



USAID | **YEMEN**
FROM THE AMERICAN PEOPLE

PRESERVING QUALITY

STRENGTHENING YEMEN'S HONEY SECTOR FOR FUTURE GENERATIONS

July 2013

The views expressed in this report do not necessarily reflect the views of the United States Agency for International Development or the United States Government. Creative Associates International prepared this report under the Community Livelihoods Project: Cooperative Agreement No. 279-A-00-10-0032-00.

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COMMUNITY LIVELIHOODS PROJECT

The Community Livelihoods Project (CLP) is a program of the USAID/Yemen. CLP is improving the lives of people who are most in need by working with communities, the Republic of Yemen Government (RoYG), and local companies to create a more stable and resilient society. The program works in areas of economic development, agriculture, health, education and governance. The CLP agricultural sector works with the Yemeni Government, partners and beneficiaries to boost food security and improve incomes in project governorates.

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ACRONYMS

AREA	Agricultural Research and Extension Authority
CLP	Community Livelihoods Project
CoC	Chambers of Commerce
DG	Director General
EMEA	Europe Middle East Africa
EOF	Economic Opportunity Fund
EOP	Economic Opportunity Program
FAO	Food and Agricultural Organization
HACCP	Hazard Analysis and Critical Control Points
HH	Household
KIT	The Royal Tropical Institute
LC	Local Council
M&E	Monitoring and Evaluation
MAI	Ministry of Agriculture and Irrigation
MENA	Middle East North Africa
MoIT	Ministry of Industry and Trade
NGO	Non-Government Organization
OMR	Optical Markup Recognition
RoYG	Republic of Yemen Government
RTA	Regional Trade Agreements
SFD	Social Fund for Development
SME	Small and Medium Enterprises
SMEPS	Small Micro Enterprise Service
SPSS	Statistical Package for Social Sciences
ToR	Terms of Reference
ToT	Training of Trainers
USAID	United States Agency for International Development
VAT	Value Added Tax
VCA	Value Chain Analysis
WTO	World Trade Organization
YHA	Yemeni Honey Association
YSMO	Yemen Standardization, Metrology and Quality Control Organization; a branch of MoT

SYSTEM OF UNITS

AUS	Australian dollar
CAD	Canadian dollar
EURO	European Monetary Unit
gallon	one gallon = 7 kg
GBP	Great Britain Pound
gm	Gram
JPY	Japanese Yen
kg	Kilogram
MT	Metric ton (1000 kilograms = 2,205 pounds)
Oz	Ounce
USD	United States dollar
YER	Yemeni rial

Note: Exchange rates in this report used to convert local prices into USD \$ were drawn from OANDA.com on **June 4, 2013**: USD \$1 = AUD \$1.03 = CAD \$1.03 = Euro €0.765 = GBP £0.653 = JPY100.

EXECUTIVE SUMMARY

Preserving Quality examines strategies to strengthen Yemen’s honey sector for future generations. The report contains a depth of technical and regulatory information about the honey sector in Yemen as well as regulatory systems in several nations with relevant experiences. The findings and conclusions emphasize the importance of building the capacity of institutions in Yemen, implementing interventions for women and youth, and strengthening traditional methods used by beekeepers that have made Yemeni honey renowned worldwide, as a premium product.

PURPOSE AND ORGANIZATION OF REPORT

This report provides an objective assessment of the honey sector in Yemen to identify potential opportunities for strengthening its future. The report is organized in four main sections that reflect the four tasks assigned to the research team (**Table I**) as well as development objectives supported by USAID, which are aligned in many respects with the United States’ **Feed the Future Initiative**. It is hoped that the findings and recommendations in this report will be of interest to stakeholders in Yemen’s honey sector, the Republic of Yemen Government (RoYG), and donor agencies exploring potential opportunities to support future development interventions that create a more stable, resilient economy for the people of Yemen.

Table I. Organization of report

SECTION: Tasks assigned to research team	Descriptions
SECTION 1: Value Chain Assessment	Assess the overall honey value chain strengths and weaknesses, including chain support activities.
SECTION 2: Market Analysis	Conduct a market analysis to highlight current end markets, market trends, segmentation, and high potential market segments, trade barriers, and opportunities for women and youth.
SECTION 3: National Marketing Strategy	Inform the development of a national marketing strategy.
SECTION 4: Institutional Capacity Building Strategy	Assist in the development of an institutional and organizational capacity building strategy.
SECTION 5: Conclusions and Recommendations	Conclusions and Recommendations

Source: USAID Community Livelihoods Program, 2013

METHODOLOGY

Qualitative and quantitative research methods were used to conduct the research for this report. A comprehensive desk review of existing studies was completed, and the findings from previous studies that remain relevant are integrated throughout this report. From May 8 to June 22, 2013, survey questionnaires were completed by 142 beekeepers in Yemen, and their responses provide new insights into issues facing producers (see **Annex 4**). In-depth interviews were conducted with stakeholders in Yemen’s honey sector: wholesalers, retailers, Government of Yemen stakeholders, academics, and the donor community. A comparative analyses of the standards, best practices, and lessons learned by honey producers, associations, and regulatory agencies situated in Yemen’s current (and potential) export markets provides a broader understanding of the context and should assist donors in selecting and prioritizing funding for interventions that are likely to achieve the most significant, sustainable impacts for the honey sector in Yemen.

KEY FINDINGS AND CONCLUSIONS

Export market diversification should be explored. A basic rule in any business enterprise is as follows: never direct more than 10 percent of overall sales to one client. While the entire Gulf is, of course, not one client; in reality the entire Gulf market area reacts to supplies and prices of Yemeni honey with relative unity. An expansion into other markets will reduce the impact of being tied to one fairly homogeneous market. In addition, the successful introduction of retail products will create a different dynamic as opposed to the current marketing plan of selling high quality honey in 7 kg plastic jugs.

The Yemeni honey sector is male dominated, but opportunities exist for women and youth. The research team found that all actors across the value chain of the honey sector in Yemen are overwhelming male. While further study is needed, there are clearly opportunities for the entry of women into key positions within this sector, such as marketing, research, and exporting to specialty markets. Opportunities exist for women and youth, but there are presently no donor interventions that this research team identified with respect to promoting the inclusion of women in research efforts or private sector opportunities in the export specialty honey sectors (e.g., organic and medical honeys). The research team found that opportunities exist for youth to gain entry to this growing sector through internships in all areas—production, retail, wholesaling, export and research.

Yemeni honey produced in traditional beehives commands higher prices than honey from modern hives. Honey produced in Yemen is unique, as are the most prevalent bees that produce the honey. Prior to any outside development interventions, donors and other interested actors should carefully consider the reasons that regional consumers are willing to pay much higher prices for Yemen honey than honey produced in any other country. An example of misdirection is the issue of modern beehives. Donors have provided financial assistance and support to beekeepers with the assumption that modern hives produce more honey and are in general a better management technique. In contrast, regional markets continue to pay a premium for honey produced in traditional hives due to the view that honey products produced in traditional hives are of higher quality.

Honey produced in traditional beehives has unique characteristics. The honey produced from traditional hives usually provides more mature (capped) honey with less moisture than honey produced from modern hives. There is some evidence that the reason behind this is due to the accuracy of bee space between the combs inside the traditional hives (developed by the bees) compared to that of modern hives.

Robust, domestic demand for honey in Yemen may discourage beekeepers and wholesalers from selling their products to export markets. There is an opportunity to build a market in North America and eventually in the European Union (EU) for precious and historic Sidr honey. However, important questions remain: Will there be enough supply to maintain the current domestic market while opening up new opportunities? Will there be sufficient interest within the honey cluster to pursue new markets as long as current prices can be maintained for Sidr honey in traditional markets? After several years of healthy growth in sales volume along with consistently higher prices without any inspection at origin; why would beekeepers or most wholesaler and exporters have any interest in changing business-as-usual?

High prices for Yemen honey may be experiencing market resistance. At the same time, observant marketers noted resistance at higher prices early in 2013, leading to a rollback of 25 percent in marketable prices. One might therefore conclude the market for Sidr honey within the current markets being served is not completely flexible.

RECOMMENDATIONS

Donor assistance is needed to strengthen institutional capacity building for the honey sector in Yemen. The honey cluster would benefit from stronger organizations, including the new initiative related to wholesalers and exporters developing within the Yemen Chamber of Commerce. Although, beekeepers by nature tend to operate as individuals, they will benefit greatly by the development of stronger organizations. Donor support such as the current Economic Opportunities Program (EOP) will be of great assistance in helping producers to gather together for mutual benefit.

Gender mainstreaming and internships for youth should be prioritized. The honey sector in Yemen would benefit from a gender mainstreaming analysis across the entire value chain, supported by an established donor project, with qualified expertise. This is particularly timely, as the development of a national research center is formed, and a specific study should be conducted to identify the best entry points for women into this sector. In addition, employment opportunities for youth are promising, and should be actively considered for integration into existing economic development interventions.

Science-based certification methodologies and labeling standards should be developed to preserve the brand integrity of Yemeni honey. The integrity of the Yemeni honey sector can be greatly enhanced by the development of methodologies to determine the scientific as well as organoleptic properties of each honey type. In addition, the development of an internationally credible labeling and certification (of integrity) system will add further credibility to the honey sector.

A traceability program to verify the origin of Yemeni honey is needed. A verifiable, traceability program related to imported honeys as well as Yemeni-produced honey should be developed—to ensure the credibility of honey produced in Yemen.

Changes to packaging containers should be considered to protect the quality of Yemen honey. The 7 kg plastic container, typically utilized to store honey in bulk, should be replaced with a container that offers more protection from extreme environmental conditions and is more practical as related to labeling.

Mapping the location, ownership and control of specific trees in Yemen with the most valuable flowers (for bee pollen) is needed. The location of existing Sidr and Salam trees in Yemen should be mapped, including determining ownership and control of land where these trees are situated. Potential for expansion and regeneration of these trees should be examined as a priority of government. An incentive program coordinated between environmental non-governmental organizations (NGOs), beekeepers, and the RoYG Forestry Department should be developed in order to encourage retention and expansion of bee trees. Planting bee trees will serve as a tool to improve the overall environment, improve the ecosystem, improve the livelihood of beekeepers, and livestock keepers since these trees are also used as forage trees and shadow shelter for the flocks during grazing in the hot summer months. Research into how Australia managed to save the endangered Leatherwood Trees in Tasmania, which also are responsible for a unique mono-floral honey, may provide an example of how to save bee trees in Yemen.

Promotion of modern beehives in Yemen should be reviewed until further impact studies are conducted. Donors, the RoYG, and other well-meaning supporters of the Yemen honey cluster should reconsider the focus on modern hives for the following reasons: (1) the market prefers honey from traditional hives and pays more for honey produced in traditional hives; (2) the cost of traditional hives is about 60 percent less than the cost of modern hives; (3) traditional hives are more ecologically friendly; (4) the volume of honey production from

traditional hives is typically the same as from modern hives; (5) traditional hives are more practical for shipping, which is an important consideration for nomadic beekeepers; (6) there is some evidence that the space within traditional hives results in more mature honey, which has stronger desirable attributes for which Yemen honey is known, and this results in higher prices in the global marketplace.

Donors should consider supporting fact-finding study-tours for Yemen stakeholders to build their capacity and to learn from the experiences of other nations. If support for a national center for beekeeping and honey production continues to build momentum, donors should support fact-finding study-tours to other nations to allow members of the honey cluster to learn how similar activities have been planned, developed, and funded in a sustainable fashion.

SECTION 1

VALUE CHAIN ASSESSMENT

I.1 INTRODUCTION

Section I of this report provides an assessment of the overall honey value chain strengths and weaknesses in Yemen, including chain support activities. This section is organized into four parts: (1) a brief examination of the performance of the honey sector in Yemen from 2008-2013; (2) a mapping of the honey value chain in Yemen; (3) an overview of the value chain environment; and (4) a SWOT analysis—strengths, weaknesses, opportunities and threats— affecting the honey value chain in Yemen. This section draws upon the findings of previous studies to provide further context and historical perspectives.

I.2 PRODUCTION, PRICES, AND EXPORT VOLUMES

A previous value chain analysis of the honey sector in Yemen completed in 2009 found that stagnation had set in during the 2006-2008 period (KIT and SMEPS, July 2009). After 2008, more recent data indicates that a robust, sustained rebound in production levels and prices has occurred. As detailed in **Table 2**, overall honey production increased each year from 2008, with official production of 2572 metric tons (MT) reported in 2012. From 2008 to 2012, prices gradually increased for all types of honey produced in Yemen.

Table 2 Honey production in metric tons and price (USD), 2008-2013

Year			2008	2009	2010	2011	2012	2013
Production			2,439	2,486	2,546	2,561	2,572	n/a
Price (USD)	Sidr honey	Wholesale, gallon	\$186 - \$209	\$209 - \$233	\$209 - \$233	\$233 - \$255	\$280 - \$300	\$300-\$400
		Retailer, kg	\$63 - \$70	\$63 - \$70	\$67 - \$80	\$60 - \$70	\$70 - \$84	\$70 - \$84
	Salam and Sumar honey	Wholesale, gallon	\$100 - \$130	\$130 - \$150	\$130 - \$150	\$130 - \$180	\$190 - \$230	\$190 - \$230
		Retailer, kg	\$25 - \$30	\$25 - \$30	\$30 - \$40	\$30 - \$40	\$35 - \$46	\$35 - \$46
	Maryee honey	Wholesale, gallon	\$50 - \$70	\$50 - \$70	\$60 - \$82	\$70 - \$93	\$70 - \$116	\$70 - \$116
		Retailer, kg	\$7 - \$10	\$7 - \$9	\$7 - \$9	\$8 - \$12	\$9 - \$12	\$14 - \$18

Notes: 1 Gallon = 7 kg. The prices in this table include applicable exchange rates between the USD dollar and the local currency from 2008 to 2013, which saw the US dollar increase in strength relative to the Yemeni Real.

Sources: Agricultural Statistical Book. 2012. Ministry of Agriculture and Irrigation, General Directorate of Agricultural Statistics. Republic of Yemen and USAID Community Livelihoods Program, 2013

Production has also increased as prices have risen. Over 20,000 beekeepers were added to the workforce during this period, with a corresponding increase in the number of beehives (see **Table 3**). Exports during this period also increased until 2011, when a modest decline occurred. The decline in exports of honey from Yemen in the year 2011 is likely related to strong domestic demand for this product in Yemen. While export volumes can be closely correlated with the volumes of Sider honey produced in a given year, the domestic market for honey produced in Yemen is robust, with deep historical roots. Trading and gifting honey from beekeepers to friends, relatives, and

guests is an age-old tradition. Networks of retail establishments exist throughout Yemen that market honey and honey based products. Taken together, these factors can affect the volume of honey available for export to other countries.

