

BEE INDUSTRY ROADMAP

EXECUTIVE SUMMARY

1. The development of the bee industry roadmap involves the participation of concerned group of the Philippine bee industry; the beekeepers, the research and academic institutions, non-government and government agencies at the national and selected regions. At the national level, a consultative group composed of key industry players (associations and cooperatives), business and financial institutions as well as concerned government institutions discuss the constraints and recommendations and identified recommended actions. The draft roadmap was presented to the National Apicultural Task Force composed of representatives from BEENET Philippines and other beekeeping associations, the Department of Agriculture (BPI, AMAS, BAI, , Department of Science and Technology, Department of Trade and Industry, PCARRD, UP Los Baños and NARTDI headed by DA Secretary Jose Yap.
2. The Bee Roadmap followed a private sector led and market-oriented approach. It shall be implemented and monitored by the private sector in partnership with the government led by the Department of Agriculture. The plan will be regularly updated to consider changes in the industry. Operational details as well as localized adaptation are encouraged at the provincial and municipal levels.
3. The current data for the industry showed good opportunities in both local and international markets. The current deficit in local supplies provides long term potential on which to anchor the further development of the bee industry roadmap. There is a need to further upgrade cost–efficiency in various operations in the input supply and distribution (queens and nucleus colonies etc.), production, post-harvest, processing and marketing.
4. There is a need for a unified stand among industry players to achieve long term goals and enhance private investments and profitability. The government also has to unite in addressing the needs of the industry by harnessing their own strengths and mandates. Policy reforms and advocacy are critical areas for the government private and institutional industry players to work on.
5. For effective implementation of the national bee program amendments must be made to existing legislations relating to the bee industry; in particular RA 9151.

I. INDUSTRY SITUATION

A. Background

a. Production as of August 2004

	Quantity / Value
▪ Current Production [^]	110.653 metric tons
▪ Total Value [^]	21. 81 M Pesos
▪ Contribution to local demand [^]	36. 66 %
▪ Total number of beekeepers*	434
▪ Total number of colonies*	5, 369

b. Export

▪ Total Export*	40 Kilos
▪ Total Export Value*	4, 480 Pesos

c. Imports

▪ Total Imports*	191.146 metric tons
▪ Total Value*	38.2 M Pesos

d. Major Producers/Associations

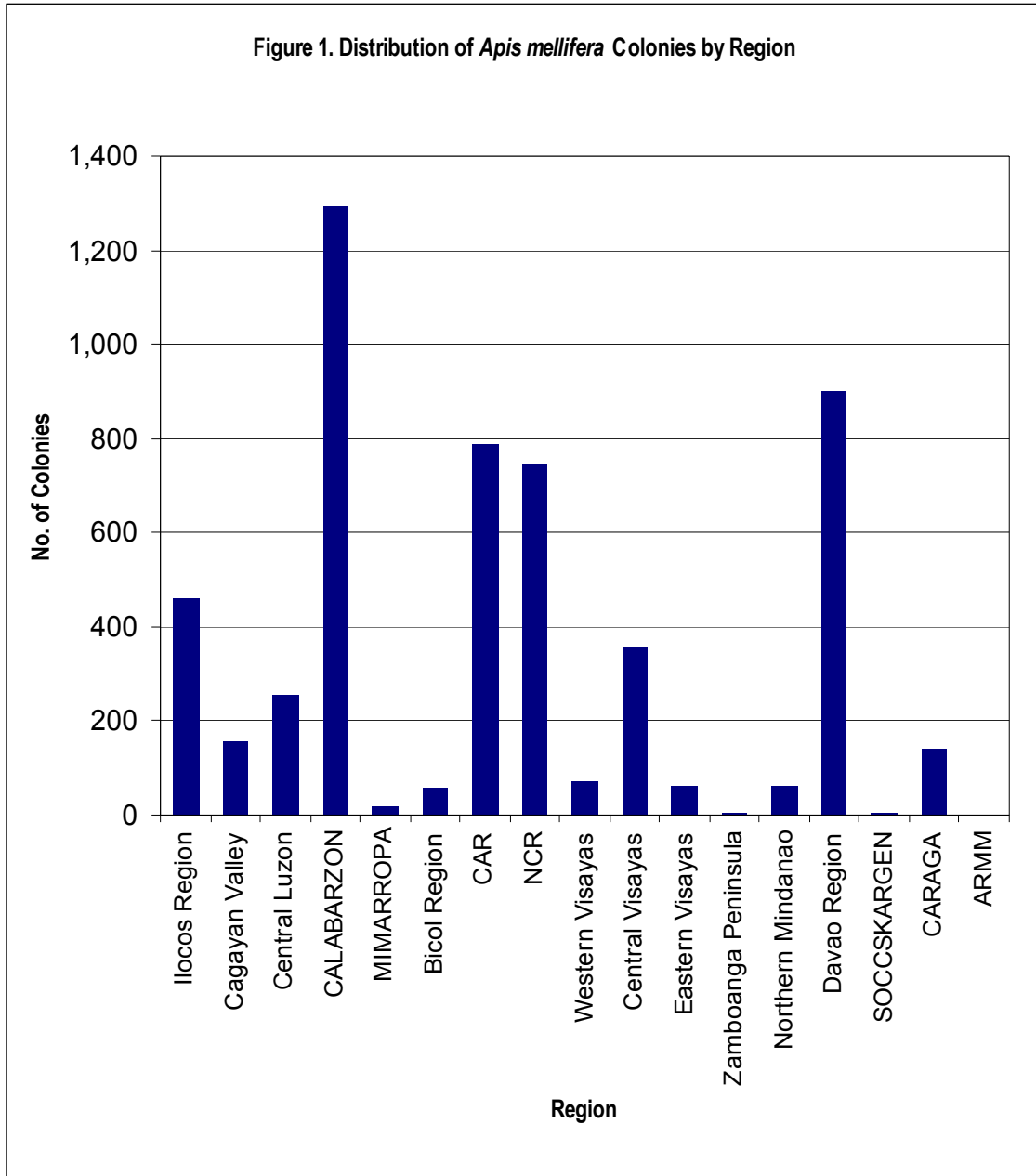
- Beekeepers Network Philippines Foundation, Inc.
- Cebu Honeybeekeepers Association (CHAI)
- PhilBee
- FILBEE
- Beekeepers Association of the Philippines
- Guinobatan Beekeepers Cooperative
- Guimaras Beekeepers' Cooperative
- Malabanan Multi-purpose Cooperative
- Panabo Beekeepers Cooperative
- Philippine Apicultural Foundation
- Tropical Honeybeekeepers Association
- Davao Del Sur Beekeepers Multi-purpose Cooperative
- Kiotoy Multipurpose Cooperative
- Bicolandia Beeraisers Association
- Borbon Beekeepers Assn. Inc.
- Cordillera Beekeepers Assn. Inc.
- Cordillera Beekeepers Overseas Workers Assn. Inc.
- Irisan Beekeepers Assn. Inc.
- Kennon Road Beekeepers Assn. Inc.
- La Union Beekeepers Assn. Inc.
- Maco Beekeepers Assn. Inc.
- Palawan Beekeepers Assn. Inc.
- Tadiangan Beekeepers and Livelihood Association, Inc.
- United Beekeepers Assn. Inc.
- Independent beekeepers
- Other Beekeeping Associations and Cooperatives

Table 1. Distribution and annual average production of *Apis mellifera*

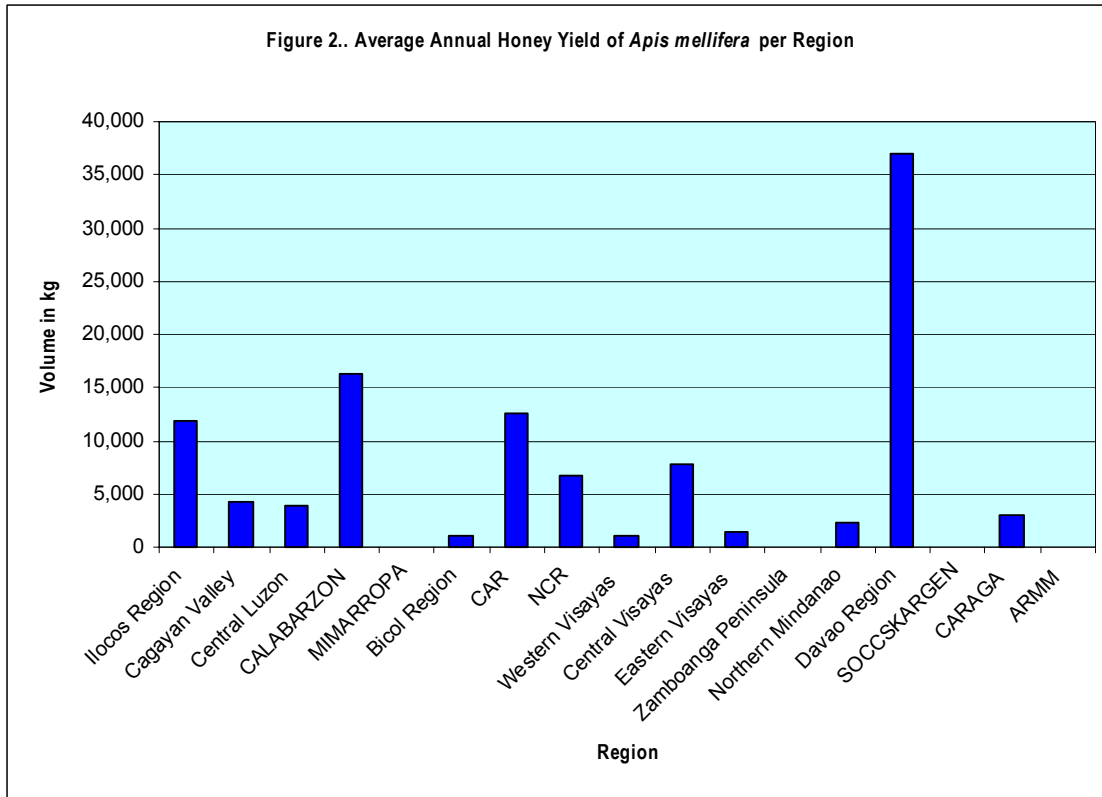
Region	Number of Colonies	Annual Average Honey produced; Kgs.	Number of Beekeepers
National Total	5,369	109,039	434
Ilocos Region	462	11,815	94
Cagayan Valley	156	4,170	43
Central Luzon	255	3,940	28
CALABARZON	1,295	16,303	79
MIMARROPA	20	50	3
Bicol Region	56	1,080	3
CAR	786	12,571	92
NCR	744	6,790	33
Western Visayas	72	980	4
Central Visayas	356	7,720	35
Eastern Visayas	60	1,360	4
Zamboanga Peninsula	2	0	1
Northern Mindanao	61	2,310	3
Davao Region	900	37,000	4
SOCCSKARGEN	3	0	1
CARAGA	141	2,950	7
ARMM	0	0	0

