activity with Phadebas - Harmonised Methods of the European Honey Commission, Apidologie – Special Issue **28**, 1997, Chapter 1.6.2

Determination of hydroxymethylfurfural (HMF) content
AOAC 980.23
or
Determination of hydroxymethylfurfural by HPLC - Harmonised Methods of the European Honey Commission, Apidologie – Special Issue **28**, 1997, Chapter 1.5.1

2.3. Literature references

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Turner, J.H., Rebers, P.A., Barrick, P.L. & Cotton, R.H. 1954. *Anal Chem*, 26, 898.

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White, J. 1979. Spectrophotometric Method for Hydroxymethylfurfural in Honey. *J. AOAC*, 509.

Winkler, O. 1955. Beitrag zum Nachweis und zur Bestimmung von Oxymethylfurfural in Honig und Kunsthonig. *Z. Lebensm. Forsch.* **102**, 160-167.

Harmonised methods of the European Honey Commission, Apidologie - special issue, **28**, 1997.

NOTE: CCS asked CCMAS to consider retaining only those essential references.
CODEX STAN 12-1981, Page 7 of 7.

Appendix C
Organic honey standards for European Union

Council Regulation (EC) No 1804/1999 of 19 July 1999 supplementing Regulation (EEC) No 2092/91 on organic production of agricultural products and indications referring thereto on agricultural products and foodstuffs to include livestock production
Official Journal L 222, 24/08/1999 P. 0001 – 0028

BEEKEEPING AND BEEKEEPING PRODUCTS

1. GENERAL PRINCIPLES

1.1 Beekeeping is an important activity that contributes to the protection of the environment and agricultural and forestry production through the pollination action of bees.

1.2 The qualification of beekeeping products as being from organic production is closely bound up both with the characteristic of the hives' treatments and the quality of the environment. This qualification also depends on the conditions for extraction, processing and storage of beekeeping products.

1.3 When an operator runs several beekeeping units in the same area all the units must comply with the requirements of this Regulation. By derogation from this principle, an operator can run units not complying with this Regulation provided that all the requirements of this Regulation are fulfilled with the exception of the provisions laid down in paragraph 4.2 for the siting of the apiaries. In that case, the product cannot be sold with references to organic production methods.

2. CONVERSION PERIOD

2.1 Beekeeping products can be sold with references to the organic production method only when the provisions laid down in this Regulation have been complied with for at least one year. During the conversion period the wax has to be replaced according to the requirements laid down in paragraph 8.3.

3. ORIGIN OF THE BEES

3.1 In the choice of breeds, account must be taken of the capacity of animals to adapt to local conditions, their vitality and their resistance to disease. Preference shall be given to the use of European breeds of Apis mellifera and their local ecotypes.

3.2 Apiaries must be constituted by means of the division of colonies or the acquisition of swarms or hives from units complying with the provisions laid down in this Regulation.

3.3 By way of a first derogation, subject to the prior approval by the inspection authority or body, apiaries existing in the production unit not complying with the rules of this Regulation can be converted.

3.4 By way of a second derogation, swarms on their own may be acquired from beekeepers not producing in accordance with this Regulation during a transitional period expiring on 24 August 2002 subject to the conversion period.

3.5 By way of a third derogation, the reconstitution of the apiaries shall be authorised by the control authority or body, when apiaries complying with this Regulation are not available, in case of high mortality of animals caused by health or catastrophic circumstances, subject to the conversion period.

3.6 By way of a fourth derogation, for the renovation of the apiaries 10 percent per year of the queen bees and swarms not complying with this Regulation can be incorporated into the organic production unit provided that the queen bees and swarms are placed in hives with combs or comb foundations coming from organic-production units. In the case, the conversion period does not apply.

4. SITING OF THE APIARIES

4.1 The Member States may designate regions or areas where beekeeping complying with this Regulation is not practicable. A map on an appropriate scale listing the location of hives as provided for in Annex Ill, Part AI, section 2, first indent shall be provided to the inspection authority or body by the beekeeper. Where no such areas are identified, the beekeeper must provide the inspection authority or body with appropriate documentation and evidence, including suitable analyses if necessary, that the areas accessible to his colonies meet the conditions required in this Regulation.

4.2 The siting of the apiaries must:

(a) ensure enough natural nectar, honeydew and pollen sources for bees and access to water;

(b) be such that, within a radius of 3 km from the apiary site, nectar and pollen sources consist essentially of organically produced crops and/or spontaneous vegetation, according to the requirements of Article 6 and Annex I of this Regulation, and crops not subject to the provisions of this Regulation but treated with low environmental impact methods such as, for example, those described in programmes developed under Regulation (EEC) No 2078/92 which cannot significantly affect the qualification of beekeeping production as being organic;

(c) maintain enough distance from any non-agricultural production sources possibly leading to contamination, for example: urban centres, motorways, industrial areas, waste dumps, waste incinerators, etc. The inspection authorities or bodies shall establish measures to ensure this requirement.

The above requirements do not apply to areas where flowering is not taking place, or when the hives are dormant.

5. FEED

5.1. At the end of the production season hives must be left with reserves of honey and pollen sufficiently abundant to survive the winter.

5.2 The artificial feeding of colonies is authorised where the survival of the hives is endangered due to extreme climatic conditions. Artificial feeding shall be made with organically produced honey, preferably from the same organic production unit.

5.3 By way of a first derogation from paragraph 5.2, the competent authorities of the Member States can authorise the use of organically produced sugar syrup, or organic sugar molasses instead of organically produced honey in artificial feeding, in particular, when it is required by climatic conditions that provoke crystallisation of honey.