Table 3. Number of hives, honey production, exported and imported, 2003-2011

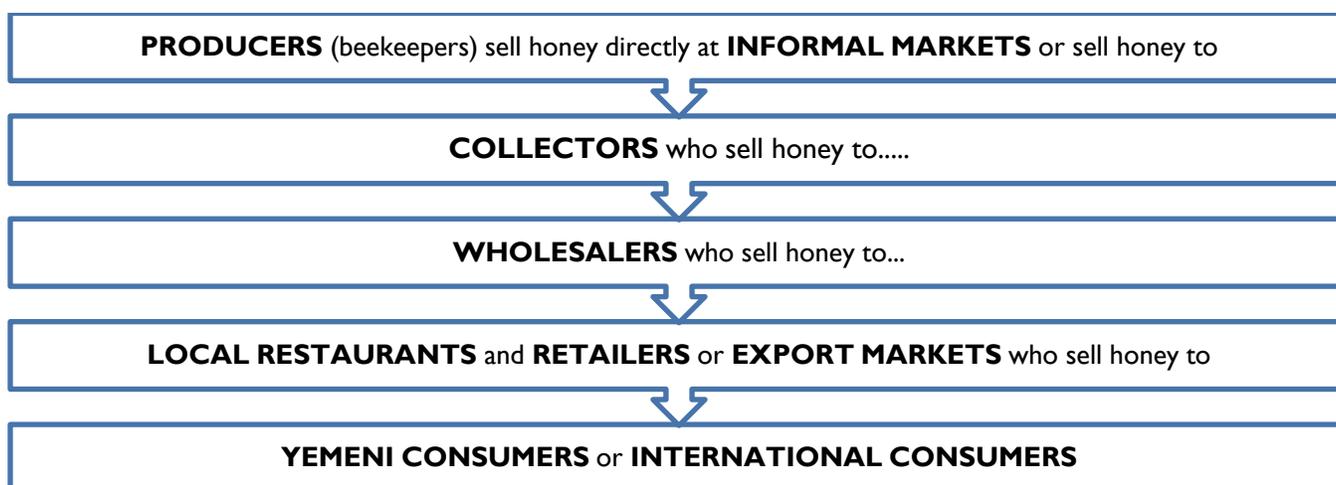
Year	Number of hives	Production, MT	Exports, kg	Imports, kg
2003	1,001,025	1,485	344	n/a
2004	1,196,503	1,771	No Data	n/a
2005	1,197,281	1,897	484	n/a
2006	1,197,551	1,930	138	n/a
2007	1,205,695	2,410	547	n/a
2008	1,223,780	2,439	635	n/a
2009	1,239,692	2,486	837	n/a
2010	1,264,771	2,546	913	n/a
2011	1,280,461	2,561	754	726,651

Source: Agricultural Statistical Book. 2012. Ministry of Agriculture and Irrigation, General Directorate of Agricultural Statistics. Republic of Yemen.

1.3 MAPPING SALES FROM PRODUCERS TO CONSUMERS

Mapping the process of selling honey in Yemen reveals that this process has changed little since the time it was mapped in the 2009 (Economic Opportunity Program (EOP), *Program Final Design Report, Working Paper 4*. Economic Infrastructure, Economic Opportunity Program: Republic of Yemen Government). Producers (beekeepers) sell honey directly to consumers at informal markets in Yemen or to collectors. Collectors then sell honey to wholesalers, who in turn sell honey to domestic or export markets, which then reach consumers (**Figure 1**).

Figure 1. Value-chain mapping various actors selling honey in Yemen, 2013



Sources: Adapted and revised from EOP (2009) by USAID Community Livelihoods Program, 2013

Time frame for bringing products to consumers. This analysis found that the time frame for honey to reach consumers may take anywhere from two months (in the case of local, informal markets in Yemen) to five years—if

honey is sold to wholesalers for resale to retail outlets or restaurants in Yemen or to export markets. The extent to which export markets have established further distribution channels (e.g., retail outlets) to reach international consumers varies. Most honey sold for export is of the Sider variety.

1.4 DONOR INTERVENTIONS

Traditionally there has been little recognizable organizational structure within the Yemen honey sector. Although there are several beekeepers organizations, wholesalers and retailers operate individually; they are not organized. In recent years, international donors have targeted the Yemen honey sector for its potential to generate income for poor and landless citizens. **Table 4** provides a summary of interventions funded by various donors in Yemen.

Table 4. International donor interventions for the honey sector in Yemen

Organization	Intervention
Arab Authority for Agricultural Development	Distributed 250 <i>Langstroth</i> hives after training 25 women beekeepers in the Aslam Hajjah Governorate in 2010 Distributed 300 <i>Langstroth</i> hives after training 30 beekeepers (women) in Alzaidiah Alhudidah Governorate.
Economic Opportunity Program Islamic Development Bank and European Union	Developed a substantial and comprehensive program which promises to enhance the entire value chain, strengthen the institutions relevant to the sector and improve the potential for export expansion.
Food and Agriculture Organization	Distributed 1000 <i>Modern Yemeni</i> hives after training 250 beekeepers in Hajjah Governorate during 2012
Japanese International Cooperation Agency	In coordination with Ministry of Agriculture and Irrigation, RoYG, is preparing to train 90 beekeepers and distributing 720 <i>Langstroth</i> hives
<i>Social Fund for Development (SFD)</i>	Implemented training as well as distributing hives for beekeepers
United States Agency for International Development (USAID)	Providing capacity building training to the Yemen honey sector through the Community Livelihoods Project (CLP), and undertaking study of institutional capacity building needs.

Source: USAID Community Livelihoods Program, 2013

1.5 SWOT ANALYSIS

In this final part of **Section I**, the strengths, weaknesses, opportunities and threats of, for and towards the honey sector in Yemen are examined. It provides a summary of key issues to consider based on the preceding analyses in this section, previous published studies, and stakeholder consultations. This SWOT analysis attempts to highlight critical issues to consider while not being unduly exhaustive.

Figure I. Highlights of SWOT Analysis, Honey Sector in Yemen



Source: USAID Community Livelihoods Program, 2013

STRENGTHS

- **Price stability.** The price of all Yemeni honey is generally among the highest in the world and pure Sidr honey from Yemen is without question the most sought after and expensive honey on global markets. “Yemeni honey is highly priced on the international market and attracts lucrative prices” (IFAD, 1999); especially in the Gulf States. The export quantity and value of Yemeni honey has been on an upward trend for the past decade.
- **Product quality.** Yemeni honey is mostly produced from natural vegetation in the mountainous and plains regions in Yemen versus production from growing crops, with a few exceptions. In general, beekeepers make every effort to avoid pesticides utilized on farms to protect colonies from losses and contamination. In addition, Yemeni beekeepers typically avoid the use of chemicals for pest or disease control. This results in honey with organic characteristics. Pure Yemeni Sidr honey is characterized with high percentage of Sidr pollen, which can reach up to 90 percent, resulting in honey with qualities unlike any other on the planet.
- **National organization to ensure quality.** The *Yemen Standardization, Metrology and Quality Control Organization (YSMO)*; a branch of the Ministry of Trade (MoT), RoYG, has a qualified, experienced core staff and is working towards the development of well-equipped laboratories capable of evaluating honey being imported, exported, and intended for domestic consumption.
- **Proposed standards to identify origin, ensure quality.** YSMO has, in cooperation with leaders within the Yemen Honey Cluster developed Proposed Standards of quality, which are anticipated to become official within three months.

- **Intellectual property protection is quickly evolving.** YSMO and the Economic Opportunity Program (EOP) have signed an agreement to establish a Trade Mark for Yemeni honey, with the objective of helping to maintain the identity of Yemeni honey. Hopefully, a trade mark is expected to be available within the next 8 to 12 months.
- **High stakeholder interest.** The Yemen Honey Association (YHA) has members interested in developing the honey sector.
- **Inter-organizational cooperation.** The Yemen Chambers of Commerce (Coca) has members involved in the Honey Cluster. Coca can be an effective organization to assist in the advancement of the honey sector. The Coca is planning to establish a division especially for the traders involved in honey business.
- **National government support.** The Ministry of Agriculture and Irrigation (MAI), RoYG, has program implementation experience and has plans to provide services to benefit the honey sector, including laboratory testing facilities.

WEAKNESSES

- **Specific government agency (authority) lacking.** There is no specific governmental authority within Yemen related to beekeeping or honey.
- **Producer capacities.** Honey is primarily produced by landless beekeepers who own very few hives. In general, beekeepers lack training and knowledge of modern bee keeping methods. Mobility of beekeepers reduces accessibility of MAI extension assistance. Beekeepers tend to lack financing to purchase hives and equipment.
- **Knowledge to prevent disease outbreaks.** There is a lack of knowledge relative to diseases impacting bees as well as how to cure disease problems which develop.
- **Producer-wholesaler trust.** Most beekeepers utilize informal marketing systems, leading to a lack of trust of traders.
- **Adulteration of products.** The honey sector, in general, is suffering from credibility, due to certain value chain actors mixing output with foreign honey or using sugar to stimulate production within beehives.
- **Lack of standards for processing and packaging.** The Yemen honey sector typically has low standards of processing; plus the absence of processing and packaging equipment.
- **National institutional capacity and experience.** The Yemen Honey Association (YHA) leadership lacks experience in running an association. The organization offers members no market knowledge or technical expertise on honey classification requirements to obtain premium prices for Yemeni honey.
- **Inadequate financial resources to recruit and retain staff at YSMO.** YSMO is challenged by the low pay received by qualified staff; while at the same time there are several hundred non-qualified staff draining resources and management effort. In addition, as of mid-2013, YSMO is lacking ISO 17025 accreditation for certification of residues of pesticides and antibiotics. Although proposed, as of June 2013 RoYG standards of identity and quality were not established. Accreditation for HACCP/ISO certification has yet to be acquired, as is accreditation for organic certification. In addition, YSMO, despite generating sufficient revenue to maintain a top quality service, is only allowed to retain 50 percent of earnings; with the balance being passed on to the Ministry of Trade's general fund.
- **Need for coordination body in government and adequate financial resources.** Although the senior management at MAI indicates serious interest in assisting and providing much needed services and extension help to the honey sector, financial resources are lacking. In addition, as there is no specific honey department within the MAI, limited resources are stretched and diluted over the numerous agricultural activities within Yemen.

- **Unregulated exporters.** Certain irresponsible exporters operate without consideration for food safety and quality and are often blocked at the border with Saudi Arabia, thereby diminishing the reputation of Yemeni honey producers.
- **Need to strengthen the capacity of nomadic producers.** Although GIZ has assisted AREA for several years in developing best husbandry practices for beekeeping, such as the introduction of the Langstroth beehive and related husbandry tools and off-season feeding of the bees, plus developing a handbook detailing all modern beekeeping husbandry practices. Unfortunately, the information contained in the book has only been made available to very few beekeepers and mostly to apiary owners with only few stationary beehives. The research team for this study did not meet any commercial (nomadic) beekeepers with knowledge of the work undertaken by AREA and GIZ.

OPPORTUNITIES

- **Center of excellence and knowledge sharing.** Development of a center for beekeeping and honey production would serve as a resource for training, education, research, supplies, quality control, certification, and marketing.
- **Capacity building to enhance quality control.** The need to systematically enhance the safety and quality of all food exports is a necessity in all nations. Establishing sanitary and quality control measures meeting WTO requirements for honey via the provision of technical assistance and training to enforce control measures is a must for the future of the Yemen Honey Cluster.
- **International markets opportunities in US and Canada.** Development of gourmet and specialty retail business for Sidr honey within the USA and Canada.
- **EU market entry requirements.** Develop suitable procedures and practices required to meet Global Gap along with EU requirements for eventual market entry into member nations of the EU.
- **Potential markets for organic products.** Organic certification can further increase returns on investment and generate additional market positions.
- **Fair trade certification.** Consider development of Fair Trade Certification which will add yet another dimension to the Marketing 'Tool Kit' for Yemeni honey marketers.
- **Traceability studies.** Initiate trial Traceability studies which will be useful in terms of immediate improved credibility for honey from Yemen (especially Sidr); but also start down 'the road' of marketing Yemeni honey within the EU.
- **US market opportunities.** Establish a USA physical presence to represent the interests of Yemeni honey during the marketing development as well as market maintenance stage. Expense could be shared with the Coffee Sector.
- **Developing credentials to emphasize the medicinal qualities of Yemen honey.** Development of internationally acceptable credentials as related to the medicinal value of Sidr honey being equal or superior to other types of honey known and accepted as having strong medicinal qualities may open a substantial new market opportunity for Sidr honey.
- **Training opportunities.** Offer extension through processors and traders; including training in modern beekeeping, disease control, and processing.
- **Development of Association to strengthen capacities, preserve brand quality.** Assistance to beekeepers relative to the development of associations to improve marketing and to invest in processing technology; plus the development of certification systems and high value brands.
- **Implementation of a quality certification system.** Continued support from all actors in the value chain in the implementation of a quality certification system to guarantee the integrity and traceability of Yemeni honey (KIT & SMEPS, July 2009).

- **Investment in bee flora (plants, trees) for bees to collect pollen.** Invest in plantation of bee flora, with especial attention and priority to Sidr, Salam and Sumer trees.
- **Natural bee wax sheet production.** Domestic production of bee wax into natural bee wax sheets used in modern beehives.
- **Potential impacts of internationally recognized inspection and laboratory services.** With the current experienced, capable personnel and infrastructure at YSMO; (with the assistance and credibility of an internationally recognized inspection and laboratory service) YSMO can be upgraded to enable this governmental organization to provide certifications for: HACCP; ISO standards related to food; honey standards (pending); organic certification and export certification, which will be acceptable in many developed countries with high standards.
- **Support from donor agencies for training and institutional capacity building.** Value Chain Development can be advanced by training funded by international donors.

THREATS

- **Adulteration.** Kashmiri honey primarily imported via Saudi Arabia is similar in taste, texture and color to Yemeni Sidr honey. In recent years mixing of the Kashmiri honey with local Sidr has become a serious problem; impacting the credibility and market value to pure Sidr honey. It is difficult by taste and the naked eye to notice a difference. The practice of cheating is eating away at the reputation of Yemeni honey.
- **Climate change.** Climate change has been a substantial factor related to honey production in Yemen in recent years. Lack of rainfall and subsequent drying conditions has limited production and is likely to continue to be a factor in the coming years.
- **Pests and diseases.** Pests and diseases in beekeeping have reduced honey production. The sector has been particularly impacted by the wax moth pest.
- **Security issues.** Production of honey has been decreased due to the lack of fuel and security problems in the last couple of years.