Source: BEENET Philippines, LUBAI, CHAI, DMMMSU, Independent Beekeepers
 Processed by: UPLB Bee Program

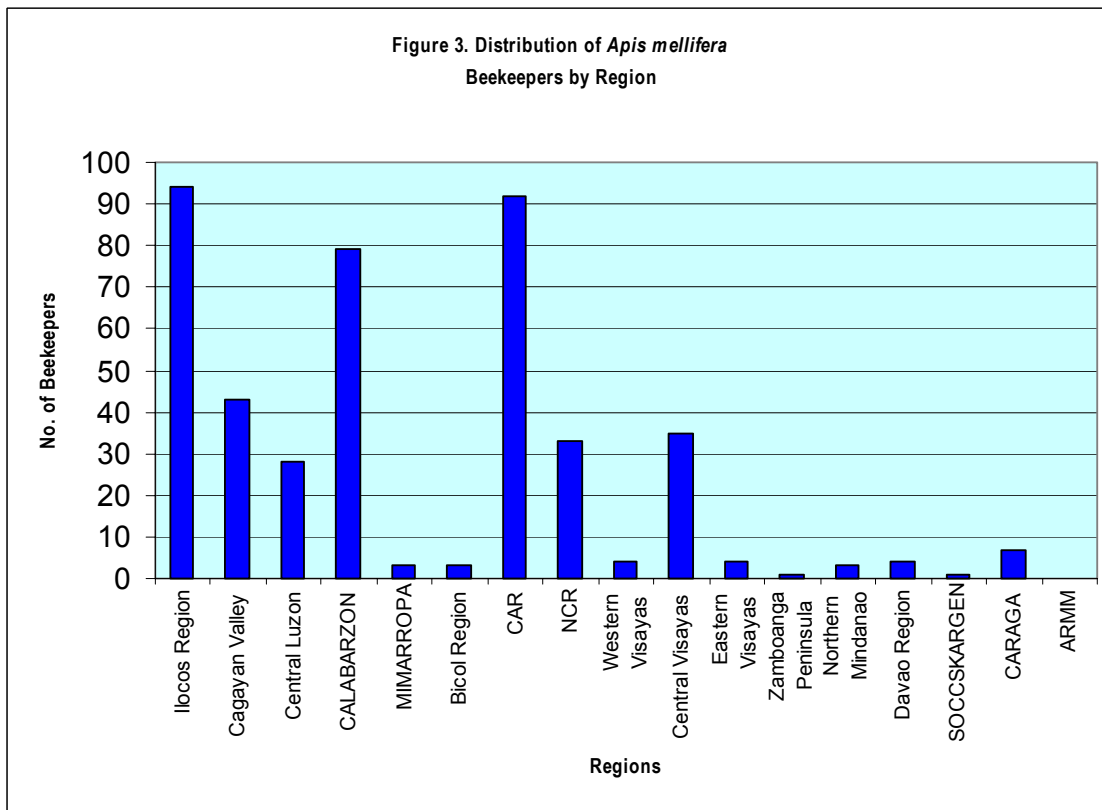
Figure 1. Distribution of *Apis mellifera* Colonies by Region



Source: BEENET Philippines, LUBAI, CHAI, DMMMSU, Independent Beekeepers;
Processed by: UPLB Bee Program



Source: BEENET Philippines, LUBAI, CHAI, DMMMSU, Independent Beekeepers; Processed by: UPLB Bee Program

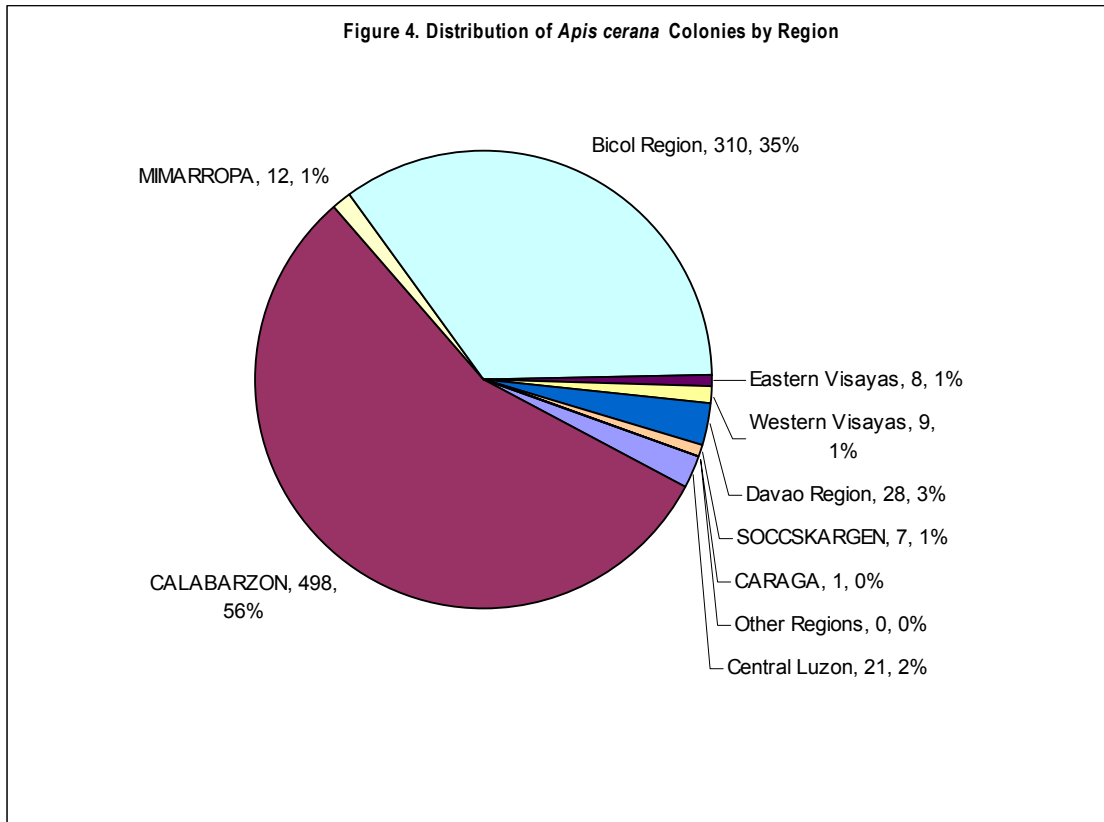


Source: BEENET Philippines, LUBAI, CHAI, DMMMSU, Independent Beekeepers; Processed by: UPLB Bee Program

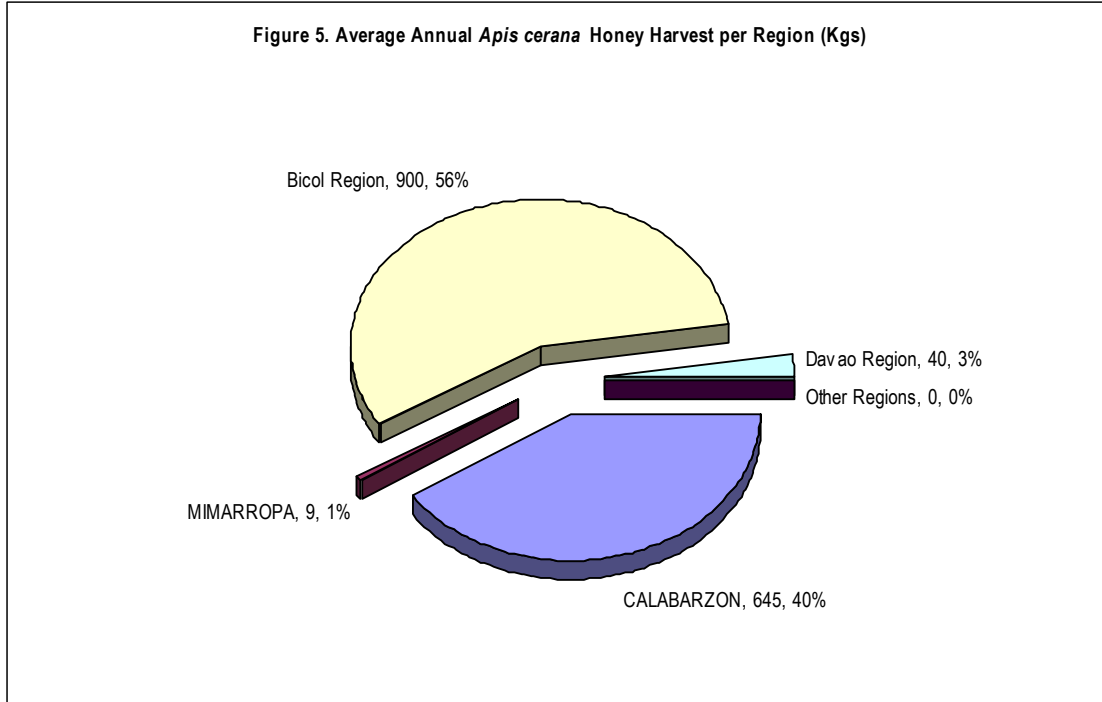
Table 2. Distribution and average annual production of *Apis cerana*

Region	Number of Colonies	Annual Average Honey produced (kg)	Number of Beekeepers
National total	894	1,594	40
Ilocos Region	0	0	0
Cagayan Valley	0	0	0
Central Luzon	21	0	3
CALABARZON	498	645	17
MIMARROPA	12	9	3
Bicol Region	310	900	7
CAR	0	0	0
NCR	0	0	0
Western Visayas	9	0	2
Central Visayas	0	0	0
Eastern Visayas	8	0	3
Zamboanga Peninsula	0	0	0
Northern Mindanao	0	0	0
Davao Region	28	40	3
SOCCKARGEN	7	0	1
CARAGA	1	0	1
ARMM	0	0	0