5.4 By way of a second derogation, sugar syrup, sugar molasses and honey not covered by this Regulation may be authorised by the inspection authority or body for artificial feeding during a transitional period expiring on 24 August 2002.

5.5 The following information shall be entered in the register of the apiaries with regard to the use of artificial feeding: type of product, dates, quantities and hives where it is used.

5.6 Other products different from those indicated in paragraphs 5.1 to 5.4 cannot be used in beekeeping which complies with this Regulation.

5.7 Artificial feeding may be carried out only between the last honey harvest and 15 days before the start of the next nectar or honeydew flow period.

6. DISEASE PREVENTION AND VETERINARY TREATMENTS

6.1 Disease prevention in beekeeping shall be based on the following principles:

(a) the selection of appropriate hardy breeds;

(b) the application of certain practices encouraging strong resistance to disease and the prevention of infections, such as: regular renewal of queen bees, systematic inspection of hives to detect any health anomalies, control of male broods in the hives, disinfecting of materials and equipment at regular intervals, destruction of contaminated material or sources, regular renewal of beeswax and sufficient reserves of pollen and honey in hives.

6.2 If despite all the above preventive measures, the colonies become sick or infested, they must be treated immediately and, if necessary, the colonies can be placed in isolation apiaries.

6.3 The use of veterinary medicinal products in beekeeping which complies with this Regulation shall respect the following principles:

(a) they can be used in so far as the corresponding use is authorised in the Member State in accordance with the relevant Community provisions or national provisions in conformity with Community law;

(b) phytotherapeutic and homeopathic products shall be used in preference to allopathic products chemically synthesised, provided that their therapeutic effect is effective for the condition for which the treatment is intended;

(c) if the use of the above mentioned products should prove or is unlikely to be effective to eradicate a disease or infestation which risks destroying colonies, allopathic chemically synthesised medicinal products may be used under the responsibility of a veterinarian, or other persons authorised by the Member State, without prejudice to the principles laid down in paragraphs (a) and (b) above;

(d) the use of allopathic chemically synthesised medicinal products for preventive treatments is prohibited;

(e) without prejudice to the principle in (a) above formic acid, lactic acid, acetic acid and oxalic acid and the following substances: menthol, thymol, eucalyptol or camphor can be used in cases of infestation with Varroa jacobsoni.

6.4 In addition to the above principles, veterinary treatments or treatments to hives, combs etc., which are compulsory under national or Community legislation shall be authorised.

6.5 If a treatment is applied with chemically synthesised allopathic products, during such a period, the colonies treated must be placed in isolation apiaries and all the wax must be replaced with wax complying with the conditions laid down in this Regulation. Subsequently, the conversion period of one year will apply to those colonies.

6.6 The requirements laid down in the previous paragraph do not apply to products mentioned in paragraph 6.3 (e).

6.7 Whenever veterinary medicinal products are to be used, the type of product (including the indication of the active pharmacological substance) together with details of the diagnosis, the posology, the method of administration, the duration of the treatment and the legal withdrawal period must be recorded clearly and declared to the inspection body or authority before the products are marketed as organically produced.

7. HUSBANDRY MANAGEMENT PRACTICES AND IDENTIFICATION

7.1 The destruction of bees in the combs as a method associated with the harvesting of beekeeping products is prohibited.

7.2 Mutilation such as clipping the wings of queen bees is prohibited.

7.3 The replacement of the queen bees involving the killing of the old queen is permitted.

7.4 The practice of destroying the male brood is permitted only to contain the infestation with Varroa jacobsoni.

7.5 The use of chemical synthetic repellents is prohibited during honey extractions operations.

7.6 The zone where the apiary is situated must be registered together with the identification of the hives. The inspection body or authority must be informed of the moving of apiaries with a deadline agreed on with the inspection authority or body.

7.7 Particular care shall be taken to ensure adequate extraction, processing and storage of beekeeping products. All the measures to comply with these requirements shall be recorded.

7.8 The removals of the supers and the honey extraction operations must be entered in the register of the apiary.

8. CHARACTERISTICS OF HIVES AND MATERIALS USED IN BEEKEEPING

8.1 The hives must be made basically of natural materials presenting no risk of contamination to the environment or the apiculture products.

8.2 With the exception of products mentioned in paragraph 6.3(e) in the hives can be used only natural products such as propolis, wax and plant oils.

8.3 The beeswax for new foundations must come from organic production units. By way of derogation, in particular in the case of new installations or during the conversion period, bees wax not coming from such units may be authorised by the inspection authority or body in exceptional circumstances where organically produced beeswax is not available on the market and provided that it comes from the cap.

8.4 The use of combs, which contain brood, is prohibited for honey extraction.

8.5 For the purposes of protecting materials (frames, hives and combs), in particular from pests, only appropriate products listed in Part B, Section 2, of Annex 11 are permitted.

8.6 Physical treatments such as steam or direct flame are permitted.

8.7 For cleaning and disinfecting materials, buildings, equipment, utensils or products used in beekeeping only the appropriate substances listed in Annex 11 Part E are permitted.

This volume provides basic information about managing wild bees and on the use of their products. It identifies and describes major bee species and their importance for nature conservation and for sustaining livelihoods of rural people. Bee products are considered at both subsistence and commercial levels, and particular attention is given to the potential for further development of managing wild bee species in developing countries. The role of bees for pollination of crops and the impact of managing bees on forestry and farming are presented. Wild-bee keeping techniques, honey production and marketing, and the international trade in bee products are described with further references and sources of additional information given. Using this publication, readers will better understand the complexities and opportunities for developing apiculture by rural livelihoods.

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