SECTION 2

MARKET ANALYSIS

2.1 INTRODUCTION

Section 2 of this report aims to conduct a comprehensive market analysis of the honey sector in Yemen, which highlights current end-markets, market trends, segmentation, and high potential market segments, trade barriers, and opportunities for women and youth. The overall approach to the marketing analysis uses a **systems approach**.¹

This section is divided into eight parts: (1) previous research; (2) international commercial challenges in quality control; (3) current production, processing and supply chain practices; (4) international standards and regulatory systems; (5) international and domestic market behavior and trends; (6) existing and potential competitiveness of Yemen bee products; (7) grading, quality control strategies and required standards and tractability; and (8) opportunities for women and youth.

2.2 PREVIOUS RESEARCH

There is an emerging body of research to assess the honey sector in Africa and, to a lesser extent, Yemen. Most of this research has been funded by donor agencies, but not necessarily officially endorsed by these agencies.²

This report and market analysis draws upon the following secondary sources:

1. *Analysis of 5 value chains, Yemen: Fish, Honey, Coffee, Wheat and Qat [Draft Report]* (KIT & SMEPS, July 2009), commissioned by the World Bank Group.
2. *EU Market Opportunities for African Honey and Beeswax* (Traidcraft, August 2007);³
3. *Honey and Beeswax Market In the EU survey* (CBI, June 2009), commissioned by the Ministry of Foreign Affairs of the Netherlands; and
4. *The World Market for Honey (Survey 1)* (FINTRAC, September 2012) funded by US Agency for International Development (USAID).

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- 1 **Controllable forces** include all aspects of physical production, primary processing/honey extraction, consolidation/assembly, quality control, processing and blending (where appropriate), packaging and labeling, pricing, physical distribution/logistics and promotion; additionally regulation of the industry to protect its integrity and Standards and their enforcement are important controllable forces. **Uncontrollable forces** include climatic, pathogenetic, national and international macro-economic, sociological, psychological and political forces for which contingencies and mitigation measures, including buffer stock management, need to be devised by the industry. The players in the industry have to develop a suitable marketing strategy and tactics by taking into consideration all of these controllable and uncontrollable forces and others that will arise in future to meet the changing demands of the marketplace. The systems approach examines this aspect and integrates Commodity, Functional Institutional and Managerial Approaches. The Systems Approach also emphasizes the importance of the use of national and international 'market information' in targeting marketing programs. In response to the expressed reputational and food safety concerns of industry stakeholders the present study necessarily devotes significant fact finding and analysis to **functional institutional needs** of the apiculture sector, focusing on quality management, quality infrastructure, required regulation and certification and the needs for enforcement of minimum Standards. With the purpose of informing the **development of a national marketing strategy**, the analysis highlights current end markets, trade technical, tariff and political barriers in international markets, benchmarking, market trends, segmentation and high-potential market segments, market positioning, transport and logistics details, buyer contacts and opportunities for women and youth. It provides the foundation of the draft to inform a strategic marketing plan and the draft training and technical assistance plans that link market opportunities with production, post-harvest and processing activities and with oversight of quality control and food safety by the regulatory bodies.
 - 2 While donor agencies may have funded studies, it is **important to note** that the findings, conclusions or recommendations of these studies do not necessarily represent the official positions or views of these agencies or the governments providing funding. Keeping this **general disclaimer** in mind, these studies provide valuable sources of data, which are contributing to a growing body of work on this subject.
 - 3 The Traidcraft report was supported by the present Director of the UK Charity Bees for Development (BfD) worked in Yemen in 1980s exploring opportunities for developing apiculture including the scope for introducing beekeeping to women.

2.3 INTERNATIONAL COMMERCIAL CHALLENGES IN QUALITY CONTROL

Background. Although some of its production and handling practices are not ideal, Yemen enjoys a reputation as a high-quality, high price producer of mono-floral and multi-floral liquid honeys and comb honeys and other bee products. Its honeys can be classified according to source of nectar (variety of flowers or trees), humidity levels and pollen content (by melissopalynology) as well as by their organoleptic properties, viscosity and color, which together still provide the principal basis of grading within the domestic trade.

Unfortunately, Yemen's image as a reliable producer of honeys from assured origins has been undermined in recent years by substitution and adulteration by unscrupulous processors and traders. The main problem is that some people illegally import Central Asian honeys in bulk and then re-export them as local honey, buying imports for USD \$ 5-7 per kilogram and then re-selling it in a relabeled package for USD \$ 100-150 per kilogram. This is harmfully undermining the business of genuine beekeepers and exporters in Yemen.

The implementation of the present study has required considerable effort to analyze the technical regulatory, grading, quality control, and non-tariff requirements of international markets and Yemen—to assess their relative levels of quality control and tolerances for presence of contaminants in edible bee products. This has offered the option for international markets to be prioritized on the measures of ease of quality control and the tolerances imposed; other measures, especially price, are also being applied in this analysis.

Due to the technically stringent evaluation and registration processes for admission of third countries to the approved list of exporters to the European Union (EU), EU countries have been investigated to illustrate a future market opportunity. Illustrations of the EU's required evaluation and registration processes, typically taking three to four years, have been provided about other third supplier countries for client consideration. Opportunities in other markets have been examined from a current perspective.

Yemen National Standards and Grading. Internationally, the 1981 CODEX Alimentarius Standard (Revision 2001) for Honey is taken as the Standard by which many countries define the normal character and range of acceptable physical and chemical variability of honeys. In 2010, the Yemen Standardization, Metrology and Quality Control Organization (YSMO) developed a first draft of a Yemeni Standard specification concerned with bee honey; it is still subject to modification. YSMO is the national correspondent of the International Standards Organization (ISO) and the national antenna of the CODEX Alimentarius Commission.

The research team for this study was advised in a meeting with YSMO in May 2013, that during the past five years it had been developing grades and standards for honey. A proposed draft of the grades and standards has been released on the website of YSMO for a sixty day review period. Based on existing law in Yemen, the proposed standards are expected to be presented to the Ministry of Trade for approval in 2013.

Considerable interaction with the honey sector occurred during the development over the five year period. In addition, the group who advised found that grades and standards applicable in other honey producing nations were not applicable for evaluating Yemen honey. As a result, evaluation procedures were developed specific to honey produced in Yemen. During the development stage, identical samples were evaluated by the YSMO staff and in turn by laboratories outside the borders of Yemen.

The Yemen draft National Standard differs from the CODEX Standard in a number of ways that tend to give an impression of erosion of the CODEX norm. The Scope of the draft Standard and the Definitions and Description of honey are a précis of the equivalent CODEX wording. This economy of wording is unnecessary. The order of the draft Standard follows a different subject sequence from CODEX, yet borrows much of the CODEX Standard's wording and style of tabulated presentation. These differences from the CODEX Standard tend to make navigation of the national Standard difficult for a foreign reader who is used to the CODEX wording. Taking the CODEX Standard as the reference, the draft national Standard's treatment of the CODEX requirements is essentially as follows:

Table 5. CODEX requirements and treatment

CODEX subject	Yemen's Draft National Standard Treatment
Essential Composition and Quality	Significantly omits quality attribute of conserved pollen but provides detailed guidance on heat treatment thresholds and separately defines pollen ratios to determine origins of honeys.
Moisture Content – maximum	Same 20 percent for multi-floral honey; except for Calluna honey which may be higher and labeled accordingly. Mono-floral honeys of Ziziphus, Acacia and Euphorbia, etc species are permitted 17 percent
Fructose and Glucose Content – minimum	60 percent parameter has additional 5 percent asserted for mono- and multi-floral honeys, except Hella at CODEX norm*
Sucrose Content – maximum	Same 5g/100g for honey, and makes exception of 8 percent for Hella and Marbai
Water Insoluble Solids Content – maximum	<i>Type error</i> but same thresholds for pressed (0.5g/100g) and non-pressed (0.1g/100g) honeys <i>but see ash below**</i>
Heavy Metals – absent	Same
Residues of Pesticides and Veterinary Drugs – CODEX maximums***	Same
Hygiene – CODEX standards	<i>Substituted</i> by National Standard No 384 on microbiology limits
Labeling	<i>Substituted</i> by a simpler wording and National Standard No 2 on labeling
Methods of Sampling and Analysis	Protocols are not specifically mentioned
ANNEX FOR VOLUNTARY APPLICATION	
Free acidity – maximum	10g/l less than CODEX 50g/l
Diastase activity – minimum	Same 3 Schade Units (SU) norm as for honeys of low natural enzyme content; silent on the higher 8 SU threshold for other honeys
Hydroxymethylfurfural content – maximum	Same 40 mg/kg; silent on the allowable 'tropical' threshold of 80 mg/kg
Electrical conductivity – maximum	Same 0.8 mS/cm for Acacias and Soqatri; higher threshold 1.2 mS/cm for "most types of honey"
***CODEX CAC/MRL 1 Maximum Residue Limits (MRLs) for Pesticides CCPR 2009; and CODEX updated CAC/MRL 2 Maximum Residue Limits for Veterinary Drugs in Food CCRVDF 2012	*The draft provides a Fructose minimum of 35 percent **The draft asserts Ash maximum at 0.6 percent, i.e., 0.6 g/100g

Source: CODEX STAN 12-1981 Standard for Honey <http://www.codexalimentarius.org/standards/list-of-standards/en/>

The omission of the crucial quality attribute for conserved pollen is unsuitable for marketing of honey internationally. The pollen conservation standard needs to be devised and included, preferably by copying the wording of CODEX.

Regarding other (minor) plants blooming during the blooming of Sidr in Yemen, the important standards of the Sidr from Yemen is the percent of Sidr pollen in the honey. The CODEX Standard asks 45 percent of the pollen to name the honey with that crop, but Sidr honey from Yemen can reach 90 percent and some times more. This indicates the purity of Sidr honey from nectar mixing (by bees) with any other flora. This is a very important factor that interferes with fixing the price of Sidr honey in Yemen. Beekeepers and sellers of honey are able to distinguish easily when the Sidr honey is mixed with honey from any other flora.

Beekeepers aim to select target pasture areas where there are not any other plants blooming during Sidr blooming. In case of that happens due to any reason, beekeepers move their hives within hours to another place where there are only Sidr trees blooming. Taking one example, Taiz is very rich in Sidr trees but the price of Sidr honey from Taiz is just USD \$35-50/kg because there are some other plants blooming with Sidr.

For ease of reference by other countries, the compatibility of the Hygiene National Standard No. 384 on microbiology limits with the CODEX Hygiene Standard should be explained. It will be advisable to establish compatibility of National Standard No. 2 on labeling with both the CODEX labeling standard and the US Department of Agriculture standard; similar accommodation of labeling requirements in other markets such as the EU, Japan and the Gulf Cooperation countries is also desirable.

The national tolerance for Ash in honey is inconsistent with the declared thresholds for pressed (0.5g/100g) and non-pressed (0.1g/100g) honeys.

According to Mr. Ibrahim Alakwa, Director of Standards in YSMO, ongoing Economic Opportunities Program (EOP), support to YSMO and respective EOF funding will enable the identified deficiencies to be rectified.

It may be noted that the Standard and regulations proposed in Yemen are very close to those applied by Jordan, but the Yemen Standard does not include the specific thresholds and tolerances for antibiotics and pesticides, and this will make it very hard to pass the international market without certification by a suitably equipped separate internationally credible certifying body.

These observations provide evidence that the draft national Standard for honey needs upgrading to rectify shortfalls. In this way the Standard would support Yemen honey's international credibility.

GRADING

Color and Optical Density

Sidr honey, the most highly appreciated Yemeni honey coming from Hadhramaut, is derived from the nectar of the thorny evergreen Jujube tree *Ziziphus spina-christi*. Sidr honey is produced in different colors ranging from white to light amber. The location plays an important role in that. Sallam honey is dark amber. Typically the Yemeni dealers judge honey color by sight, not by instrumentation.

Yemen has adopted the US Department of Agriculture Color Grading System for honey as follows:

Table 6. Color designations of extracted honey

USDA Color Standards Designations	Color Range USDA Color Standards	Color Range Pfund Scales Millimeters	Optical Density _{1/}
Water White	Honey that is Water White or lighter in color.	8 or less	0.0945
Extra White	Honey that is darker than Water White, but not darker than Extra White in color.	Over 8 to and including 17.	.189
White	Honey that is darker than Extra White, but not darker than White in color.	Over 17 to and including 34.	.378
Extra Light Amber	Honey that is darker than White, but not darker than Extra light Amber in color.	Over 34 to and including 50.	.595
Light Amber	Honey that is darker than Extra Light Amber, but not darker than light Amber in color.	Over 50 to and including 85.	1.389
Amber	Honey that is darker than light Amber, but not darker than Amber in color.	Over 85 to and including 114.	3.008
Dark Amber	Honey that is darker than Amber in color.	Over 114	

_{1/}Optical Density (absorbance) = log 10 (100/percent transmittance), at 560 nm for 3.15 cm thickness for caramel -glycerin solutions measured versus an equal cell containing glycerin

Source: United States Standards for Grades of Extracted Honey, US Department of Agriculture
<http://www.ams.usda.gov/AMSv1.0/getfile?dDocName=STELDEV3011895>

Organoleptic measurement: Odor and Taste. Differential pricing in the domestic honey trade is largely based on odor and taste and the proven origin or (in default) the trader’s estimate of the percentage of high-value Sidr honey present in the sample or blend. The research team for this study considered it impossible, even to the level of 40 percent, to determine the honey source by these organoleptic methods since the odor in particular is affected by many things in addition to its source like the way it was extracted, the way it is stored, the heating treatment, the level of hydroxyl methyl furfural (HMF), and several other minor issues. For trial, the team recommends selecting 5-10 types of honey of known origin and composition (including imported honeys), and then have at least twenty local honey-odor experts (dealers) identify them through blind testing.

Prospects for Organic Production. Yemen has begun exploring the feasibility of organic certification of its products. As yet there is no authority in Yemen for organic certification. A member of the research team was the Vice Chairman of the committee, formed by the Yemeni Ministry of Agriculture to implement a byelaw for organic products and a draft document was submitted to the Minister for consideration. A response is awaited. It may be worthwhile to associate with a third-party external certification organization to obtain certification for Yemen honey. This was discussed this with Proffessor Dr. Khalid Alrothaiman, the Chairman for the organization in the KSA

(Representative for a German Association), responsible for issuing the organic certificate. He visited Yemen in 2010 for preliminary discussions.

Potential Organizations to support Yemen obtaining organic certification of honey products. One or more of the following organizations for *true* Organic Certification could be approached to assist with opening up marketing opportunities in the USA: (1) *OneCert Inc.*; (2) *The Certification Alliance*; (3) *International Federation for Organic Agriculture Movements (IFOAM)* www.ifoam.org. There are equivalent bodies in Europe with a similar purpose. Meanwhile the website (<http://www.yemensidrhoney.com>) offers what its owners consider to be organic product without actual certification.