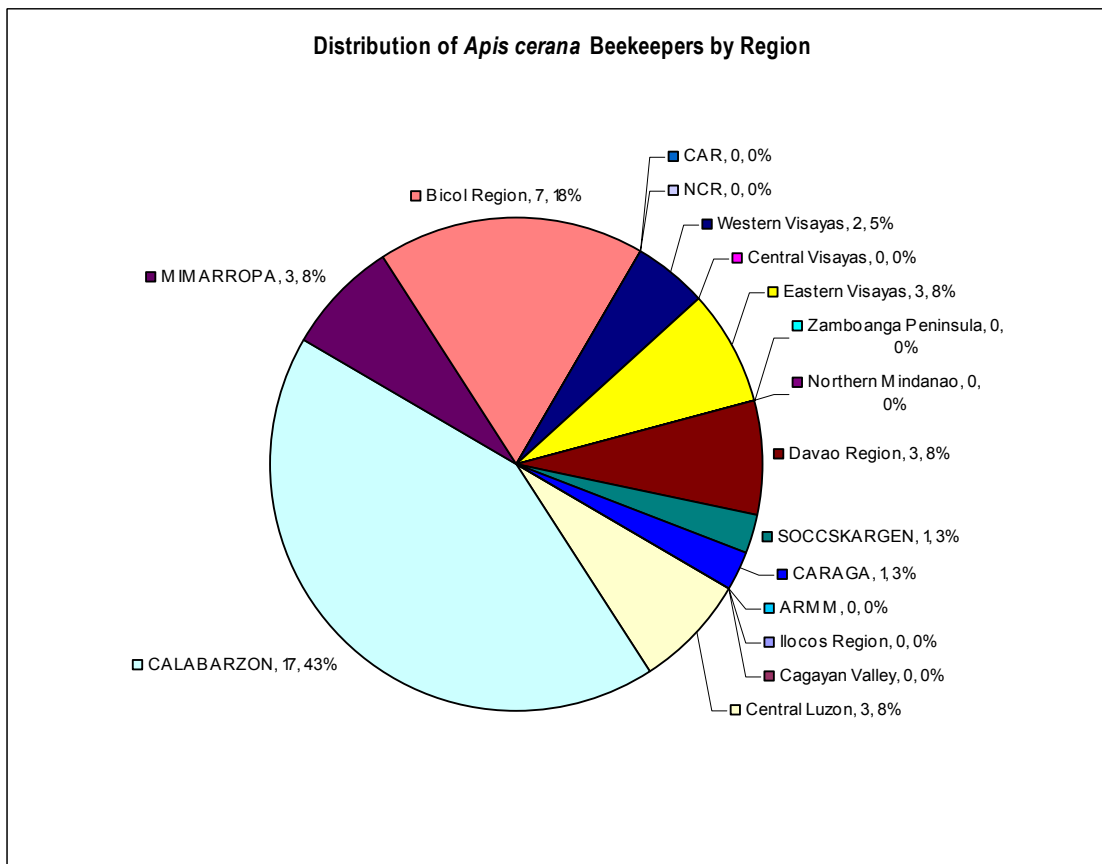
Source: BEENET Philippines, LUBAI, CHAI, DMMMSU, Independent Beekeepers; Processed by: UPLB Bee Program



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Source: BEENET Philippines, LUBAI, DMMMSU, Independent Beekeepers; Processed by: UPLB Bee Program



Source: BEENET Philippines, LUBAI, CHAI, DMMMSU, Independent Beekeepers; Processed by: UPLB Bee Program

APPENDIX 3

Table a. Total Philippine Imports in Metric Tons of Honey, Artificial honey, Beeswax 1999-2003

Product	2003	2002	2001	2000	1999	Average Growth Rate (99-03)	Percent Change (02-03)
Natural Honey	191.146	245.681	152.591	271.692	361.827	(7.48)	(22.20)
Artificial Honey wtr/not mixed with natural honey	16.322	21.845	51.143	708	1.272	1749.17	(25.31)
Beeswax	11.397	9.455	8.677	15.975	17.363	(6.04)	20.54

Source: National Statistics Office (NSO)

Table b. Total Philippine Imports Natural, Artificial honey, Beeswax; 1999-2003 CIF, Value in USD

Product	2003	2002	2001	2000	1999	Average Growth Rate (99-03)	Percent Change (02-03)
Natural Honey	287,275	303,188	167,509	305,760	589,036	(4.39)	(5.25)
Artificial Honey wtr/not mixed with natural honey	13,819	21,398	44,103	3,583	2,179	277.11	(35.42)
Beeswax	43,575	33,313	45,528	100,102	58,024	5.49	30.80

Source: National Statistics Office (NSO)

Table c. Summary of Merchandise Export Markets by Regional Blocs Natural Honey, January to December, 1999-2003 (FOB Values in US\$)

Country	2003			2002		2001		2000		1999	
	Quantity	Value	% Share	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Total Exports (Regional Blocs)	40	80	100	0	0	0	0	144	830	390	1,908
Netherlands	0	0	0	0	0	0	0	144	830	0	0
Australia	0	0	0	0	0	0	0	0	0	180	800
South Korea	40	80	100	0	0	0	0	0	0	0	0
Bahrain	0	0	0	0	0	0	0	0	0	190	1,009
United Arab Emirates	0	0	0	0	0	0	0	0	0	20	99

Source: National Statistics Office (NSO)

APPENDIX 4

Mexico honey exports (Philippines included), January to June 2001

Buyer	Net Kilograms	Net Pounds	FOB Total Price U\$\$	FOB Price U\$\$ per Kilogram	FOB price U\$\$ CENTS per pound	Supply Percentage
Germany	10 590 000	23 346 560	12 743 000	1,2	55	70
Saudi Arabia	1 129 000	2 488 977	1 431 000	1,27	57	7
Austria	15 000	33 069	25 000	1,67	76	0
Belgium	353 000	778 219	185 000	0,52	24	2
Canada	36 000	79 365	46 000	1,28	58	0
Costa Rica	40 000	88 183	47 000	1,18	53	0
Ecuador	44 000	97 002	37 000	0,84	38	0
Spain	114 000	251 323	123 000	1,08	49	1
U.S.A.	1 337 000	2 947 531	1 568 000	1,17	53	9
Philippines	20 000	44 092	27 000	1,35	61	0
France	65 000	143 298	87 000	1,34	61	0
Honduras	3 000	6 614	10 000	3,33	151	0
Italy	58 000	127 866	109 000	1,88	85	0
Japan	20 000	44 092	79 000	3,95	179	0
Panama	11 000	24 250	13 000	1,18	54	0
Portugal	43 000	94 797	54 000	1,26	57	0
Puerto Rico	42 000	92 593	52 000	1,24	56	0
United Kingdom	817 000	1 801 146	891 000	1,09	49	5
Switzerland	277 000	610 670	350 000	1,26	57	2
Venezuela	215 000	473 986	260 000	1,21	55	1
TOTAL	15 229 000	33 573 633	18 137 000	1,19	54	100

Source: Apiservices – International Honey Market. www.apiservices.com

APPENDIX 5

Argentine honey exports (Philippines included), March 2003

Buyer	Net Kilograms	Net Pounds	FOB Total Price US\$	FOB Price US\$ per Kilogram	FOB Price US\$ Cents per Pound	Supply Percentage
Bolivia	4 938	10 886	6 890	1.4	63	0
Canada	216 188	476 605	469 772	2.17	99	2
U.S.A.	678 842	1 496 565	1 595 689	2.35	107	6
Philippines	19 560	43 122	47 335	2.42	110	0
Japan	239 828	528 721	602 790	2.51	114	2
Austria	60 185	132 683	132 407	2.2	100	0
Belgium	53 100	117 063	82 305	1.55	70	0
Denmark	286 387	631 365	557 433	1.95	88	2
Spain	297 204	655 212	521 840	1.76	80	2
France	400 380	882 672	938 651	2.34	106	3
Ireland	118 440	261 111	286 945	2.42	110	1
Italy	582 146	1 283 391	1 413 376	2.43	110	5
Norway	53 820	118 651	125 132	2.33	105	0
Netherlands	181 046	399 131	380 144	2.1	95	1
United Kingdom	930 960	2 052 381	1 885 956	2.03	92	8
Switzerland	121 850	268 629	276 512	2.27	103	1
Germany	6 518 528	14 370 652	14 465 011	2.22	101	54
Australia	1 362 767	3 004 336	3 769 231	2.77	125	11
TOTAL	12 126 169	26 733 176	27 557 419	2.27	103	100

Source: Apiservices – International Honey Market. www.apiservices.com

APPENDIX 6

Honey exports from the US (Domestic merchandise only), 1999-2000

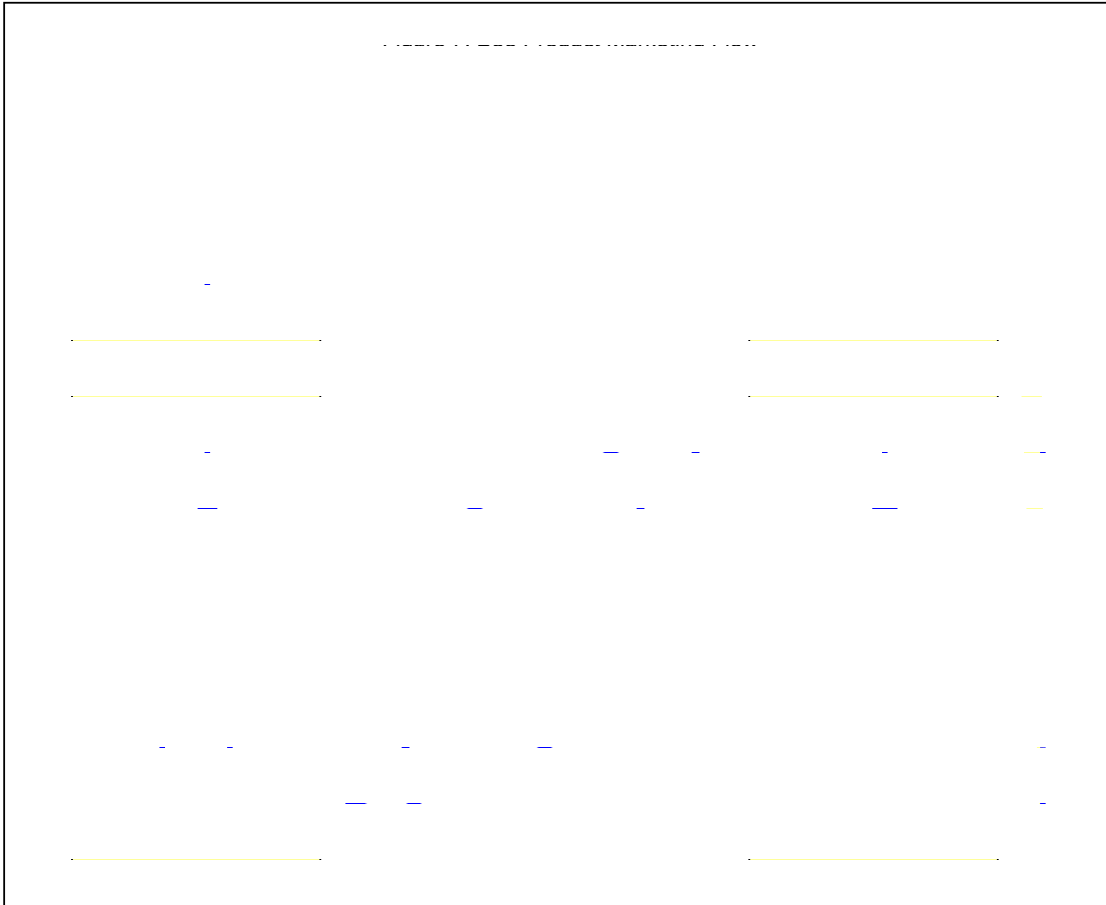
Country	Year/Quantity (1999 /Pounds)	Year/Quantity (2000 /Pounds)	Variance (2000 from 1999)
Aruba	8,003	10,432	2,429
Australia	37,414	98,612	61,197
Bahamas		3,382	3,382
Bahrain	36,982		(36,982)
Bangladesh	90,001	19,180	(70,821)
Barbados	9,310	7,809	(1,501)
Belgium	146,586	122,622	(23,964)
Brazil		3,792	3,792
Canada	812,411	849,631	37,220
Chile		3,792	3,792
China	543,489	98,208	(445,281)
Costa Rica	1,850	5,399	3,549
Ecuador	5,337	5,567	229
Finland		7,584	7,584
France	675	12,795	12,121
Germany	1,512,739	1,676,874	164,135
Greece		38,973	38,973
Ghana		46,325	46,325
Guadeloupe	13,267	20,240	6,973
Guyana	12,430	2,511	(9,918)
Honduras		41,281	41,281
Hong Kong	787,693	64,213	(723,479)
Hungary	1,164		(1,164)
Iceland		359	359
India		3,792	3,792
Indonesia	112,421	78,157	(34,264)
Israel	41,914	213,981	172,067
Italy		7,584	7,584
Japan	674,998	536,893	(138,105)
Jordan	39,850		(39,850)
Korean Republic	772,578	1,505,349	732,772
Kuwait	414,568	775,973	361,404
Lebanon	23,067	11,376	(11,691)
Malaysia		122,366	122,366
Marshall		3,792	3,792
Mexico	412,368	139,419	(272,949)
Netherlands	43,261	7,584	(35,677)
Netherlands Antilles	13,728	17,361	3,633
Nigeria	5,044	3,990	(1,054)
Pakistan	69,291	39,945	(29,345)
Peru		3,792	3,792
Philippines	1,015,701	280,178	(735,523)
Qatar	144,979	172,902	27,923
Russia	2,842	3,792	950
Saudi Arabia	1,058,931	912,028	(146,904)
Singapore	51,779	72,551	20,772
Slovakia	57,126		(57,126)

Appendix 6 continued

Spain	80,468	41,943	(38,525)
Sweden	181,580	83,034	(98,546)
Switzerland	44,315	37,536	(6,779)
Taiwan	49,996	16,138	(33,858)
Thailand		3,792	3,792
Trinidad	67,608		(67,608)
Turkey		3,792	3,792
United Arab Emirates	664,762	620,008	(44,753)
United Kingdom		311,554	311,554
Venezuela	2,465		(2,465)
Yemen	959,360	976,219	16,859
TOTAL EXPORTED	11,024,349	10,146,403	(877,947)

Source: U.S. Dept of Commerce, Bureau of the Census Foreign Trade Division, as reported by USDA in National Honey Market News

d. Local Marketing Channels



Prepared by: UPLB Bee Program

e. Research and Development Institutions

- Benguet State University
- Camarines Sur State Agricultural College
- Cavite State University
- Don Mariano Marcos Memorial State University
- Mariano Marcos State University
- Philippine Normal University
- Saint Louis University
- University of the Philippines Los Baños

f. Major Importers

- Apollo Chemicals
- PHILUSA Corporation
- Carica Health Products
- Rustans
- Fly Ace Corp.
- Colgate-Palmolive Phil.
- Nestle Philippines
- XTC Inc.
- Golden Star Marketing Inc.

g. Safety Nets

- Product quality; applying international standards for local and imported produce.
 1. Honey and pollen analysis.
 2. Pathological and chemical residue analysis.
 3. Self-monitoring and reporting among various beekeeping organizations.
 4. Coordination of R&D institutions with concerned government agencies like BFAD, FNRI and DTI.

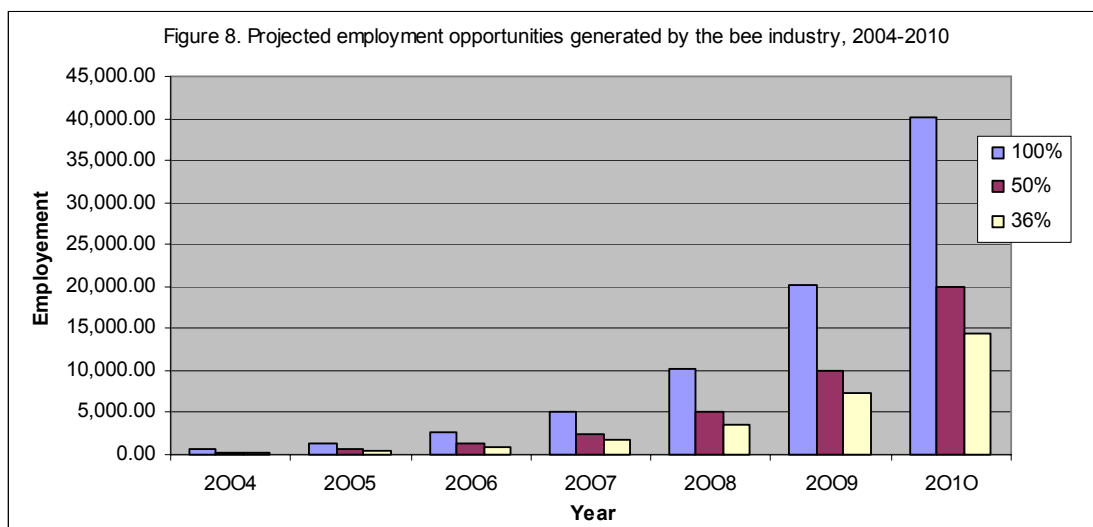
- Bees and equipment
 1. Quarantine of imported queens and other bee species.
 2. Restrictions on source and importation of *Apis* spp. colonies
 3. Pathological tests on local colonies.
 4. Quarantine and certification for migratory colonies.

h. Benefits of the Industry

- Generates employment (local and foreign)(job generation)
 - Develop industries that cater to beekeeping, like equipment fabrication and carpentry.
 - Processing of bee products requires additional trained labor.
 - The manufacture of value added products creates avenue for training and employment for out of school youth, women and other sectors.
 - Maintenance of apiary requires extra labor.
 - Self-employment.
 - Skilled beekeepers have opportunities to work in apiaries abroad.

Table 3. Projected employment opportunities by the bee industry

Percent success rate ¹	YEAR						
	2004	2005	2006	2007	2008	2009	2010
100%	662.00	1,300.00	2,613.00	5,095.32	10,121.88	20,124.72	40,030.32
50%	331.00	650.00	1,306.50	2,547.66	5,060.94	10,062.36	20,015.16
36%	238.32	468.00	940.68	1,834.32	3,643.88	7,244.90	14,410.92



¹ based on data collected by the UPLB Bee Program during monitoring of its trainees in different provinces

- Increases agricultural productivity (food security)
 - Pollination of crops using bees results in increased crop yield.
 - Honey and bee brood are part of the diet in many communities.
 - Bee brood is a source of protein in the diet of many indigenous people.

Table 5. Yield increase of some agricultural crops pollinated by bees

CROPS	MEAN % YIELD INCREASE
Coconut (Native San Ramon)	35-70
Cotton (Deltapine 16)	35
Tomato *	35
<i>Cucurbits</i>	
Watermelon	73.9
Cucumber	76.5
Squash	88.9
Upo	84.3
Patola	85.1
Ampalaya	98.7
Sunflower	30.0
Pechay	90.0
Chinese mustard	45.3
Passion fruit ^	100.0
Sweet potato	17.0
Calamansi	56.0
Radish	22.0

Source: UPLB and Bee Program archives; Prepared by: UPLB Bee Program

* - pollinated by bumble bee

^- pollinated by carpenter bee

- Market of bees and bee products (income generation)
 - Honey and combs are sold as food supplement in many communities.
 - Pollen is sold for human and feed supplement for fighting cocks.
 - Honey cider sells as a popular alternative remedy for many ailments.
 - Honey and propolis based cosmetics have a is now popularly used.
 - Nucleus colonies are sold to new clientele.
 - Packaged bees have been sold to apiaries in other countries, especially in the middle-east.
 - Bee venom is sought by pharmaceutical companies as an ingredient in anti-rheumatic drugs.