2.4 CURRENT PRODUCTION, PROCESSING AND SUPPLY CHAIN PRACTICES OF CONCERN FOR EXPORT HYGIENE AND QUALITY CONTROL

Although the Yemen apiculture sector aspires to remaining competitive there are some serious limitations in practices that undermine quality and need to be rectified,

Honey Extraction and Containers. Typically, liquid honey sold to traders is not a result of centrifuging, or pressing but from putting comb honey in a 30 gallon container and then using a spiked wooden paddle to stir the entire contents into a liquid condition after which the ‘finished’ product is left to settle and then passed through a filter and stored in a plastic container ready for sale. Stakeholders have advised that the quality of containers used is inadequate for preserving honey quality. The scope for replacing the primitive extraction practice and for using clean hygienic containers is considerable and simple and should be based on modern techniques already known in Yemen. Buyers and dealers should take the initiative to support and incentivize these improvements.

Honey Dehydration. Sometimes extracted honey does not exhibit sufficient viscosity and contains too much moisture. This is combated by air-drying that may be accompanied by gentle heating. These practices have the following drawbacks that impair the quality of the resulting dehydrated honey: (1) mineral matter contamination from airborne dust; (2) destruction of vitamins in the honey; and (3) color loss; darkening of the honey.

Packaging. Although exceptionally “Yemeni Honey World” has attractive presentations, in order to justify the correct positioning in the ‘upscale’ specialty sector in the USA, success will come with the packaging and presentation approach more like being taken by Balqees in Dubai (see: <http://www.balqees.com>). If there is no capacity to package in an upscale fashion within Yemen, exporters developing new markets must ship in bulk and contract packaging within the targeted market area such as the USA, Canada and eventually the EU. This is a common practice in the food business and not a great obstacle, but must be considered in recommendations for the sector.

2.5. INTERNATIONAL STANDARDS AND REGULATORY SYSTEMS FOR HONEY

This report examined standards and regulations concerning honey products in the Kingdom of Saudi Arabia, USA, Canada, European Union, Australia, New Zealand and Japan. **Annex 3** provides comprehensive details about these standards and regulations.

Of the countries investigated, the EU group’s stringent requirements for producer-nation Residue Monitoring Plans (RMP) present the toughest regulatory system for Yemen to cope with; however, all the other nations reported

upon must nevertheless be assured the products are free of pesticides or other contaminant chemicals and have levels of insoluble matter and ash below a tight threshold. In all cases they require assurance and labeling that attest to the type and quality of honey as advertised; not produced by bees with a 'sugar high'. These markets and many others may then grant honey from Yemen duty free status or favored developing nation status.

Preliminary regulatory analysis suggests that there is very little difference between the EU, USA, Canada and Japan (yes it is catching up in MRLs) among consumers, and Australia and New Zealand among producers on the tolerances for harmful residues, and in many cases, there is common zero tolerance. Moreover, one way or the other, shipments to these markets must be vetted pre-shipment to ensure safe passage and acceptance at final port. Once a shipment is **red flagged**, a **black mark** is then placed on all shipments of honey from that country.

2.6 INTERNATIONAL AND DOMESTIC MARKET BEHAVIOR AND TRENDS

Overview of Potential Target Markets, International Production and Trade

Taking an estimate of 2,600 MT of Yemeni national honey production, this represents less than 0.2 percent of world production, which is in the region of 1.5 million MT.

In 2010, "China was the most significant global producer, producing 398,000 MT, or 26 percent of the global share by volume. The next largest producers were Turkey at 81,115 MT (or 5.3 percent), USA at 79,800 MT (or 5.2 percent), and Ukraine at 70,800 MT, or 4.6 percent" (FINTRAC, 2012). Argentina is also a major honey producer, but drought and floods caused production to drop from 110,000 MT to 59,000 MT (or by 46 percent) from 2005 to 2010.

The EU and Africa produced 203,600 MT (13 percent) and 179,400 MT (12 percent) of global supply, respectively. Ethiopia is the largest African producer of honey. From 2005 to 2010, Ethiopian honey production increased 26 percent from 36,000 MT to 45,300 MT, but very little was exported; Tanzania is Africa's biggest honey exporter to the EU at some 350 MT per year. Approximately 400,000 MT of honey (i.e., 27 percent of world production) enters international trade. At current production levels, Yemen exports will remain an insignificant niche. FINTRAC explained that China accounted for 39 percent of all world honey imports (excluding intra-EU trade) in 2011 and 39 percent of EU imports.

The EU has the highest per capita honey consumption in the world and produced enough honey to fulfill approximately 60 percent of its demand in 2010. From 2006 to 2011, EU imports (excluding intra-EU trade) increased by 8 percent from 135,325 MT to 146,742 MT and equivalent values rose by 91 percent from \$222.9 million to \$425.2 million. In general, EU consumers prefer light honey (i.e., white, extra light amber, light amber) as opposed to dark honey (i.e., amber).

After addressing its antibiotic contamination problems and thereby retrieving access to the EU market, China is the largest honey supplier to the EU market, specifically Belgium, Spain, United Kingdom, and Poland, while exports to Germany and the Netherlands are on the rise. However, although formerly a major supplier to the US market, Chinese exports to the US drastically declined during 2001 to 2011, from 17,713 MT to 1,530 MT after an antidumping duty of 221 percent was imposed by the US Department of Commerce in late-2001 over antibiotic contamination. Once Chinese producers contained the outbreak with antibiotics (sparking the EU ban), they sought to gain back their former US market share by "dumping" their honey at 150 percent below market price. This triggered an anti-dumping duty which was later modified to \$2.63 per kilogram in 2009. As of August 2012, the duty remained in effect.

Argentina has tended to be the default substitute for China as a supplier of bulk honeys to the EU. It effectively exploited that opportunity in the middle of the 2000s to satisfy nearly 50 percent of EU import requirements but currently it holds about 19 percent of the EU market.

Important for comparison with Yemen in the niche context, Mexican honey exports to the EU reached nearly 16,000 MT in 2011 and accounted for 11 percent of EU imports. The majority of Mexican honey (~12,000 MT per year) was purchased by Germany, with the UK being the secondary EU buyer. It should be noted that 95 percent of honey production in the Yucatan Peninsula is exported to the international market, and specifically to the EU. Tradecraft (2007) summarized European preferences as follows:

Table 7. Preferences of honey types, EU Markets, 2007

Country/Sector	Preferences
Belgium and Luxembourg	Creamed honey, not too hard
UK	About 80 percent of honey is blended and a large part (about 50 percent) consists of creamed or set honey
Denmark	Light-colored honey, but also a small demand for dark varieties
France	Monofloral honey types such as rape, clover, acacia, fir, pine, rosemary, thyme, heather
Germany	Liquid monofloral types – pine, fir, rape, clover, heather
Industrial sector	Generally lower grade, especially low water /higher HMF content

Source: Reproduced and adapted from TraidCraft, 2007, p. 10.

It is useful to note the French and German shared preference for Monofloral honey types. Traidcraft described European national honey consumption patterns (person per year) as ranging from 1.2 kg in Germany down to 0.25 kg in Italy, with the United Kingdom, France and Netherlands consuming about 0.45 kg and Spain reaching 1.0 kg, nearly matching Germany's consumption.

Honey Prices. This study has necessarily involved the search for access to trade proprietary information. Owing to unexpected levels of trade secrecy encountered during enquiries, international market comparisons and analysis have necessarily targeted retail markets from which wholesale and free-on-board (FOB) pricing has been indicatively interpreted. In the absence of available proprietary internal industry pricing studies, the present study aims to examine retail honey prices in major international markets as a proxy for wholesale trade pricing.

The minimum pricing of honeys produced and sold in Yemen may be summarized for 2013 as follows:

Table 8. Minimum prices of local honeys in Yemen

Honey variety	Point of sale	2013 minimum price USD \$/kg	Wholesale price % of Retail price
Sidr	Wholesale	42.86	61%
	Retail	70.00	
Salam/ Sumar	Wholesale	27.14	78%
	Retail	35.00	
Maryee	Wholesale	10.00	71%
	Retail	14.00	

Source: USAID Community Livelihoods Program, 2013

Table 8 sets a minimum wholesale price benchmark of the equivalent of USD \$10/kg or USD \$10,000/tonne for Maryee multi-floral honey while Sidr has a minimum price four times higher and 1.6 times the price of Sumar.

The SMEPS and KIT value chain report of 2009 presented a median wholesale price benchmark of the equivalent of USD \$7.50/kg or USD \$7,500/tonne for Maryee multi-floral honey while Sidr had a median price equivalent to USD \$50/kg, nearly seven times higher and three times the price of Sumar at USD \$16/kg. The differentiation of prices between these three honey types appears to have significantly narrowed since 2009 with Sidr in particular experiencing erosion of its unique, high priced status.

SMEPS and KIT also identified the following ratios of Wholesale price percent of domestic Yemeni Retail price:

- Sidr: 86 percent, with beekeeper accounting for 72 percent
- Sumar: 67 percent, with beekeeper accounting for 54 percent and the retailer capturing 33 percent of the retail value which was over twice the level of retailer value capture obtaining with Sidr and Maryee.
- Maryee: 85percent, with beekeeper accounting for 76 percent

Additionally, in the case of Sidr for export they identified the exporter taking 29 percent of export value and the beekeeper retaining the remaining 71percent (i.e., essentially the same share as in domestic sale).

The research for this study suggests that since 2009 the wholesale share of the final domestic retail price of Sidr and Maryee honeys has declined by some 25 percent, perhaps due to keen competition at wholesale level to purchase from beekeepers while the retailer share has increased. This raises the question of whether retail consumer demand has greatly exceeded supply.

Oddly, the wholesale share of retail price of Sumar has increased by some 16 percent since 2009. In the present report and in the SMEPS and KIT study, Sumar's behavior is at variance with the pattern of the other types of honey that were analyzed and there is now strong reason to suggest that the analysis submitted by SMEPS and KIT either over-stated the retailer's margin for Sumar or seriously under-stated the retailer margin on the other two honey types considered.

International Prices. The US Honey Board statistics for 2010 through 2012 described honeys landed in USA from Argentina, China, Ethiopia and Mexico as not exceeding USD \$4,000 per tonne, and generally holding at around USD \$3,000 per tonne. During the same period European countries were importing at some USD \$3,500 per tonne from the foregoing origins except China whose honey was consistently priced at under USD \$2,500 per tonne. In the foregoing analysis there were some higher price exceptions but, as these were not repeated, they do not provide a basis for forecasting. FINTRAC concluded that the better grades of Chinese honey were being shipped to USA while 'bakers' grade was being sold to Europe.

FINTRAC (2012) reported that due to its limited availability and high quality, EU prices (CIF) for Mexican honey were the most expensive of the three largest suppliers. From January 2010 to August 2012, Mexican Orange Blossom honey averaged \$3,752 per MT, while the darker grade Yucatan honey averaged \$3,489 per MT. The same report identified average landed-cost of imported honeys in Saudi Arabia at a level of just under USD \$4/kg up to 2010, with an unverified estimate of just over USD \$4/kg for 2011. Import volumes between 2006 and 2010 varied from 8,000 MT to 13,000 MT per year.

All of these low-priced markets, offering under USD \$4/kg landed at destination, hold no interest for Yemeni producers, processors and exporters.

OPPORTUNITIES IN THE POTENTIAL INTERNATIONAL MARKETS

Honey. Development of the present study has included active search for niche market examples and identification of market opportunities well above USD \$4/kg where Yemen may be able to compete effectively. The two examples selected encompass honeys marketed internationally by Mexican quality producers and New Zealand's high quality Manuka honey industry.

Although the facts were broadly known before the present study was initiated, reference to international trade in honey reveals Yemen to be an exceptionally high priced source. For the purposes of international comparison, and reflecting on the attitude of the Yemen honey trade to the different types of honey, based on organoleptic determination of quality, Maryee is not regarded in this study as a key candidate for export. However, Salam/Sumar is being considered as a secondary international marketing possibility after Sidr. Salam/Sumar has a prevailing wholesale price equivalent to some USD \$27/kg.

To enable ready comparison, the Table harmonizes the indicated currency price of the actual net weight retailed in each case into an equivalent US Dollar price/kg of that product. The exchange rates taken to convert local prices to USD \$ are the rates quoted by OANDA.com for 04 June 2013 as follows: USD \$1 = AUD \$1.03 = CAD \$1.03 = Euro €0.765 = GBP £0.653 = JPY100.

The outcome of preliminary analysis is as follows:

- I. Uniquely, the Dubai-based company named Balqees is successful in marketing a range of Yemen honeys in elaborate packaging at retail prices that start at USD \$131/kg for wildflower honey, reach USD \$142/kg for Sumar honey and rise through various Sidr blends to a top price of USD \$310/kg for pure Sidr honey. It is interesting to note that Balqees' highest price product is just 2.4 times the price of its lowest priced product. In comparison with the behavior of the Yemen domestic market, sales by this Dubai retailer either under-emphasize the uniqueness of Sidr honey or overstate the quality and value of the lesser honey types from Yemen.

- Green Valley LLC offers Sidr honey at USD \$154/kg which is barely higher than the price that Balqees can get for Sumar honey.
- Taking an illustrative international minimum retail threshold of USD \$25/kg that is actually USD \$2 less/kg than the current wholesale price of Sumar in Yemen, Non-Yemeni, non-Manuka honeys that enjoy especially high prices include the following, as extracted from the matrix:

Table 9. Retail honey price comparison, international

Country of Sale	Sales outlet	Origin	Description	Package	grams	Local currency retail price	Equivalent retail price USD/kg
Germany	Walter Lang Honigimport GmbH	Spain	Erika honey: Heidehonig Erika - cremig gereinigt	Bulk	1000	193.75	\$253.27 USD/kg
USA	Amazon	Mexico	Imperial Yucatan Honey Dzidzilche	12 Oz Bottle	340	58	\$170.59 USD/kg
USA	Marky's	France	French Pure Lavender Honey 8.8 oz./ 250 g	glass jar	250	17.95	\$71.80 USD/kg
USA	Williams – Sonoma \$ 14.95 11 oz	USA	Blue Hills Wildflower Honey 11 oz	glass jar	308	14.95	\$48.54 USD/kg
USA	Deandeluca.com	USA	Wild Raspberry Honey 10 oz/ 298 g	glass jar	298	14	\$46.98 USD/kg
USA	Deandeluca.com	Spain	Mitica Wild Lavender Honey 7 oz/ 200g	glass bottle	200	6	\$30.00 USD/kg
USA	Fairwaymarket	France	Miels de Chataignier - Chestnut Tree Honey 8.82 oz	glass jar	250	6.99	\$27.96 USD/kg
USA	Fairwaymarket	France	Miels Chailan - Miel de Lavande de Provence - French Lavender Honey	glass jar	250	6.99	\$27.96 USD/kg
USA	Marky's	Italy	Acacia Honey Jar - unpasteurized raw honey - 17.5 oz/500 gr	glass jar	500	13.25	\$26.50 USD/kg

Source: USAID Community Livelihoods Program, 2013

- Mono-floral lavender honeys command from USD \$28/kg to USD \$72/kg at retail level but may not be taken as inspiring price examples that will interest Yemen's industry; the Yemen wholesale price of Sumar is too high for it to be a (lavender honey) comparative international marketing prospect. It would need to retain a higher standing and higher price that distinguishes its excellence of quality far above these otherwise 'premium' international mono-floral grades.
- Taking the reported 'floor' prevailing Yemen wholesale price for (pure) Sidr at (rounded) USD \$43/kg, it may be concluded that it leaves the international processors/packers/branders/marketing companies such as Balqees

and Green Valley with enough margin for profitability at their retail level. USD \$43 is 14 percent of USD \$310. Possibly they may be paying more than this price, perhaps 20 percent (or more) of USD \$310 which is some USD \$62/kg.