- Enhances biodiversity
 - Bees are the main pollinators of local timber (*Pterocarpous*, *Acacia*, etc) as well as other forest species.
 - Bees are responsible for seed formation of wild bananas, fruit trees and of vines.
 - Mangroves, primary breeding grounds for many marine species, are pollinated by giant honeybees.

i. Industry opportunities

- **Market led**
 - Relatively low supply vs. relatively high demand in the local market.
 - Increasing awareness to the many health benefits of hive products led to a high demand in Taiwan, South Korea and Japan for Philippine honey and other hive products.
 - Droughts in Australia and contamination of chemicals in Chinese honey resulted in shortage of honey supply.
- **Climatic and Geographical advantage.**
 - Varied rainfall distribution assures year round pollen and nectar sources in different parts of the country.
 - 6-month honey season, longer than in most temperate countries.
 - No winter and can supply packaged bees when these are unavailable from temperate countries.
 - Strategic location near Asian trading hubs and with major air and sea ports.
- **Prospects for pollination**
 - Major mango and coffee producing corporation are intent on using honeybees for pollination (13 colonies / hectare).
 - Vegetable and seed producing companies are expanding production using honey bees (3-6 colonies/ hectare).
 - Only a number of colonies are available for contract pollination services.
 - High demand for coconut oil based products; beekeeping was introduced to coconut growing area.
- Diversified bee products both basic and value-added
- Low sugar costs vs. high honey prices
- High consumer preference for local honey and other bee products
 - The local market has developed a preference for good local honey even if it is sold at about twice the price of imported honey.
 - This is compounded by the increase in awareness of the medicinal properties of bee products apart from its various uses in different industries such as beeswax for cosmetics and as an ingredient for polishes.
- Manpower exportation of beekeepers
 - Canada, Australia, New Zealand, the United States and Saudi Arabia have in the past and at present are employing experienced Filipino beekeepers.
- Ecotourism
 - Incorporating beekeeping module in agriculture, forest and park management as new attraction will increase awareness and tourism in certain parts of the country.

j. Immediate concerns

- Quality control of bees and bee products

- Reported entry of contaminated bee products in major air and sea ports around the country remained un-checked.
- Proliferation of fake and adulterated honey is undermining local produce.
- Increasing production
 - There is a need to train more beekeepers, government sourced funds are needed to support training programs.
 - Island born queens were found to be more suited for local beekeeping; government funds for regional breeding centers and incentives for privately owned ones are needed.
 - Government subsidy for imported queens is needed, as these queens will strengthen all breeding programs.
- Security (quarantine, financing, insurance)
 - Some imported queens don't pass through quarantine and may lead to possible entry of new bee and plant diseases to the country.
 - Illicit trade of diseased bee colonies and bogus training programs needed to be checked, accreditation and creation of bee inspector/-ion teams must be a priority.
 - Few financing sources for loans as result of lack feasibility data for beekeeping in many regions.
 - Like farming, beekeeping is affected by weather and climatic conditions; there is a need for bee insurance support as fallback of beekeepers when they are affected by calamities and pest infestation.
- Research and developmental needs on genetic diversity, bee breeding, pollination and socio-economic constraints in technology adoption
 - Development of baseline data for character reference needs grants and logistical support from the government.
 - Genetic research grants for the development of markers needed for tracing origins of bee entering the country must be sourced with government help.
 - Funding and logistical support for pollination studies is needed by SCU's. A comprehensive analysis of success and failure in adoption of developed technologies including beekeeping must be supported in part by government agencies involved.
 - A comprehensive floral calendar will be indispensable to bee and integrated pest management schemes; studies leading to the development of such must be funded. (see Attachment 1)
- Advocacy and legislation
 - Legislation in support of biological research and intellectual property must be enforced.
 - Development of educational materials in support of beekeeping and the bees' role in the environment needed to be funded.
 - Amendments must be made to Bills and Acts pertaining to bees and the beekeeping industry, to make its structure and goals more industry oriented.
- Community Development
 - Inclusion of beekeeping in major community development and agro-industrial program must be studied and be implemented whenever feasible.

B. Vision

A Philippine bee industry capable of supplying quality bees and bee products to local and foreign markets.

C. Industry Goals and Objectives

Table 6. Goals and specific objectives of Philippine beekeeping industry

GOALS	SPECIFIC OBJECTIVES
To increase annual production of quality honey and other bee products	<ol style="list-style-type: none">1. To train more beekeepers and beekeeping technicians2. To develop management practices for the improvement of bee pastures and native bee stocks3. To produce quality queens and stocks4. Import new queens to improve genetic pool of existing production and breeding colonies
To develop cost effective support services for the bee industry	<ol style="list-style-type: none">1. To establish regional centers for basic and advance beekeeping training, bee product processing and analysis, bee disease diagnosis, breeding, financial and consultancy assistance.2. To enhance policies and advocacies relevant to the bee industry.
To increase industry and government participation in the conduct relevant researches on pollination, bee product development, management and genetic diversity in support to the industry	<ol style="list-style-type: none">1. To conduct genetic diversity studies2. To develop technologies for utilizing non-<i>Apis</i> species in pollination3. To conduct research on bee product development4. To provide package of technologies for the management of native honey bees

Prepared by: UPLB Bee Program

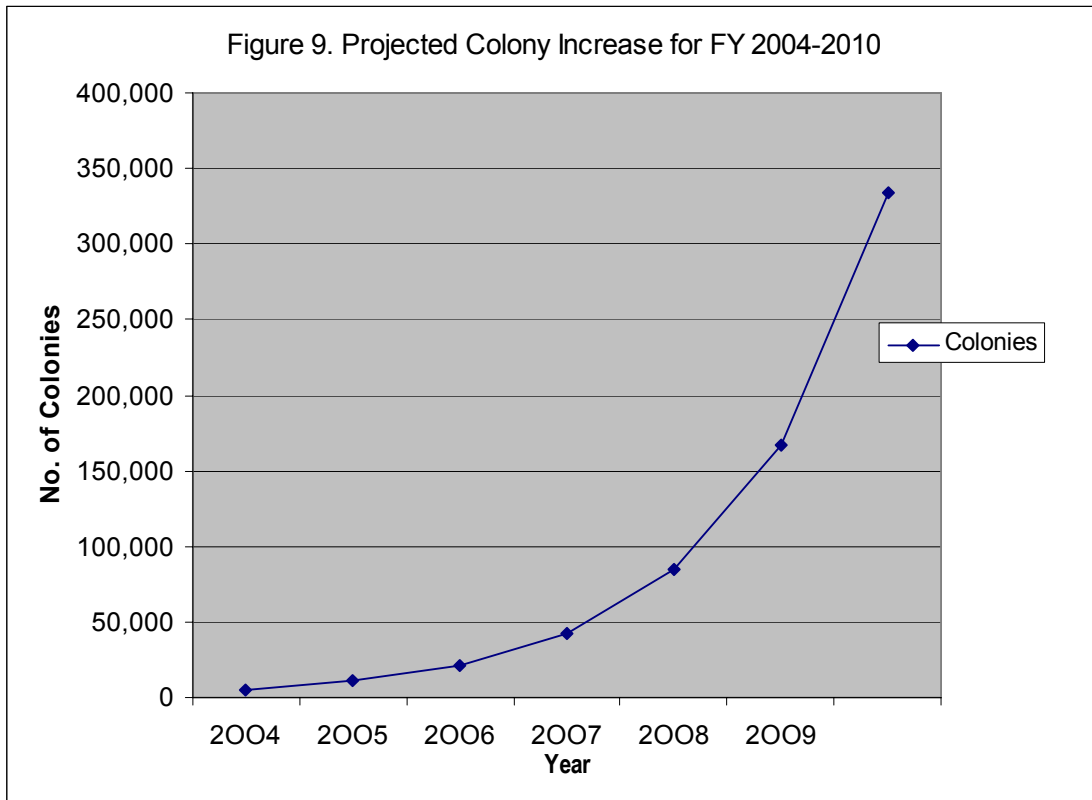
D. Targets

- Continuous supply of quality queen bees and bee stocks
- Increased production of quality bees and bee products
- Strict quarantine of imported queen bees and bee products
- Designation of bee inspectors per region
- Available channels for financing of industry and research needs
- Creation of bee insurance
- Development of human resource for research and development in beekeeping and for entrepreneurial income generating endeavor

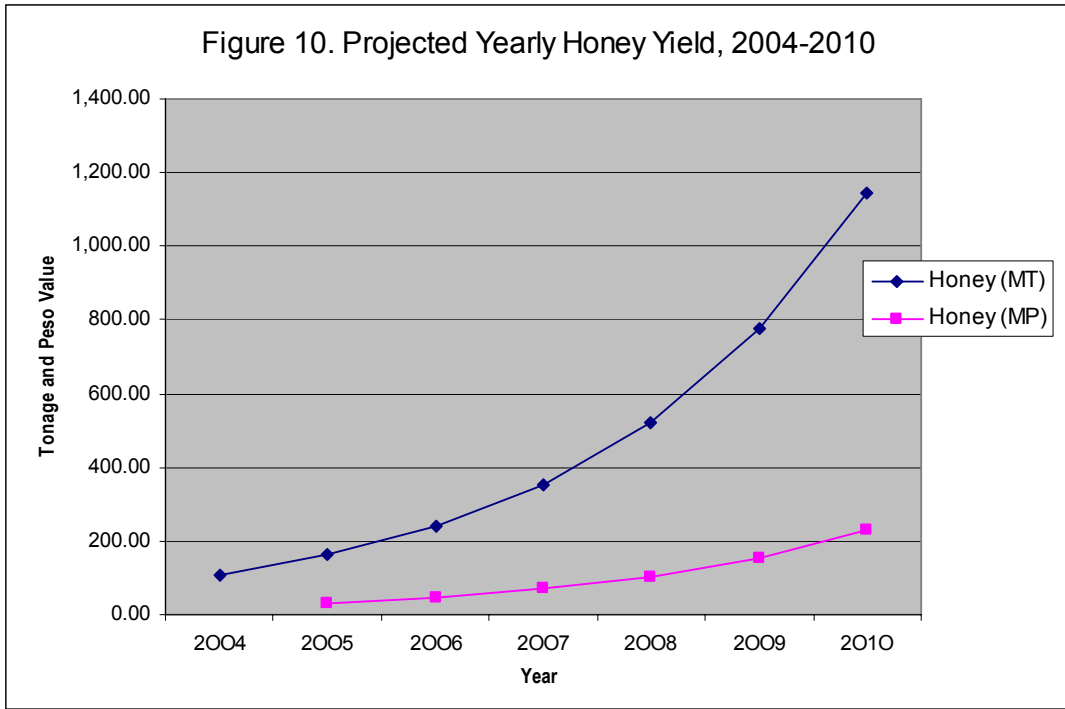
Table 7. Projected Increase in Number of Colonies and Hive Products, 2004-2010

Product	Year						
	2004	2005	2006	2007	2008	2009	2010
Colonies	5,369	10,684	21,262	42,311	84,199	167,556	333,436
Honey (MT)	109.04	161.38	238.84	353.48	523.15	774.27	1,145.91
Honey (MP)		32.28	47.77	70.70	104.63	154.85	229.18
Pollen (MT)	88.59	176.29	350.82	698.13	1,389.28	2,764.67	5,501.69
Pollen (MP)	53.15	105.77	210.49	418.88	833.57	1,658.80	3,301.01
Beeswax (MT)							
Beeswax (MP)							

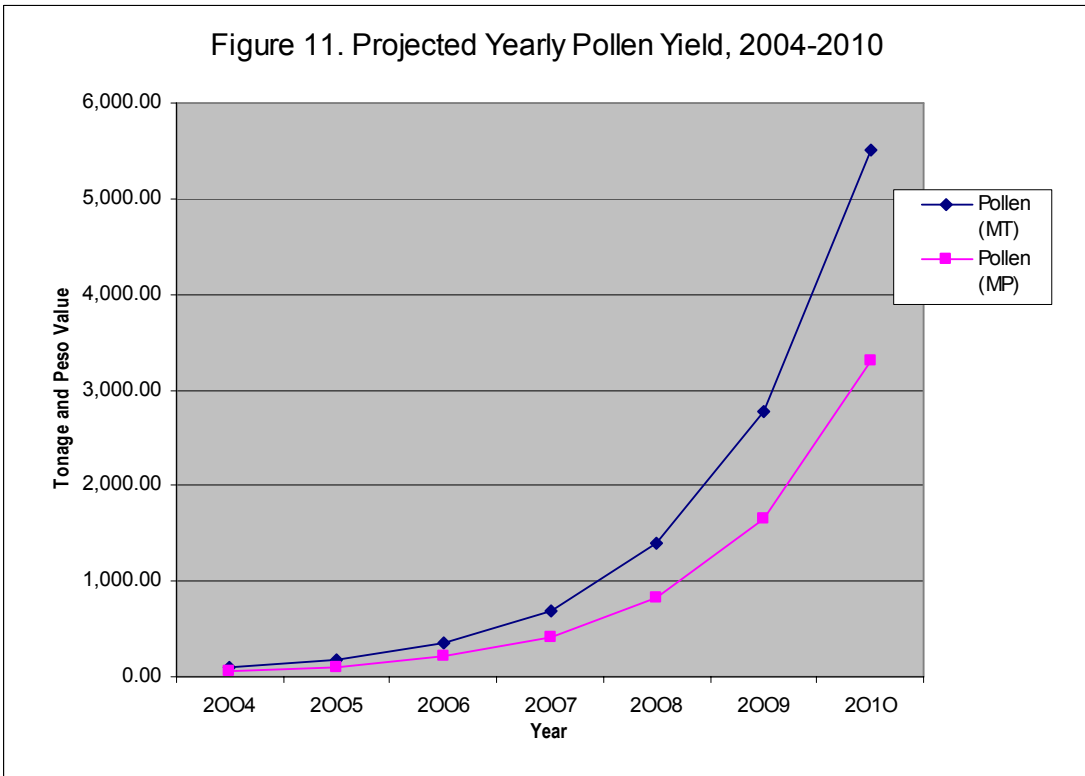
Prepared by: UPLB Bee Program



Prepared by: UPLB Bee Program



Prepared by: UPLB Bee Program



Prepared by: UPLB Bee Program

Table 4. Estimated number of jobs generated the beekeeping industry

Job or Opportunities	Need for a 100 Colony Apiary	FY 2003 (30 apiaries)	FY 2004 (54 apiaries)	FY 2005 (107 apiaries)	FY 2006 (213 apiaries)	FY 2007 (423 apiaries)	FY 2008 (842 apiaries)	FY 2009 (1676 apiaries)	FY 2010 (3334 apiaries)	Total
Beekeeper	2	60	108	214	426	846	1,684	3,352	6,668	13,360
Carpenter	2	60	108	214	426	846	1,684	3,352	6,668	13,360
Foundation maker	3	90	162	321	639	1,269	2,526	5,028	10,002	20,040
Honey packing and marketing	2	60	108	214	426	846	1,684	3,352	6,668	13,360
Pollen and other product processing	3	90	162	321	639	1,269	2,526	5,028	10,002	20,040
Extra labor*	1	30	54	107	213	423	842	1,676	3,334	6,680
Total Jobs	13									86,840

* - extra labor optional among beekeeper; functions include cleaning equipment and up-keep of apiary grounds.

II. STRATEGIES AND KEY INSTITUTIONS INVOLVED

Table 8. Major strategies and key institutions identified for the improvement of beekeeping industry

MAJOR STRATEGIES	KEY INSTITUTIONS
Enhancement of and Increased Funding for Research, Development and Extension a. Bee breeding Program; Genetic Diversity Studies b. Bee product development program c. Management and Conservation d. Pollination e. Technology adoption	a. UPLB, USM b. MMSU, PNU, SLU c. BSU, UPLB, CSSAC d. UPLB, CvSU, BSU, CSSAC, USM e. UPLB, MMSU, DMMMSU
Improving access to quality and reasonably priced inputs. a. Queens b. Nucleus Colonies c. Equipments	a. BEENET, BPI, UPLB b. BEENET, BPI, UPLB c. BEENET, DOST
Linkages with or partnership with various industry support mechanisms (i.e. strong linkages between beekeepers, buyers, interagency and private-private partnerships)	DA, BEENET, TAPI, PCARRD
Enhancement of bees and bee product quality and classification standards	DTI, BFAD, DOST
Enhancement of market infrastructure facilities (i.e. access roads, processing centers)	AMAS, DTI
Human resource development (i.e. skills training)	DMMMSU, TAPI, ATI
Export market development	DTI, AMAS
Policy analysis and advocacy	DA, NEDA, BEENET, NEDA, PCARRD

a. Strategy of Implementation

Developmental objectives are achieved through properly planned, coordinated and implemented strategies and programs. Hence, strategies should be considered available resources, potentials, issues and constraints to effect the desired results. Strategies should also reflect changing needs and demands, location-specific problems and technological advancements.

▪ Action Plan

- Project planning and mobilization

A development framework for the Philippine bee industry will be formulated. This will be integrated to existing development programs and new ones formulated and geared to the making beekeeping a major commercial industry. The creation of a Multi-partite Technical Working Group or a National Beekeeping Board is thereby recommended. This group will be composed of beekeeping organizations, government agencies, GO's, NGO's and SCU's under the overall supervision of the DA.

- Project commissioning

A Memorandum of Agreement will be executed between the parties involved, the DA, DOST, BEENET, UPLB, DMMMSU, LGU's and representatives of the pilot communities prior to the implementation of development efforts. This will be done to articulate the commitment of the collaborating institutions.

- Project Operation

- Capacity building

New beekeeping technicians and beekeepers will be trained in various provinces. Technicians will be based in selected SCU's that will become technology incubator and assistance centers. Funds for infrastructure and personnel development will be allocated or sourced by the National Beekeeping Board. BEENET members will be trained to assist the said centers in testing and distributing new technologies.

- Establishment of techno-demo apiary

A Memorandum of Agreement will be enacted between the Board and the pilot communities in the establishment of techno-demo apiaries. Funding and cost recovery schemes will be instituted to sustain daily apiary operations.

- Project monitoring and evaluation

- In accordance with the proposed developmental framework, beekeepers are expected to work closely with the collaborating parties to gather benchmark information; monitor progress and impacts of major activities; and disseminate suitable apicultural technologies in the area of implementation.

- Project expansion

- Replicate apiaries will be put in place in succession after costs were recovered from prior endeavors.

b. Budget Requirement (Feasibility study for beekeeping)

Beekeeping Assumptions

- Concept. This model does not include costs of ancillary equipment, rents and taxes.
- Stationary. No migratory beekeeping. Reasonably good forage (e.g. suburbs of Metro Manila, anywhere outside the downtown of most cities). Few colonies per apiary. Apiaries spaced 5 or more km apart. Rural areas will be best.
- Colony Strength. Double full-depth. Eight (to 14) brood frames prior to bloom of major honey sources in the area.
- Good Bee Stock. Disease-free with young fully mated queens. Good nucleus colonies double in strength in five to six weeks under adequate colony management and good foraging conditions. Double, full-depth strength can be attained within three to four months.

- Timing. Best starts are made five months prior to bloom of major honey sources. Honey harvest starts one to two months after the start of bloom. Honey harvest ends one month after the last bloom.
- Equipment. Good wood equipment and wax foundation will accelerate the growth of colonies.
- Skill. Always upgrade beekeeping knowledge and skills. Get in touch with other beekeepers. Participate in beekeeping courses and seminars. Experienced beekeepers who are in commercial production can give valuable advice.

LAUNCHING

The Bee Industry Roadmap will be launched on.....

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APPENDIX 2

Financial Models

Model assumptions

1. The starter colonies will be two as suggested.
2. This will be a fully-capitalized venture.
3. The bee products to be procured are honey, pollen and beeswax.
4. The colonies will only be split into two, assuming that some colonies may swarm. No colonies will be sold and yearly re-queening will be done for *A. mellifera*. Queens will be bought. Self-raised queens are not acceptable for *A. mellifera* but will be allowed for *A. cerana*.
5. There is no increase in the prices of commodities.
6. Consultant fees and materials for honey houses are not included in this model.
7. Production materials such as dehumidifier and honey extractor will be borrowed.
8. Rental fee is not included.

Table a. Financial model of *Apis mellifera* beekeeping

Parameters	Items per colony	Unit price (PhP)	Number of units needed				Total amount per year			
			Year 1	Year 2	Year 3	Year 4	Year 1	Year 2	Year 3	Year 4
A. Pre-operation cost										
Standard hive* (9 frames + 1 division board)	1 set	1400	2	4	8	16	2,800	5,600	11,200	22,400
Box hive for super*	1 pc	360	2	4	8	16	720	1,440	2,880	5,760
Frame*	11 pcs	50	22	44	88	176	1,100	2,200	4,400	8,800
Queen excluder*	1 pc	350	2	4	8	16	700	1,400	2,800	5,600
Hive tool*		300	1				300			
Smoker*		1000	1				1,000			
Bee veil and gloves*		200	1				200			
Feeding jar, 500mL	1 pc	3	2	2	4	8	6	6	12	24
Stainless steel knife*		50	1				50			
Pollen trap*	1 pc	600	1	1	2	4	600	600	1,200	2,400
Settling tank, 500-kg cap*		500	1				500			
Hive stand, metal, 4-col *		600	1		1	2	600		600	1,200
Sugar, white	20 kg	28	40	80	160	320	1,120	2,240	4,480	8,960
Miticide strips	2 strips	120	4	8	16	32	480	960	1,920	3,840
Weighing scale, 10-kg cap	1 pc	350	1				350			
Wax melter	1 pc	3000			1				3,000	
Pollen drier, 10-kg cap		400			1				400	
			SUBTOTAL A				10,526	14,446	32,892	58,984
B. Operation cost										
<i>Nucleus colony</i> (queen, 3 brood frames, 1 food frame)		3300	2				6,600			
Queen	1 pc	450		4	8	16		1,800	3,600	7,200
Foundation wax	16 pcs	50	32	40	80	160	1,600	2,000	4,000	8,000
Labor cost	1	500/mo	12 x	12 x	12 x	12 x	6,000	6,000	6,000	6,000
Depreciation cost* (10%/yr)							847	1,971	4,619	9,235
Contingency cost (10% operation cost)							1,505	1,177	1,822	3,044
			SUBTOTAL B				16,552	12,948	20,041	33,479
C. Production cost										
Honey										
Bottles with caps, 500g	50/60 pc	12	100	240	480	960	1,200	2,880	5,760	11,520
Label	50/60 pc	2	100	240	480	960	200	480	960	1,920
Seal, 100 pcs/set	50/60 pc	15	1	3	5	10	15	45	75	150
Pollen										
Bottles with caps, 100g	10 pcs	7	20	40	80	160	140	280	560	1,120
Label		2	20	40	80	160	40	80	160	320
Seal, 100 pcs/set	1 set	15	1		1	2	15		15	30