6. Applying the 14 percent factor to the mid-range honeys of Balqees at some USD \$152, the cost of raw material (Socotra, Sumar and Sidr blends) would be no more than USD \$21 which is USD \$6/kg less than the wholesale price of Sumar in Yemen. Examination of this limited sample of relevant international trading practices suggests that the importers may actually be content to work with more than a 14 percent raw material input cost to the final retail product. To resolve the discrepancy of USD \$6/kg it may be possible to conclude that the prevailing wholesale price of Sumar does leave enough margin for the importers and so they may perhaps be viable with USD \$27/USD \$152 which is a 18 percent raw material cost on the final retail product.
7. Based on an indicative landed cost of some USD \$3.50/kg for 'generic' honeys from China and other major producers landed in USA and Europe, the matrix provides main retail prices of such multiple origins, multi-floral honeys in the range of some USD \$6 up to USD \$12. This could imply a raw material (honey) cost that is between 29 percent and 58 percent of the retail price obtaining but in all these cases the volumes are high and doubtless reap economies of scale that cannot currently be contemplated for Yemen's industry. It could be concluded that at the current volume of export, actual production, consolidation and distribution practices in the Yemen honey sector prevent Yemen from garnering more than 20 percent of the final retail price of elaborately presented final branded Yemeni honey in the Dubai market. The same may apply in other Middle Eastern markets.
8. The incentive therefore to create capacity in Yemen to produce, test, certify and internationally market a specialty retail branded product, to gain more than 20 percent of the final retail price, is very high.
9. New Zealand Manuka honeys (all types investigated) that are sold at retail level in USA all lie in the price range (/kg) of USD \$120 down to USD \$36 while Manukas sold in UK start at USD \$30 and reach a maximum of USD \$72. They do not even approach the prices garnered by Balqees and Green River for their Yemen honeys. However the data provided imply that the absolute retail floor price for any Manuka honey is USD \$30/kg. The highest Manuka "Active" price in the matrix is \$90/kg and that is after a lot of development of the Active certification system. It may be possible to conclude that the broad range of retail prices of all grades of Manuka Active is \$30 to \$90. The \$120 product is not stated as "Active".
10. Other than the other exotic types as listed that merely fall within the foregoing range and end at USD \$48/kg (Blue Hills wildflower), the only types/brands that might capture imagination in Yemen are Erika honey: Heidehonig Erika - cremig gereinigt sold from Germany* and Imperial Yucatan Honey Dzidzilche from Mexico sold in USA. The former (probably exported from Spain) falls within EU regulation while the latter does not. Yemen would be advised to engage with the marketing/branding companies of these two products to ascertain potential future interest in marketing Sidr.... on the basis that the retail price could exceed \$150/kg which is the level at which Balqees and Green Valley Sidr prices start.

Erica Heather Honey

HoneyTraveler (2013) reports as follows:

"Erica Heather honey is the broad term for honey produced from the Erica species (E. Tetralix L., E. Scoparia L., E. Arborea L., E. Australis L., E. Vagans L., etc) of the heath and heather family, Ericaceae. This

family includes many other honey plants, such as blueberries, ling heather, cranberries, rhododendrons, strawberry tree and sourwood trees. Erica plants are closely related to common heather, *Calluna Vulgaris*, the nectar source of what is known as 'true' Heather Honey."

There are over 650 Erica species endemic to Europe, the Mediterranean and S. Africa. As a result, it often one of the many nectars found in multifloral honeys. Yet there are several species of Erica that produce distinct single flower honeys in countries ranging from the UK (Scotland), to North Africa; it has a dark amber color with orange hues that turns light brown when crystallized. It is very fragrant almost pungent spicy, with a woody, caramel aroma. Normally sweet with a strong, sharp, slightly bitter taste, caramel and cocoa flavours. The aftertaste persists. It crystallizes quickly into a fine smooth texture. It is well matched with medium to strong cheeses, excellent with aged cheese. Not advised for fragrant teas as its strong flavor will overpower the gentler taste. Sensitive to rain and weather, production is irregular in some countries. Blossoms in late March to late April and is harvested in May. *Locations:* It is found in France, Spain, Italy and North Africa,

Honeycomb. USA data for honeycomb marketing suggests that until a certified specialty honey production system as above could be developed, simple export marketing of honeycomb might be explored. Viability would depend on the margins required by players in the downstream value chain, i.e., exporter, distributor and retailer. Surely to achieve prices of interest to the Yemen, the retail prices would need to robustly exceed the given examples of USD \$58/kg to USD \$86/kg obtaining for specialty USA honeycomb marketed in USA. Therefore even honeycomb marketing would need to be accompanied by a high amount of 'cachet'.

Duties. EU imports of honey have a general 12.8 percent duty rate for third-party countries. After first becoming an approved supplier to the EU under the requirements for a Residue Monitoring Plan, Yemen might qualify for a 0 percent tariff rate due to the Everything but Arms Treaty. Mexico has a reduced rate of 8.6 percent. US imports of honey have a general duty of 1.9 cents per kilogram (Most Favored Nation rate) and 6.6 cent per kilogram for Cuba and North Korea. Mexico has a 0 percent import duty rate for honey. In Canada the importer of honey has to pay the fee prescribed by the Canadian Food Inspection Agency Fees Notice for the verification of the import declaration. Duty rate (MFN) is 10.5 percent. Japan has an import honey duty rate of 15 percent (MFN rate) and 30 percent general rate. Depending on status, Yemen may qualify for a 0 percent tariff rate. Saudi Arabia and the United Arab Emirates have a general 5 percent duty rate (Ad valorem duty) for honey imports.

Rates for Canada, the European Union and Japan were sourced from:

<http://www.dutycalculator.com/dc/185513/home-garden/groceries/jelly-jello-dessert/import-duty-rate-for-importing-honey-from-new-zealand-to-hong-kong-is-0/>

. The other rates were sourced from FINTRAC (2012).

Yemen Baseline Technical and Financial State of Marketing of Bee Products. According to the Ministry of Agriculture and YHA, the Yemeni apiculture sector currently comprises some 100,000 primary producers. The number reported by SMEPS and KIT in 2009 was 75,000. Production volumes of different honey varieties in Yemen for more recent years are presented earlier in **Section I** (see **Table 3**).

2.7 EXISTING AND POTENTIAL COMPETITIVENESS OF YEMEN BEE PRODUCTS

Comb Honey

Regarding the wholesale price of comb honey (USD \$70 for 1–1.5 kg), it is only for Sidr (Booghia Sidr not Marbaee Sidr), while the other types (Salam/Sumar and Maryee) of comb honey are cheap (USD \$15 -35). Booghia Sidr means

produced during the main Autumn/Fall season of Sidr (September - November). Marbaee Sidr means produced during the summer season from Sidr. This information on wholesale trade may be summarized as follows:

- Booghia Sidr honeycomb fetches in the region of USD \$56/kg
- Salam/Sumar and Maryee honeycomb fetches in the region of USD \$20/kg

Figure 2: Comb honey retail packs



Cut-comb

Complete comb, cut-comb or chunk is honey sold whilst still within the honey comb and requires a particular type of colony management. The implied guarantee of purity and freshness is appreciated by many consumers. Adulteration cannot be achieved. Special production techniques have been developed to produce a clean, fresh-looking piece of section, cut-comb or chunk honey, which is easy to ship, handle and retail. These products require special care during preparation and do not favour long transportation at warm ambient temperatures, nor long-term storage.

Section comb honey is a small section of completely sealed comb built of virgin (new) beeswax, preferably with light-coloured honey which remains liquid until consumed. Round, square or hexagonal sections with prefabricated wood or plastic frames are given to the colonies with a very thin foundation sheet. The specially prepared colony fills up the sections with comb and honey which is directly packaged in an attractive clear container (plastic wrap, box with clear window etc.) to protect the contents from contamination, moisture and breakage.

Cut comb honey can be produced in regular frames or top bar hives. If foundation sheets are used they should be particularly thin and no wires or other reinforcing materials should be incorporated into the comb. Pieces are carefully cut according to the package shape and size and are left on a wire rack to drain the honey from the cut cells, taking care to keep bees away. Once dry, they can be packaged like section comb honey in clear protective containers. Extra care needs to be taken not to break any sealed cells or smear honey over them because it will look unattractive later on. If left in the sun even momentarily, wax cappings will become transparent and the comb will break easily with the slightest movement. All other conditions, such as light-coloured honey, cold storage and avoiding rough transportation and handling are the same as for section comb honey.

Smaller comb pieces can also be packed inside jars, which may then be filled with liquid honey. Ideally the comb honey and the liquid honey will be of the same light clear colour. Each jar should have only one cleanly cut "chunk" and honey should not crystallize before consumption.

Extracted from FAO (1996) 'Value-added products from beekeeping' at <http://www.fao.org/docrep/w0076e/w0076e07.htm>

Comparing these prices reveals that for Sidr and Maryee they are respectively better than the minimum liquid honey prices indicated, but not in the case of Salam/Sumar where the price is significantly lower. Earlier in this report it was asserted that to achieve export prices and profit margins of interest to the Yemeni industry, the retail prices of Yemeni comb honey in importing nations would probably need to robustly exceed the given examples of USD \$58/kg to USD \$86/kg obtaining for specialty USA honeycomb marketed in USA. This may not necessarily be required for Salam/Sumar and Maryee comb which is available at around USD \$20/kg but will certainly be required

for Booghia Sidr honeycomb, therefore Booghia Sidr honeycomb marketing overseas would need to be accompanied by a high amount of 'cachet' that attests to fineness/quality and projects it at a price well in excess of USD \$100/kg.

Technically, Booghia Sidr honeycomb marketing overseas might already be possible since the capacity within Yemen for retail packaging varies from specialized retail packing of comb honey as illustrated below in Stainless Steel of grade 304 to rudimentary packaging for liquid honeys.

Honey. When compared with the recent history of the domestic honey market in Yemen and, especially, with prevailing 2013 wholesale and retail prices in Yemen for its main types of classified honey reported earlier, the analysis of some international retail prices of honey and other minor bee products presented; identifies a limited number of illustrations of special opportunities exploited in the niche/specialty markets for high-grade, high-price honeys and honeycomb that might be imitated by Yemeni exporters.

The Yemeni honey industry needs to take careful note that its own prevailing honey prices are far higher than any of the 'scientifically marketed' honeys from Australia and New Zealand.

In conclusion, *apart from Yemeni honeys already being sold in the Middle East generally and in Dubai in particular*, there were two liquid honey products that require further investigation to ascertain whether Yemen honey and especially Booghia Sidr honey could be offered with similar or even better quality and taste attributes to attract high-end international consumer interest. These were the Yucatan honey example marketed through Amazon in USA and the Erika (bulk) honey offered by Walter Lang in Germany.

In all other respects, prices of Yemen honeys, especially wholesale prices as reported, are beyond the financially feasible scale of international market competition. In particular it is important to keep in mind that none of the premium certified New Zealand Manuka honeys command the levels of prices expected by Yemen's industry for its higher grades.

Evidently the existing very high priced national and Middle Eastern markets need to be nurtured and maintained with the greatest care as there is no immediate alternative Worldwide at this price level.

Royal Jelly and Propolis. Royal Jelly in the Yemen domestic market is coming from China. Very few local apiarists specialize in Royal Jelly production. There is no formal trade in propolis in Yemen.

2.8 GRADING, QUALITY CONTROL STRATEGIES AND REQUIRED STANDARDS AND TRACEABILITY

Yemen cannot afford to jeopardize its enviable established market positions by risking further incidences of substitution and/or adulteration by unscrupulous processors and traders, especially when traditional importers, including the Gulf Cooperation countries, are tightening their own regulatory and inspection frameworks to protect their consumers.

Models of best practice. Australia and New Zealand offer exacting models of quality control and supply chain organization and market targeting based on best practices that could be effective when applied in the Yemeni context. The reality is that Yemen has to embark on several years' development to achieve the Australian chain model of producing to satisfy specific customer and market food safety and regulatory requirements. Such development would adopt the principles of HACCP and incorporate:

- bilingual labeling
- taste profiles
- production dates/batch coding
- full traceability of the product through a unique bar-coding system, and
- establishment of packer's formal production and handling quality measures for beekeepers' contractual compliance.

To this quality control path may possibly be added the idea of seeking to copy some of the remarkable science applied by New Zealand to protect and promote its Manuka honey industry, more particularly its Unique Manuka Factor® (UMF) Honey Association which is able to claim certain levels of bio-activity that are absent in competitors' honeys. UMF producers use a wide variety of measures to rate their honey. Along with UMF® and the Molan Gold Standard, they include:

- AAH (Antibacterial, Antioxidant Honey)
- MGO, which measures the amount of MGO
- Active and activity
- AHH+
- Bio-active and bio-activity
- NPA (Non Peroxide Activity)

It is noted that to help reduce confusion and maintain confidence in their honey products worldwide, the government of New Zealand is supporting the creation of an enforceable standard for bio-activity in honey through The Bee Products Standards Council. There are also very useful lessons to be learned from the New Zealand RiMP approach that seeks to minimize risks and avoids use of antibiotics. If it wishes to diversify abroad from its traditional domestic Middle Eastern markets, *Yemen could be advised to engage with the Australian and New Zealand industries to explore how to adopt some of their proven practices (especially antibiotic limits) for international market penetration purposes.* For a future international marketing strategy that includes targeting the EU nations, Yemen should additionally supplement its plans by preparing to develop a Residue Monitoring Plan (RMP) in partnership with the EU inspection system.