Table a. continued

Handling and Transportation							500	500	500	500
							2,110	4,265	8,030	15,560
TOTAL COST							29,188	31,659	60,963	108,023
Sales										
Honey, Year 1, 25 kg/ col	50 bot	150	100				15,000			
Year 2, 3 & 4, 30 kg/ col	60 bot	150		240	480	960		36,000	72,000	144,000
Pollen, 1 kg/col	10 bot	100	20	40	80	160	2,000	4,000	8,000	16,000
Beeswax, grade A, 1 kg/col		300	2	4	6	8	600	1,200	5,600	2,400
TOTAL SALES							17,600	41,200	85,600	162,400
NET INCOME							-11,588	9,541	24,637	54,378

Table b. Financial model for *Apis cerana* beekeeping

Parameters	Items per colony	Unit price (PhP)	Number of units needed				Total amount per year			
			Year 1	Year 2	Year 3	Year 4	Year 1	Year 2	Year 3	Year 4
A. Pre-operation cost										
Standard hive* (9 frames + 1 division board)	1 pc	200	2	4	8	16	400	800	1,600	3,200
Frame*	10 pcs	15	20	40	80	160	300	600	1,200	2,400
Feeding jar, 500mL	1 pc	3	2	2	4	8	6	6	12	24
Handsprayer		45	1				45			
Wax melter*		3000			1				3,000	
Pollen trap*	1 pc	500	1	1	2	4	500	500	1,000	2,000
Hive stand, metal, 5-col cap*		600	1		1	2	600		600	1,200
Queen cage	1 pc	3	2				6			
Smoker*		1000			1				1,000	
Hive tool*		300	1				300			
Stainless steel knife*		50	1				50			
Pollen drier, 10 kg-cap*		400	1				400			
Settling tank 500-kg cap *		300	1				300			
Bee veil and gloves*		200	1				200			
Strainer, plastic		50	1				50			
Sugar, white	5 kgs	28	10	20	40	80	280	560	1,120	2,240
Weighing scale, 10 kg cap*	1 pc	350	1				350			
							3,787	2,466	9,532	11,064
							6,000	6,000	6,000	6,000
B. Operation Cost										
<i>Nucleus colony</i> (queen, 3 brood frames, 1 food frame)		40	2				80			
Labor cost	1	500/mo	12 x	12 x	12 x	12 x	6,000	6,000	6,000	6,000
Depreciation cost* (10%/yr)							315	505	1,345	2,225
Contingency cost (10% operation cost)							640	651	735	823
							7,035	7,156	8,080	9,048
C. Production Cost										
Honey										
Bottles with caps, 500g	4 pcs	12	8	16	32	64	96	192	384	768
Label	4 pcs	2	8	16	32	64	16	32	64	128
Seal, 100 pcs/set	4 pcs	15	1			1	15			15
Pollen										
Bottles with caps, 100g	10 pcs	7	20	40	80	160	140	280	560	1,120
Label	10 pcs	2	20	40	80	160	40	80	160	320
Seal, 100 pcs/set	10 pcs	15	1		1	1	15		15	15
Handling and Transportation		500					500	500	500	500
							822	1,084	1,683	2,866
TOTAL COST							11,644	10,706	19,295	22,978

Table b. continued

Sales											
Honey, 2kg / col	4 bot	180	8	32	64	128	1,440	5,760	11,520	23,040	
Pollen, 1 kg/col	10 bot	150	20	80	160	320	3,000	12,000	24,000	48,000	
Beeswax, grade A, 1 kg/col		300	2	4	8	16	600	1,200	2,400	4,800	
TOTAL SALES							5,040	18,960	37,920	75,840	
NET INCOME							-6,604	8,255	18,626	52,863	

Financial Analysis of the Models

Apis mellifera

	Year 1	Year 2	Year 3	Year 4	TOTAL
Total Cost	29,188	31,659	60,963	108,023	229,832
Gross Income	17,600	41,200	85,600	162,400	306,800
Net Income	-11,588	9,541	24,637	54,378	76,968
Return of Investments (ROI) (the higher, the better)	12,136	30,347	70,769	144,813	258,065
Benefit-Cost Ratio (BCR) BCR > 1.0 better	-95.4820	31.4394	34.8134	37.5502	1.3349

Time for investment of Php 144,813 to return - after 4 years

Depreciation Schedule	Year 1	Year 2	Year 3	Year 4	TOTAL
Material Bought – Year 1	887	887	887	887	3,548
Material Bought – Year 2		2,011	2,011	2,011	6,033
Material Bought – Year 3			4,619	4,619	9,238
Material Bought – Year 4				9,235	9,235
	<u>1,564</u>	<u>2,898</u>	<u>7,517</u>	<u>16,752</u>	<u>28,054</u>

	Year 1	+Year 2	+Year 3	+Year 4	TOTAL
Yearly Investment	10,526	14,446	32,892	58,984	
	1,610	3,765	7,530	15,060	
Sub-Total	12,136	18,211	40,422	74,044	144,813
		12,136	30,347	70,769	
Overall Total	12,136	30,347	70,769	144,813	258,065

Apis cerana

	Year 1	Year 2	Year 3	Year 4	TOTAL
Total Cost					
Gross Income	11,754	10,728	19,318	23,003	64,802
Net Income	5,040	18,960	37,920	75,840	137,760
Return of Investments (ROI) (the higher, the better)	-6,714	8,233	18,602	52,837	72,958
Benefit-Cost Ratio (BCR) BCR > 1.0 better	4,109	7,159	17,874	31,304	60,446
	-163.3853	114.9951	104.0740	168.7853	
	0.4288	1.7674	1.9630	3.2969	2.1259

Time for investment of Php 31,304 to return - after 4 years

Depreciation Schedule	Year 1	Year 2	Year 3	Year 4	TOTAL
Material Bought – Year 1	363	363	363	363	1,452
Material Bought – Year 2		553	553	553	1,659
Material Bought – Year 3			1,394	1,394	2,788
Material Bought – Year 4				2,277	2,277
	<u>937</u>	<u>916</u>	<u>2,310</u>	<u>4,587</u>	<u>8,176</u>

Financial analysis continued

	Year 1	+Year 2	+Year 3	+Year 4	TOTAL
Yearly Investment	3,787	2,466	9,532	11,064	
	322	584	1,183	2,366	
Sub-Total	4,109	3,050	10,715	13,430	31,304
Overall Total	4,109	4,109	7,159	17,874	60,446

Assumption for *A. mellifera* and *A. cerana* : 10% desired rate of return, for 10 years

Monetary income is negative on the first year. Total assets, however, is positive (this includes the bees and other materials bought/fabricated).

Suggestions for positive monetary income on the first year:

1. Fabricate or improvise own materials such as hives, boxes, frames and benches. This may minimize material cost by 50%.
2. Since the number of colonies is few, the beekeeper may not hire a laborer so that labor cost will still be a part of the income.
3. Buy in bulk. Costs for production materials such as bottles, seals and labels usually are discounted when bought in bulk.
4. Make your own wax foundation using the beeswax produced. This lessens the operation cost by 20%.
5. Selling of nucleus colonies proves to be a more profitable venture than selling of products.

Notes: If suggestions will be done, costs and returns during the first year of operation will be break even and >50% in net income in the following years.

Source: Magsaysay, J. F. , R. M. Lucero, A. C. Manila-Fajardo and N. E. Tapay. 2004. Bees for New Asia. Economics of Raising Honey Bees in the Philippines

LAUNCHING

APPENDIX 1

Plants Visited By Bees

Family	Scientific name	Common name	Pollen Source	nectar source	Blooming Season
Acanthaceae	<i>Thunbergia grandiflora</i> (Rottb. & Willd.) Roxb.		A	x	All the year
	<i>Hygrophila lancea</i> Miq.	Kahoy-kahoy	a	?	Nov.- Apr.
Aceraceae	<i>Acer serrulatum</i> Hay.				
Agavaceae	<i>Agave cantula</i> Roxb.	Maquey	a	x	Occasionally
Amaranthaceae	<i>Alternanthera tenella</i> Colla	Kutsarita	a	x	Most of the year
	<i>Amaranthus spinosus</i> L.	Kolites lalake	a	x	All the year
	<i>Amaranthus viridis</i> L.	Lolites babae	a	x	All the year
	<i>Celosia argentea</i> L.	Kadayoan	a	?	Aug.- Feb.
Anacardiaceae	<i>Anacardium occidentale</i> L.	Kasoy	a	x	Dec.-Feb.
	<i>Mangifera indica</i> L.	Mangga	A	x	Nov.- May
Apocynaceae	<i>Thevetia peruviana</i> K. Schum	Campanilla	A	x	All the year
Aquifoliaceae	Unidentified species				
Asclepiadaceae	<i>Asclepias curassavica</i> L.	Mais-maisan	p	x	Most of the year
Balsaminaceae	<i>Impatiens balsamina</i> L.	Kamantigue;	a	?	Most of the year
Begoniaceae	Unidentified species				
Betulaceae	<i>Alnus japonicum</i> L.	Alnus	A	extra floral	All the year
	<i>Alnus maritima</i> (Marsh.) Nutt		A	x	All the year
Bignoniaceae	Unidentified species				
Bombacaceae	<i>Bombax malabaricum</i> DC	Malabuyok/	a	x	Feb.-Mar
	<i>Ceiba pentandra</i> L. Gaertn.	Kapok	A	x	Jan.-Mar
	<i>Durio zibethinus</i> Murr.	Durian	a	x	Jun.-Sept
Boraginaceae	<i>Trichodesma</i> sp.	Mabulo	a	x	Mar. – Jun
Caesalpinaceae	<i>Cassia siamea</i> Lam.	Acacia	A	x	Jun.- Dec.
	<i>Tamarindus indica</i> L.	Sampalok	A	x	Apr.- Oct.
Campanulaceae	Unidentified species				
Caprifoliaceae	Unidentified species				
Caryophyllaceae	Unidentified species				
Caricaceae	<i>Carica papaya</i> L.	Papaya	a	x	All the year
Casuarinaceae	<i>Casuarina equisetifolia</i> Forst.	Agoho	A	?	Most of the year
Combretaceae	Unidentified species				
	<i>Terminalia catappa</i> L.	Talisay	a	x	Most of the year
Commelinaceae	Unidentified species				
Compositae/ Asteraceae	<i>Ageratum conyzoides</i> L.	Bulak manok	A	x	Most the year
	<i>Bidens pilosa</i> L.	Beggar ticks	A	x	Oct.-Nov.
	<i>Cosmos caudatus</i> HBK	Cosmos	A	x	All the year
	<i>Emilia sonchifolia</i> (L.) DC.	Tagulinao	A	?	Oct.-Apr.
	<i>Helianthus annuus</i> (L.) DC	Sunflower	A	x	Oct.-May
	<i>Sonchus oleraceus</i> L.	Gagatang	A	x	Apr. –Aug.
	<i>Tagetes erecta</i> L.	Amarillo	A	x	All the year
	<i>Tithonia diversifolia</i> (Hemsley) A. Gray	Suga-suga	A	x	Oct.-Mar.
	<i>Tridax procumbens</i> L.	Bulak-manok	A	?	All the year
	<i>Wedelia biflora</i> (L.) DC	Hagonoy, kuri-kuri	A	x	Most of the year
Convolvulaceae	<i>Vernonia cinerea</i> (L.) Less	Bulak-manok	A	?	All the year
	<i>Ipomoea batatas</i> (L.) Poir.	Kamote	a	x	All the year
	<i>Ipomoea triloba</i> L.	Campanilla morada	A	x	All the year
	<i>Ipomoea nil</i> (L.) Roth.	Campanita	a	x	All the year
	<i>Merremia</i> sp.		a	x	
Cruciferae/ Brassicaceae	<i>Brassica juncea</i> (L.) Coss.	Mustasa	a	x	All the year

Plants visited... continued

Cucurbitaceae	<i>Cucumis melo</i> L.	Melon	A	x	Mar.-May
	<i>Cucumis sativus</i> L.	Pipino	A	x	All the year
	<i>Luffa cylindrica</i> Roem.	Patola		x	
	<i>Momordica charantia</i> L.	Ampalaya	A	x	All the year
	<i>Sechium edule</i> (Jacq.) Swartz	Sayote	A	x	All the year
	<i>Trichosanthes</i> sp.	Melon-melonan	a	?	Jun.- Feb.
Cyperaceae	Unidentified species				
Ericaceae	Unidentified species				
Euphorbiaceae	<i>Antidesma</i> sp.	Bignay	a	x	Mar.- Aug.
	<i>Codiaeum variegatum</i> L.	Croton	a	?	All the year
	<i>Hevea brasiliensis</i> HBK	Para rubber tree	p	x	
	<i>Macaranga tanarius</i> (L.) Muell.-Arg	Binonga	A	?	Jan.-Apr.
Flacourtiaceae	<i>Hydnocarpus alcalae</i>	Dudoa	A	?	Most of the year
Gramineae	<i>Zea mays</i> L.	Mais	a		Aug.- Sept.
	<i>Saccharum officinarum</i>	Tubo	a	sap	Occasionally
	<i>Cynodon dactylon</i> (L.) Pers.	Bermuda grass	a		Jun.- Sept
	<i>Panicum maximum</i> Jacq	Guinea grass	a		All the year
	<i>Chloris barbata</i> (L.) Sw.		a		All the year
Labiatae	<i>Hyptis suaveolens</i>	Suob-kabayo	a	x	All the year
Lauraceae	<i>Persea americana</i> L.	Avocado	a	x	March
Liliaceae	Unidentified species				
Loranthaceae	<i>Loranthus</i> sp.				
Lythraceae	Unidentified species				
Malphigiaceae	Unidentified species				
Malvaceae	<i>Gossypium hirsutum</i> L.	Bulak	a	x	May- Jun.
	<i>Hibiscus rosa-sinensis</i> L.	Gumamela	a	x	All the year
	<i>Malvaviscus arboreus</i>		a	?	All the year
Magnoliaceae	Unidentified species				
Melastomataceae	Unidentified species				
Meliaceae	<i>Aglaia</i> sp.		a	x	Aug.-Dec.
	<i>Lansium domesticum</i> Jack	Lanzones			Jun
	<i>Sandoricum koetjape</i> (Burm. f.) Merr.	Santol	a	x	Feb.- Mar.
	<i>Canarium ovatum</i> L.	Pili	a	?	Mar.-Apr.
Mimosaceae	<i>Acacia</i> sp.		a	x	Oct.- May
	<i>Leucaena leucocephala</i> (Lam) de Wit	Ipil-ipil	A	x	All the year
	<i>Mimosa pudica</i> L.	Makahiyang babae	A	x	All the year
	<i>Mimosa diplotricha</i> var <i>diplotricha</i> (ex Sauvelle) Wright	Makahiyang lalake	A		All the year
	<i>Pithecellobium dulce</i> (Roxb.) Benth.	Camachile	a	x	Oct.- Apr.
	<i>Prosopis vidallana</i> Naves	Aroma	a	x	Sept.- Mar.
Moraceae	Unidentified species				
Moringaceae	<i>Moringa oleifera</i> L.	Malunggay	A	x	Jan.-May
Musaceae	<i>Musa</i> spp.	Saging	A	x	All the year
Myristicaceae	<i>Knema</i> sp.				
Myrsinaceae	<i>Aegiceras corniculatum</i> (L.) Blanco	Pilapil, tunduk-tundukan	A	x	Oct.-Mar.
Myrtaceae	<i>Callistemon citrinus</i> (Curt.) Stapf	Bottle brush	A	x	All the year
	<i>Eucalyptus</i> sp.		A	x	
	<i>Psidium guajava</i> L.	Bayabas	A	x	All the year
	<i>Syzygium cumini</i> (L.) Skeels				

	<i>Eugenia malaccensis</i> L.	Makopa	A	x	Mar.-Apr.
	<i>Eugenia jambolana</i> Lam.	Duhat	A	x	Feb.-Mar.
Nyctaginaceae	<i>Bougainvillea bougainvillea</i>	Bougainvillea	a	?	All the year

Plants visited.... continued					
Palmae/ Arecaceae	<i>Actinophleus macarthurii</i>	Macarthur palm	A	?	All the year
	<i>Areca catechu</i> L.	Bunga	a	?	All the year
	<i>Cocos nucifera</i> L.	Niyog	A	x	All the year
	<i>Elaeis guineensis</i> Jacq.	Oil palm	A	x	All the year
	<i>Veitchia merrillii</i> (Besc.) H.E.	Bunga de china	x		All the year
Papilionaceae	<i>Aeschynomene indica</i> L.		A	x	All the year
	<i>Erythrina</i> sp	Dapdap	A	x	All the year
	<i>Gliricidia sepium</i> (Jacq.) Steud	Madre de cacao; kakawate	p	x	Dec.-Apr.
	<i>Glycine max</i> L.	Soya bean	a	x	Occasionally
	<i>Indigofera</i> sp.	Tayom-tayom	a	?	Most of the year
	<i>Pterocarpus indicus</i> Willd.	Narra	a	x	Apr.-May
	<i>Sesbania roxburgii</i> Merr.	Katuray	a		Most of the year
Passifloraceae	<i>Passiflora edulis</i> Sims.	Passion fruit	a	x	At intervals all the year
Pinaceae	Unidentified species				
Pittosporaceae	Unidentified species				
Plumbaginaceae	<i>Plumbago</i> spp.	Alogbati	a	?	Oct. - Dec
Polygonaceae	<i>Antigonon leptopus</i> Hook & Arn.	Cadena de amor	A	x	All the year
	<i>Polygonum</i> sp.		a	?	Most of the year
Portulacaceae	<i>Portulaca oleraceae</i> L.	Golasiman	a	?	All the year
Rhamnaceae	<i>Zizyphus jujuba</i> Mill	Manzanitas	a	x	Jul.-Sept.
Rosaceae	Unidentified species				
Rubiaceae	<i>Coffea</i> spp.	Kape	a	x	Most of the year
Rutaceae	x <i>Citrofortunella microcarpa</i> (Bunge) Wijnands	Kalamansi	a	x	Most of the year
	<i>Citrus grandis</i>	Pomelo	a	x	Most of the year
	<i>Murraya</i> sp.	Kamuning	x	x	Jul. – Sept.
Sapindaceae	Unidentified species				
Sapotaceae	<i>Mimusops elengi</i> L.	Bansalaguin	a	x	Most of the year
	<i>Pouteria campechiana</i> L.	Chesa	A	?	
Simarubaceae	Unidentified species				
Solanaceae	<i>Brugsmania suaveolens</i>	Talampunay	A	?	Most of the year
	<i>Lycopersicon lycopersicum</i>				
	<i>Nicotiana tabacum</i> L.	Tabako	A	x	All the year
	<i>Solanum wendlandii</i> Hook. f.		A	?	June
Sterculiaceae	<i>Kleinhofia hospita</i> L.	tanag		?	Sept. - Nov.
Tiliaceae	<i>Diplodiscus paniculatus</i> L.		a	?	
	<i>Muntingia calabura</i> L.	Aratiles	a	?	Most of the year
	<i>Triumfetta</i> spp.	Calot-kalotan	a	?	Oct.- Feb.
Ulmaceae	<i>Trema amboinensis</i> Blume	Hagod	A	?	Jan.- Apr.
Umbelliferae	<i>Centella asiatica</i> (L.) Urban	Takip-kuhol	A	?	Oct.- May
Urticaceae	Unidentified species				
Verbenaceae	<i>Lippia nodiflora</i> (L.) Rich	Cape vine	a	x	All the year
	<i>Vitex negundo</i> L.	Lagundi	a		All the year
	<i>Vitex parviflora</i> Juss	Molave	a	x	May-Oct
Zingiberaceae	<i>Hedychium coronarium</i> Koenig	Kamia	p	x	Jun.- Dec.

_____ A – pollen valuable to bees; a- less valuable to bees; p – toxic or not available in large quantities; x – nectar source;

? – under study; All unidentified species are currently being identified.

(Tilde and Payawal, 1987; Payawal, et al., 1987; Payawal, et al., 1989; Payawal et al., 1991; Tilde and Payawal, 1992; Forbes and Cervancia, 1994; Arguelles and Cervancia, 1998; Fajardo, et al., 2002; Tilde, et al., 2003; Manila-Fajardo and Cervancia, 2003, Manila-Fajardo, et al., 2003; Manila-Fajardo and Cervancia, 2004) UPLB Bee Program.