2.9 OPPORTUNITIES FOR WOMEN AND YOUTH

The research team found through this market analysis that all actors across the value chain of the honey sector in Yemen are overwhelming male. While further study is needed, there are clearly opportunities for the entry of women into key positions within this sector, such as marketing, research, and exporting to international markets. As a start, the honey sector in Yemen would benefit from a gender mainstreaming analysis across the entire value chain, supported by an established donor project with qualified expertise. This is particularly timely, as the development of a national research center is formed, and a specific study should be conducted to identify the best entry points for women into this sector.

The research team also found that numerous employment opportunities exist for youth to gain entry to this growing sector through internships in production, retail, wholesaling, export and research. These opportunities are very promising, and should be actively considered for integration into existing economic development interventions.

SECTION 3

DEVELOPMENT OF A NATIONAL MARKETING STRATEGY

3.1 INTRODUCTION

Section 3 aims to inform the development of a national marketing strategy for Yemen. This section is divided into three parts: (1) standards of conformity; (2) prioritizing export markets for Yemen honey producers to target; and (3) a proposed timeframe to implement a national marketing strategy.

3.2 STANDARDS OF CONFORMITY

As touched on in the comparison with CODEX Standards, to quickly gather international buyer credibility (also to reassure local consumers), Yemen needs to align all of its Standards and quality control protocols and practices with the equivalent norms adopted by major international markets. It should not pretend that deviation from international norms will enhance its credibility; only deviations that assert even higher quality standards, such as for moisture content (as in one current case) will earn international admiration.

With the active support of YHA and the Ministry of Agriculture, YSMO should lead this thrust and would be advised to imitate, where feasible, the regulations and practices that have been developed and applied by New Zealand. These practices incorporate risk minimization and risk management. Moreover, New Zealand manages a comprehensive, regularly updated database that tracks the regulatory norms and contamination tolerances of its numerous international markets.

The evolution of improved standards, quality protocols and their application needs to be iterative over a period of some five years, first, targeting the satisfaction of the national and regional markets and then in order of priority, *if proven to be financially and economically feasible*, the North American and (if required) the Japanese and EU markets.

As YSMO continues to gear up its credentials; it could be possible to introduce a third inspection and laboratory service with international credentials (such as Quality Services International (QSI)), Germany, or the Swiss inspection body Société Générale de Surveillance SA (SGS), which can assist YSMO to develop its own credentials. At the same time, in the interim Yemen needs to determine if shipments destined for KSA, North America or Japan will meet their administrative and regulatory requirements. In the short term, the EOP Final Design has funds earmarked for just this sort of market development activity. Avoiding at all costs the potential of a shipment being rejected or **red flagged** by an importer's governmental agency is vital. If it is not possible for YSMO to conduct sufficient evaluations and tests prior to shipping to ensure passage on through to consumers, then QSI, SGS, or another internationally credible body must be commissioned to undertake the work. This raises a question of whether there should be a national ban on exports to these destinations until such quality and traceability (plus periodic QSI 'vetting') systems have been instituted under a MOU between the Yemen Honey Association and YSMO to keep the **red flags** down. It is required to reinforce the accompanying legislation and regulation.

3.3 PRIORITIZING EXISTING AND NEW MARKETS

Yemen can learn from the New Zealand (NZ) example, but there are also clear differences:

- As in existing marketing practices that rely heavily on visual and organoleptic determination of taste and quality, emphasis should be on making a clear differentiation, including scientific measures between an authentic Yemeni product from a specific origin and grade, and generic blended honey of no clear origin.
- In the immediate term, target markets should be domestic and regional; thus the emphasis should be on competing with imports rather than seeking distant export markets
- To achieve a premium product, especially for early acceptance in North American markets and eventual approval in the EU, Yemen could follow the NZ example in drawing-up an American Foul Brood-free (ABF) management strategy and ban the use of antibiotics.
- Depending on immediate pricing prospects, to achieve a premium product that is adulteration-free, the industry could encourage the production of cut-comb, and develop standards and guidelines to ensure quality.
- To compete with imported brands, Yemen could develop a mark proving it to be of local origin. This would have to be backed up by traceability protocols and a monitoring system.
- Acknowledging the socio-economic conditions of many beekeepers, it is essential that regulation does not become a barrier. To counter this risk, a market-led approach is recommended whereby buyers and packers offer education and incentive to their suppliers to conform to certain improved standards that initially will provide adequate product quality reassurance in the national and regional markets.
- After further investigation and quantification of the scope and value of other markets internationally, it would be realistic to match the medium-term market penetration strategy for each targeted market with a matched dedicated quality control strategy. For example, it may be easier and quicker to satisfy North American regulators than their counterparts in the EU.

Protection of existing markets in the gulf. The price analysis in this study demonstrates that the existing, very high priced, national and Middle Eastern markets need to be nurtured and maintained with the greatest care, accompanied by immediate quality assurance and packaging improvement as outlined in the previous Section of this study. This applies to both liquid honey and honeycomb.

Focus on existing and value-adding product lines. The collective view of the authors of this study is that the highest grade of Sidr honey needs to be the flagship of the enhanced marketing effort that should be directed to KSA, Dubai and other Gulf Cooperation Council destinations. This view is based on the example offered from the Balqees retailing operation from Dubai, and more particularly, on the advice of the Yemeni honey dealers.

Diversification should be based on a plan to follow-up and test market Sidr honey and honeycomb products among internationally identified gourmet, specialty, and natural food opportunities, focusing on North America.

3.4 PROPOSED TIMETABLE FOR IMPLEMENTATION OF A NATIONAL MARKETING STRATEGY

The cascade of proposed measures to support a national marketing strategy includes a set of activities within a five-year time frame. The following timetable is proposed:

1. **Year 1: Marketing to domestic and regional markets.** Enhance marketing and quality assurance in the national and traditional regional markets.
2. **Years 1-2: Marketing to gourmet and natural food honey markets in North America:** Follow up and test market honey and honeycomb products among internationally identified gourmet, specialty and natural food opportunities, focussing on North America.
3. **Years 2-5 onwards: Marketing to organic and medical honey markets:** In years 2 and 3, initiate and explore the respective economic feasibility of an institutional development process to support development of:
 - a. An internationally credible Residue Monitoring Plan (RMP), including any required overseas partnerships in laboratory analytical services and certification (*SGS/QSI, etc*) – Year 4 onwards (*if part of 3. above*)
 - b. Organic Grade bee products – Year 6 onwards (*surely subject to prior achievement of 'Result' 3. and legislative, budgetary and donor commitments*)
 - c. Medical Grade bee products – Year 6 onwards (*surely subject to prior achievement of 'Result' 3. and legislative, budgetary and donor commitments*).
4. **Years 2-5: Marketing to other global markets:** Build institutional capacity (*YSMO; YHA*) for quality monitoring and support to industry adoption of HACCP and Global GAP practices (*this would benefit other sectors, too*). Year 1 and possibly also trailing into Year 2 might need legislative, budgetary and donor commitments to be agreed.
5. **Year 5 onwards: Sustained support for a global brand:** Year 5 onwards, build producer and processor capacity in HACCP and Global GAP practices (*i.e., after there is adequate and sustainable institutional capacity to administer/support it*).

SECTION 4

INSTITUTIONAL AND ORGANIZATION CAPACITY BUILDING

4.1 INTRODUCTION

The aim of **Section 4** is to inform the development of an institutional and organizational capacity building strategy for the honey sector within Yemen. This section divided into two parts: (1) current challenges and problems and (2) recommendations related to honey production and processing.

4.2 CURRENT CHALLENGES AND PROBLEMS

Yemen is traditionally the largest honey manufacturer in the Arabian Peninsula, and it produces the highest quality and most expensive honey from ancient Sidr trees (*Ziziphus spina-christi*) (USAID, 2012). Recently, Yemeni honey is facing some threats because Sidr honey is being blended with imported honey or even substituted for domestic production, which has damaged the Yemen honey sector within the nation and denigrated the image of Yemeni honey on the global scene. Also, sugar feeding to bees during the season is another threat affecting the image of Yemeni honey.

Therefore, to protect the integrity of domestic honey production in Yemen, the Standardization Metrology and Quality Control Organization (YSMO) has been developing grades and standards for honey with considerable interaction with the honey sector over the past five years. During the development stage, identical samples were evaluated by the YSMO staff and in turn by labs outside the borders of Yemen. A rough draft of the grades and standards was presented to the Minister of Trade for approval in order to propose a practical methodology and structure for establishing an internationally accepted procedure for quality assurance and identity for honey from Yemen.

These proposed grades and standards are intended to provide a practical, uniform, and official methodology for the entire honey sector in Yemen. Such a program is also envisioned to provide global credibility for Yemen honey, which is destined for export markets.

Honey destined for export can be graded, inspected and stamped on a volunteer basis to satisfy the requirements of the country to where honey is being exported. A stamp verifying this inspection will hopefully satisfy the country to which the honey shipment is destined. It will also add comfort and value to buyers and consumers. YSMO staff would, over time, envision the further development of a registered trademark for Yemen honey, which has been evaluated by YSMO.

4.3 RECOMMENDATIONS RELATED TO HONEY PRODUCTION AND PROCESSING

Apiculture is an old profession practiced by Yemenis from BC, and Yemeni beekeepers convey their experiences in apiculture from one generation to another.

Yemeni honey is highly valued on international markets and attracts lucrative prices. Therefore, donor interest in this sector is understandable, since it holds the potential to address poverty in Yemen. Many donors have sponsored training of beekeepers or provision of modern beehives.

The Social Fund for Development (SFD) is one of the main sponsors for apiculture in Yemen, training thousands of beekeepers and providing them with beehives across the country over the years. As well, the USAID Community Livelihood Project (CLP), the Arab Authority for Agricultural Development, FAO, and JICA, have all contributed to interventions in this sector.

At the same time, despite all the donor support, the volumes of honey produced remains low, as the annual honey production per beehive is estimated to average 2-5 kg, which is considered very low compared with the Middle East averages for well-kept colonies (20-25 kg) and compared to the world averages for well-kept colonies (higher than 70 kg). The differences in the Middle East and the world averages are mainly due to the differences in the availability of wild and cultivated flora.

There are different types of hives used in Yemen. Of the 142 beekeepers surveyed for this study, 76.2 percent used traditional hives versus 7.1 percent who used modern hives with the balance using both types (see **Annex 4**). Beekeepers prefer traditional hives for many reasons, including:

1. Beekeepers can handle traditional hives more easily than modern hives.
2. Traditional hives are very suitable for traveling; this is very important for nomadic beekeepers.
3. The build-up of bees inside the modern hives is very difficult to manage and weak hives are difficult to maintain in contrast to traditional bee hives.
4. Traditional hives cost less (USD \$7, estimate) than modern hives (USD \$25, estimate).
5. There is no agreement among beekeepers that modern hives produce more honey than traditional ones.
6. Beekeepers are in agreement with wholesalers, retailers, and exporters that the honey produced from traditional hives are of higher quality compared to honey produced from modern beehives. The honey coming from traditional beehives is generally well capped, while honey coming from modern has more moisture, which is a very important standard for Yemeni buyers, as they prefer the less moisture. This may be due to bee space, which is believed to be larger in modern hives than traditional hives.

This anecdotal wealth of knowledge passed on from generation-to-generation would greatly benefit from science-based studies, which are far more likely to occur with donor support. Nevertheless, using traditional hives have a number of drawbacks:

1. No disease inspection is possible in the traditional hives.
2. No manipulation of combs locations inside the colony is possible (when you have disorders).
3. No queen test is possible.
4. No swarming control is possible.
5. No wax comb reuse is possible.
6. Bees consume 8-10Kg of honey to produce 1 kg of wax.
7. Bee time calculations spent in wax foundation building, which can be used for honey collection.
8. No queen rearing or selection.
9. No drone production for selection programs.
10. No royal jelly production.
11. No pollen production.
12. Low level of good wax production.
13. No bee venom production.

Practical Guidance for Building the Institutions and Organizations. Apiculture is one of several departments in the Ministry of Agriculture and Irrigation. Documents indicate, at one point, specialists of apiculture desired a General Directorate for Apiculture within the Agriculture and Irrigation Ministry. About fifty specialists gathered in 2004 in Sayoun, Hadramout, to discuss the formation of such a body, with the support of Ministry of Agriculture. Nevertheless, to date little, if any, tangible progress towards the realization of this objective has been made. Today, with the continued growth of the honey sector there is a need for establishing a center for apiculture that can deal with all things related to apiculture and honey. Meetings with YSMO staff and many specialists confirm the need of such a center, which is the first step for developing the honey sector in Yemen.

The need to establish a Honeybee Research and Extension Center. There is a need to establish a center to develop the beekeeping sector in Yemen. Establishment of a center is considered a crucial first step to begin developing the honey sector in Yemen.

International experience shows that most of the successful stories of research for development in apiculture were supported under the auspices of a governmental center or departments working under the umbrella of research and extension centers. Such a center is needed not only to conduct research, but also to transfer new technologies and techniques that have been internationally developed to make them suitable to local conditions.

Such a center should have different divisions, required for develop beekeeping sector, including hive management division, quality control, and so on. The mandate of similar centers in other nations includes conducting applied research to develop the sector itself directly with adaptation of newly developed techniques and sharing of international experiences for local adoption. At the same time, it can be a productive center, presenting a successful model for the investor in this sector.

To establish an official connection between the center and the government, the center could be under the authorization of the Agriculture Minister, and controlled by a Board from government and the Chamber of Commerce (60 percent and 40 percent, respectively), and the Government can form a key to its future success.

Annex I includes details about the staffing needs and an organizational chart for such a center, based on the following vision and mission:

Vision: A center of excellence for developing applied apicultural research and technology transfer, to achieve optimal sustainable use of local honey bees and natural resources.

Mission: Conducting applied research to raise the beekeepers livelihood, and promote the beekeeping sector, and its contribution to the national economy, poverty alleviation, and environmental impact and ecosystem services.

Conclusions

There is a need to establish a center to develop the beekeeping sector in Yemen. The center should be independent, having its own resources for sustainability. There is a need for this center to support producer organizations, which will lead to further contributions to the honey sector in Yemen.

SECTION 5

CONCLUSIONS AND RECOMMENDATIONS

Section 5 includes a summary of key findings, conclusions and recommendations.

5.1 FINDINGS AND CONCLUSIONS

Export market diversification should be explored. A basic rule in any business enterprise is as follows: never direct more than 10 percent of overall sales to one client. While the entire Gulf is, of course, not one client; in reality the entire Gulf market area reacts to supplies and prices of Yemeni honey with relative unity. An expansion into other markets will reduce the impact of being tied to one fairly homogeneous market. In addition, the successful introduction of retail products will create a different dynamic as opposed to the current marketing plan of selling high quality honey in 7 kg plastic jugs.

The Yemeni honey sector is male dominated, but opportunities exist for women and youth. The research team found that all actors across the value chain of the honey sector in Yemen are overwhelming male. While further study is needed, there are clearly opportunities for the entry of women into key positions within this sector, such as marketing, research, and exporting to specialty markets. Opportunities exist for women and youth, but there are presently no donor interventions that this research team identified with respect to promoting the inclusion of women in research efforts or private sector opportunities in the export specialty honey sectors (e.g., organic and medical honeys). The research team found that opportunities exist for youth to gain entry to this growing sector through internships in all areas—production, retail, wholesaling, export and research.

Yemeni honey produced in traditional beehives commands higher prices than honey from modern hives. Honey produced in Yemen is unique, as are the most prevalent bees that produce the honey. Prior to any outside development interventions, donors and other interested actors should carefully consider the reasons that regional consumers are willing to pay much higher prices for Yemen honey than honey produced in any other country. An example of misdirection is the issue of modern beehives. Donors have provided financial assistance and support to beekeepers with the assumption that modern hives produce more honey and are in general a better management technique. In contrast, regional markets continue to pay a premium for honey produced in traditional hives due to the view that honey products produced in traditional hives are of higher quality.

Honey produced in traditional beehives has unique characteristics. The honey produced from traditional hives usually provides more mature (capped) honey with less moisture than honey produced from modern hives. There is some evidence that the reason behind this is due to the accuracy of bee space between the combs inside the traditional hives (developed by the bees) compared to that of modern hives.

Robust, domestic demand for honey in Yemen may discourage beekeepers and wholesalers from selling their products to export markets. There is an opportunity to build a market in North America and eventually in the European Union (EU) for precious and historic Sidr honey. However, important questions remain: Will there be enough supply to maintain the current domestic market while opening up new opportunities? Will there be sufficient interest within the honey cluster to pursue new markets as long as current prices can be maintained for Sidr honey in traditional markets? After several years of healthy growth in sales volume along with

consistently higher prices without any inspection at origin; why would beekeepers or most wholesaler and exporters have any interest in changing business-as-usual?

High prices for Yemen honey may be experiencing market resistance. At the same time, observant marketers noted resistance at higher prices early in 2013, leading to a rollback of 25 percent in marketable prices. One might therefore conclude the market for Sidr honey within the current markets being served is not completely flexible.

5.2 RECOMMENDATIONS

Donor assistance is needed to strengthen institutional capacity building for the honey sector in Yemen. The honey cluster would benefit from stronger organizations, including the new initiative related to wholesalers and exporters developing within the Yemen Chamber of Commerce. Although, beekeepers by nature tend to operate as individuals, they will benefit greatly by the development of stronger organizations. Donor support such as the current Economic Opportunities Program (EOP) will be of great assistance in helping producers to gather together for mutual benefit.

Gender mainstreaming and internships for youth should be prioritized. The honey sector in Yemen would benefit from a gender mainstreaming analysis across the entire value chain, supported by an established donor project, with qualified expertise. This is particularly timely, as the development of a national research center is formed, and a specific study should be conducted to identify the best entry points for women into this sector. In addition, employment opportunities for youth are promising, and should be actively considered for integration into existing economic development interventions.

Science-based certification methodologies and labeling standards should be developed to preserve the brand integrity of Yemeni honey. The integrity of the Yemeni honey sector can be greatly enhanced by the development of methodologies to determine the scientific as well as organoleptic properties of each honey type. In addition, the development of an internationally credible labeling and certification (of integrity) system will add further credibility to the honey sector.

A traceability program to verify the origin of Yemeni honey is needed. A verifiable traceability program related to imported honeys as well as Yemeni-produced honey should be developed to ensure the credibility of honey produced in Yemen.

Changes to packaging containers should be considered to protect the quality of Yemen honey. The 7 kg plastic container, typically utilized to store honey in bulk, should be replaced with a container that offers more protection from extreme environmental conditions and is more practical as related to labeling.

Mapping the location, ownership and control of specific trees in Yemen with the most valuable flowers (for bee pollen) is needed. The location of existing Sidr and Salam trees in Yemen should be mapped, including determining ownership and control of land where these trees are situated. Potential for expansion and regeneration of these trees should be examined as a priority of government. An incentive program coordinated between environmental non-governmental organizations (NGOs), beekeepers, and the RoYG Forestry Department should be developed in order to encourage retention and expansion of bee trees. Planting bee trees will serve as a tool to improve the overall environment, improve the ecosystem, improve the livelihood of beekeepers, and livestock keepers since these trees are also used as forage trees and shadow shelter for the flocks during grazing in the hot

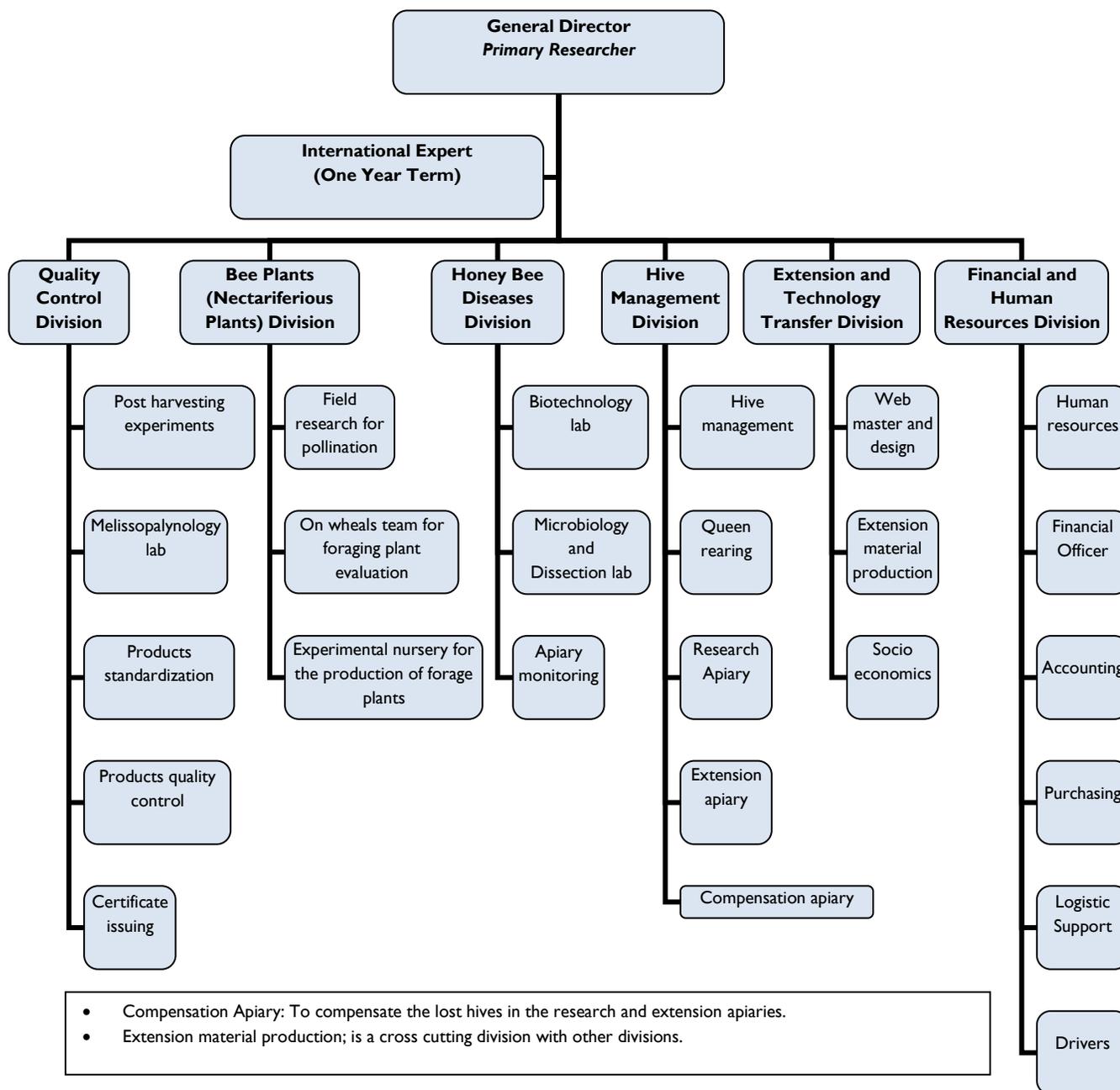
summer months. Research into how Australia managed to save the endangered Leatherwood Trees in Tasmania, which also are responsible for a unique mono-floral honey, may provide an example of how to save bee trees in Yemen.

Promotion of modern beehives in Yemen should be reviewed until further impact studies are conducted. Donors, the RoYG, and other well-meaning supporters of the Yemen honey cluster should reconsider the focus on modern hives for the following reasons: (1) the market prefers honey from traditional hives and pays more for honey produced in traditional hives; (2) the cost of traditional hives is about 60 percent less than the cost of modern hives; (3) traditional hives are more ecologically friendly; (4) the volume of honey production from traditional hives is typically the same as from modern hives; (5) traditional hives are more practical for shipping, which is an important consideration for nomadic beekeepers; (6) there is some evidence that the space within traditional hives results in more mature honey, which has stronger desirable attributes for which Yemen honey is known, and this results in higher prices in the global marketplace.

Donors should consider supporting fact-finding study-tours for Yemen stakeholders to build their capacity and to learn from the experiences of other nations. If support for a national center for beekeeping and honey production continues to build momentum, donors should support fact-finding study-tours to other nations to allow members of the honey cluster to learn how similar activities have been planned, developed, and funded in a sustainable fashion.

ANNEX1 : HONEY RESEARCH AND EXTENSION CENTER

VISION: A center of excellence for developing applied apicultural research and technology transfer, to achieve optimal sustainable use of local honey bees and natural resources.



Source: USAID Community Livelihoods Program, 2013

Mission: Conducting applied research to raise the beekeepers livelihood, and promote the beekeeping sector, and its contribution to the national economy, poverty alleviation, and environmental impact and ecosystem services.

Goals:

- A. Establishment of a research base to develop the beekeeping sector.
- B. Conducting applied research to develop the beekeeping sector.
- C. Training and extension to promote and develop the beekeeping sector.

Tools:

- A. Establishment of research apiaries.
- B. Establishment of honey bee diseases inspection laboratory.
- C. Capacity building.

In order to achieve the above goals for the development of beekeeping sector in Yemen, the center needs to include under its umbrella the following divisions:

Hive management division:

This division mandate is to conduct the research in the following aspects:

- 1. Research on the hive management in modern and traditional hives.
- 2. Research on queen rearing under Yemeni conditions.
- 3. Research on the usage of advanced techniques (e.g., usage of wax foundations, queen excluders, and types of modern and traditional hives).
- 4. Research on seasonal management of honey bees under Yemeni climatic conditions.
- 5. Research on migratory beekeeping practices.

Honey bee diseases division:

This division mandate is to conduct the research in the following aspects:

- 1. The use of biotechnology techniques for the identification of honey bee viruses.
- 2. The use of microbiology techniques for the identification of bacterial, fungal, and nose-mosis diseases.
- 3. Monitoring and research on mite infections.
- 4. Comprehensive research on honey bee predators and parasites.

Bee plants (nectariferous plants) division:

- 1. Evaluation of wild flora as a forage plant for bees.
- 2. Evaluation of cultivated plants as a forage plant for bees.
- 3. Evaluation of the contribution of honey bees to the ecosystem services.
- 4. Research for development of honey bee flora.
- 5. Evaluation of honey bees' contribution to agricultural crop pollination and wild flora pollination.

Quality control division:

Hive products are usually highly threatened with adulteration. Therefore, it is important to establish such division to be responsible for:

- 1. Honey quality control using melissopalynology techniques.
- 2. Control of hive products according to HASSAP.
- 3. Research for promotion of other hive's products like: wax, pollen grains, propolis, royal jelly and venom.

Extension and technology transfer:

1. Transferring the technology and techniques developed by the department or center division.
2. Evaluation of implemented projects and extension materials impact assessment.
3. Conducting socio-economic studies.
4. Evaluation of beekeepers and consumers feedback.
5. Development of extension materials.
6. Conducting of training courses and workshops.
7. Training of trainers.

Staff needs for such center:

1. Senior scientist with long experience in apicultural research. Preferably with long research experience in several research fields in apiculture sciences. (PhD).
2. International expert (PhD). Experienced in apicultural research with over ten years research experience in several research fields in apiculture sciences. Experienced in fundraising and management of regional and international research and extension projects in apiculture. One-year-term of work for the project launching. His mandate is to help the DG in the implementation of the project, setup the research system, approach international funding agencies, and research and extension centers to promote the collaboration with the center, and finding possible post-doctoral researchers and on-sabbatical base researchers.
3. Senior researcher experienced in hive management. Preferably with an apicultural or entomology background. (PhD).
4. Senior researcher experienced in honey bee diseases. Preferably with apicultural or entomology background. (PhD).
5. Senior researcher experienced in bee plants (Nectariferous plants). Preferably with a botanical background. (MSc or PhD).
6. Senior researcher experienced in quality control, preferably in food processing and experienced in HACCAP standards. (MSc or PhD).
7. Extension specialist, experienced in extension and technology transfer. (MSc or PhD)
8. Three field technicians (bachelor in apiculture or entomology) with long experience in beekeeping. (BSc. or MSc).
9. One research assistant in biotechnology. (BSc. or MSc).
10. One research assistant in microbiology. (BSc. or MSc).
11. One research assistant in food processing. (BSc. or MSc).
12. One research assistant in extension (BSc. or MSc).
13. One research assistant in socio economics studies (Minimum MSc.)
14. One graphic designer. Experienced in books, brochures, pamphlets, video production, and web design.
15. Human resources officer (BSc. or MSc) Experienced in human resources. Background in HR and or management.
16. Financial officer (BSc. or MSc) Experienced in fundraising, communication with international agencies. Background in any financial related field.
17. Accountant (BSc or MSc), Background in accounting.
18. Purchasing officer (BSc). Preferable with experience in purchasing agricultural goods.
19. Logistic support (community college or BSc) (two persons). Preferably with an agriculture background and experience in public relations.
20. Office and field workers (high school). (three persons) Preferably, with some knowledge in agriculture or apiculture.

21. Drivers, (three persons). Preferably, able to drive all kinds of vehicles, small tracks, and buses.

Table 10. Staff Budgeting

This table has been redacted because it contains the proposed salaries of individual staff.

Table 11. Budget in USD \$

This table has been redacted because it contains the proposed salaries of staff.

Training program required. For increasing honey production, many skills are needed to be acquired by Yemeni beekeepers (e.g., ideal management of beehives, queen rearing, hygienic practices, queen rearing, and so on). The proposed center can provide such courses, especially with the support of an international expert. Also, the technical staff of the proposed center will also be required package and market training programs.

Sustainability of the Center. It is very important that the center should be planned to be an independent or semi-independent governmental organization that receives support from the government, but keep its income for the organization. This is very important and forms the core for success and sustainability. Without this concept, the prospects for success will be weak and the center may not be sustainable after the termination of funding. Therefore, a sustainability analysis is very important, which should be conducted before establishing the center.

To cover ongoing operations costs of the center, it is important to plan it as a productive center in addition to the other activities mentioned. It is proposed that the center own 1000 beehives, which can generate significant future each year funds to eventually replace initial donor support. This number of hives can be planned to propagate from 120 hives, which can be purchased in the establishment year with help of the international expert and the donor community.

However, looking at similar project cases, Sana'a University established semi-independent governmental organizations called Special Units. This may also be a good option, as most of the resources needed for the center can be provided from the university itself without need for extra salary. Even if there is a need for a specialist or technician, they can be transferred from another department of the university or the Ministry of Agricultural. Only the need will be for an international expert (one year term), and the cost for this position will be incurred during the establishment year. Also, the building needed for the center is already existence at the university (beekeeping unit), and it needs only some minor modification to fulfill anticipated needs.

The important matter is the contract and agreement that will be signed between donors and Sana'a University for establishing the center at the university. This contract should be very clear in terms of independence, direct linkages in the extension activities, and with a clear statement that these services are to be offered free of charge.

The production of the center can also be extended to beehives, which are more profitable. One beehive costs USD \$70, and with queen rearing and artificial insemination three hives from each mother hive per year is a reasonable expectation. This will add value, as the beehives will be produced from good mothers, which will help in increasing the productivity of honey from beekeepers that purchase those hives. In addition, the center can be involved in other activities like:

- Selection of queens' breeder, these queens need to be first given for free in the first few years, and then it can be sold by the center.

- Issue certificates for quality assurance, and producers have to pay for a fee for certificates.
- Provide training, where the basic training must be free (to promote the beekeeping sector), but advisory services training may also be charged directly (paid by the beekeeper himself) or indirectly (by raising funds from donors).

Producer Organizations. There are about six producer organizations scattered in the country, they are:

- Beekeepers Association of Hadramaut Valley - Hadramaut
- Society for the Protection of Bee wealth - Taiz
- Beekeepers Agricultural Cooperative Association of Adim Valley – Al Makaterah
- Beekeepers Association – Al Aodain
- Beekeepers Association – Amanat Al-Asemah
- Beekeepers Association – Al Kanawes

The performance of these organizations is very weak. They are facing many difficulties organizationally, financially, and so on. Helping these organizations can lead to more contributions to the honey sector in Yemen.

Conclusions. There is a need to establish a center to develop the beekeeping sector in Yemen. The center should be independent and develop its own resources for sustainability. There is a further need to support producer organizations, which will lead to more contribution into the sector.

ANNEX 2: METHODOLOGY USED FOR MARKET ANALYSIS

The approach to market analysis incorporated the standardized successful sampling methods and sample design that have served well for previous projects. First the research methodology and structured stakeholder survey instruments were developed, followed by training of the survey team in May 2013.

The marketing components of the *2010 National Strategy for Developing Beekeeping in The Republic of Yemen* and previous work undertaken to support marketing by the sector and key sources of secondary information that have supported the analysis are first presented.

To establish the general international technical context of the industry, Yemen's Standards, regulation and grading of bee products from different origins are compared with equivalent practices in international markets including Canada, European Union countries, Japan, USA, and traditional export markets in the Arabian Gulf States, including United Arab Emirates, Kuwait, Qatar and Saudi Arabia, Australia and New Zealand (a very high quality competitor) are also included in both the market and production contexts. Import regulation in international markets was found to be highly challenging in the areas of control of purity from antibiotic substances.

To examine Yemen's potential competitiveness this study necessarily focuses on examining Standards, grading and international prices for high quality mono-floral and multi-floral honeys from other producer nations and trends in their international demand and pricing, with particular reference to Australia, Mexico and New Zealand and their models of value chain organization and market targeting based on best practices that could be effective in the Yemeni context. The international 'generic' trade in table and 'bakers' honeys is described in brief because the respective low-priced markets offering some USD\$3 to USD \$4/kg landed at destination hold no interest for Yemeni producers, processors and exporters.

Where feasible information gathered between consumer, dealer and producer surveys was triangulated and also presented for verification at the Workshop of Stakeholders held in Sana'a' 19/06/2013. Stakeholders consulted included primary producers and processors, consolidators, domestic, import and export traders in bee products, government and the industry's membership and support bodies and related institutions. Secondary data and the survey output enabled the presentation of the current Yemen baseline technical and financial state of marketing of bee products and the status of ongoing marketing initiatives. The baseline state offers reference for Indicators against which improvements resulting from application of the new marketing strategy should be measured.

Existing and Potential Competitiveness of Yemen bee products are presented. Against the foregoing comparisons the team presents its initial assessment of Current production, processing and supply chain practices of concern for export hygiene and quality control

The recommendations for contribution to the proposed national marketing strategy have been developed in cooperation with Yemen industry leaders including government, producer organizations, input suppliers, middlemen, wholesalers/exporters retailers and other strategic partners. They also draw on advice received from Bees for Development, an independent organization based in UK which supports apiculture in developing countries.

The recommendations from Bees for Development specifically provide:

1. Prioritized targets among existing and new markets;
2. Required focus of effort in existing and new value-adding product lines;
3. Respective grading and quality control strategies that will meet identified requirements of the respective market segments including required Standards and traceability to meet international market access requirements;
4. Product presentation and packaging commensurate with the identified grading requirements.
5. Corresponding suggested price incentives along the value chain to improvements in production and processing;
6. Requirements for reinforcement of institutionalization of public and private quality assurance plans and controls, testing services and certification processes under the control of the *Yemen Standardization, Metrology and Quality Control Organization (YSMO)* and other public and private bodies such as the *Yemeni Honey Association (YHA)*;
7. Respective necessary investments in human resources, infrastructure, nationally and internationally credible operating procedures and protocols, and training;
8. Required improvement and streamlining of export formalities;
9. Required reinforcement of accompanying legislation, regulation and enforcement; and (*subject to the foregoing*),
10. Timetables for targeted incremental product promotion in key markets *matched to the forecast of committed production capacity and support services.*

ANNEX 3: INTERNATIONAL STANDARDS FOR GRADING HONEY

Kingdom of Saudi Arabia Standards and Grading. For shipments to Saudi Arabia the Saudi Arabian Standards Organization (SASO) has organized laboratories at the Yemen border where they test and evaluate honey coming from Yemen. SASO requires honey entering the country to include labeling that indicates the product name, origin, weight, production and expiry dates and the importer and exporter. Complete labeling requirements, hygienic regulations and definitions of honey are available from SASO. It is understood that other members of the Gulf Cooperation Council including Kuwait, Qatar, Dubai and Abu Dhabi, and Jordan apply such standards and refer to the US Grading System.

USA - United States Standards for Grades of Extracted Honey (1985). The standards serve as a basis for the inspection and grading of honey by the Federal inspection service, the only activity authorized to approve the designation of U.S. grades as referenced in the standards, as provided under the Agricultural Marketing Act of 1946. The Standards make frequent reference to over-riding Regulations Governing Inspection and Certification of Processed Fruits and Vegetable, Processed Products Thereof, and Certain Other Processed Food Products set out in document 7 CFR 52.38 of the United States Department of Agriculture (USDA) Agricultural Marketing Service. These Regulations were established under the 1946 Agricultural Marketing Act. Under this Act, Title 40 covers Protection of Environment where the latest revision of Part 180 describes Tolerances and Exemptions for Pesticide Chemical Residues in Food.⁴

The US Environmental Protection Agency. The agency sets the limits, known as tolerances, on how much of a pesticide residue can remain on food and feed products, or commodities. Inspectors from the Food and Drug Administration and the USDA monitor food in commerce to ensure that these limits are not exceeded. All tolerances are provided in units of parts per million (ppm). There are no limits for veterinary drugs in honey which implies that they should be absent.⁵ For honey grading the relative importance of key factors is expressed numerically on the scale of 100. The maximum number of points that may be given each factor is:

Table 12. Factors affect grading

Factors	Points
Flavor and aroma	50
Absence of defects	40
Clarity	10
Total Score	100

Source: US Food and Drug Administration (FDA) <http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfcr/CFRSearch.cfm?CFRPart=556>

4 These may be retrieved from: <http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&SID=b3ddeeddbd2df3a1075233494a7b4fd9&rgn=div5&view=text&node=40:25.0.1.1.28&idno=40>
Also see: <http://www.epa.gov/opp00001/food/viewtols.htm>

5 Source: <http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfcr/CFRSearch.cfm?CFRPart=556>

- a) U.S. **Grade A** is the quality of extracted honey that meets the applicable requirements of Table IV or V, and has a minimum total score of 90 points.
- b) U.S. **Grade B** is the quality of extracted honey that meets the applicable requirements of Table IV or V, and has a minimum total score of 80 points.
- c) U.S. **Grade C** is the quality of extracted honey that meets the applicable requirements of Table IV or V, and has a minimum total score of 70 points.
- d) **Substandard** is the quality of extracted honey that fails to meet the requirements of U.S. Grade C.

Classification according to these standards is voluntary for the importer or reseller of honey in the US, so long as the product's import conforms to the regulations governing inspection and certification of processed fruits and vegetables. In 2011, the reinforcing Regulation 74 FR 32389 came into effect, which stipulates that honey bearing a USDA-issued grade standard must include information on the country of origin.

Canada. Honey trading is governed by the Honey Regulations C.R.C., c. 287—May 20, 2013.⁶ The product must meet all other requirements of the Food and Drugs Act and the Food and Drug Regulations.

Health Canada's Veterinary Drugs Directorate (VDD) acknowledges that honey producers face with the limited number of approved drugs available for minor species such as honey bees. Additionally, the emerging resistance to the only approved antimicrobial drug that fights American foul brood disease is exacerbating the situation. In 2012 VDD reached an agreement with the Canadian Food Inspection Agency (CFIA) to amend the joint Policy on Administrative/Maximum Residue Limits (AMRLs/MRLs) for Veterinary Drugs in Food Products to include Working Residue Levels (WRLs) for antimicrobials used in honey. The WRLs for honey were derived by extrapolating lowest established AMRL/MRL values of antimicrobials approved for use in other food-producing animals. The difference between MRLs and WRLs is that since no new scientific data has been submitted by drug manufacturers on these approved veterinary drugs for use in another species, they cannot be promulgated until adequate animal safety and efficacy data have been gathered. The WRLs are set conservatively and are not intended to represent AMRL/MRL values in honey. The WRLs will be reviewed periodically to reflect new scientific information and are subject to modification or cancellation. WRLs are unique to Canada and are a more open and transparent version of action thresholds, which are usually not publicized by other countries. WRLs, in honey are lower than the MRL/AMRL for the same residue in other foods because they incorporate additional safety margins since Health Canada does not have the data for use of these drugs in honey bees. These conservative safety margins are set to ensure that there is no undue risk to human health.

Chloramphenicol and Nitrofurantoin antibiotics are banned in Canada. AMRL for Oxytetracycline is fixed at 300 ppb and WRL of Erythromycin is 30 ppb. Currently, honey is the only product regulated by the Honey Regulations. Bee products such as honeycomb (comb honey), flavored honey, royal jelly, bee propolis, and bee pollen fall under the jurisdiction of the Food and Drugs Act. Depending on the intended use of some of these products, including honey, they may also fall under the Health of Animals Regulations.

European Union (EU) Countries. The EU group may have the most rigorous technical import controls of all nations covered in this study. Although they generally are not high-priced markets for honey, these countries place very high emphasis on food safety monitoring by exporter countries. Three main groups of contaminants are targeted for examination:

6 These are downloadable from the internet: <http://laws-lois.justice.gc.ca/PDF/C.R.C., c. 287.pdf>

- Banned veterinary substances (such as chloramphenicol); authorized veterinary substances (but found in excess of their authorized limits, such as antibiotics and insecticides); and, environmental pollutants (such as pesticides or heavy metals).
- Presence of Chloramphenicol, Nitrofurantoin, Sulphonamide and Tetracycline antibiotics, Tylosin and heavy metals are all banned in the EU. In producer countries where these products pose a risk, there are important and costly preventive controls to consider before planning exports to Europe; Canada appears to offer a slightly less rigorous export option.

An exporter country to any EU member State is barred until it has adopted an EU-approved food safety monitoring system for exports. As a recent example, it took Cameroon three years to gain such access to the EU market (BfD, 2013):

Table 13. Timeframe for Cameroon Residue Monitoring Plan (RMP) approval in order to be added to the EU list of third countries

Year	Month	Task
2006	November	Summary document circulated to interested parties
2007	July	First meeting with a MINEPIA official
2007	October	First exporters' meeting, organised by NGO partners
2008	April	Second exporters' meeting, organised by NGO partners
2008	August	Focal point within MINEPIA is officially appointed by the Ministry
2008	October	Official sample collection
2009	February	RMP submitted by MINEPIA
2009	October	Commission Decision published

Source: Bees for Development (BfD), 2013

In the late 1990s China lost its EU approved status for three years due to honey contamination with chloramphenicol, tetracycline and streptomycin that had been used to treat outbreaks of 'foulbrood' bacteria and similarly in 2010 India was banned due to (FINTRAC, 2012) "a lack of traceability regarding origin, adulteration, and contamination by the heavy metal Lead and antibiotics. The US has not banned Indian honey, but there is strong suspicion that a considerable portion of imports from India are of Chinese origin."

The EU Directives and Regulations governing honey imports have an extensive list. The list has been updated and expanded from that offered by Partap and colleagues in the 2009 ICIMOD report. The specific minimum product standards for honey regarding labeling, quality, and contaminant levels are set forth in Council Directive 2001/110/EC.2. The requirements are quite detailed: the directive defines honey and related products, and provides the minimum composition criteria for human consumption, such as sugar and moisture content, as well as chemical properties and disease activity. Substances to be monitored for Residues in Honey for Consumption are defined in Decision 2001/159/EC and modified in 2001/487/EC. Compliance with these standards is ensured through the

conformance to a Residue Monitoring Plan by “third country” exporting countries, with product verification taking place in approved laboratories. The list of approved (and disqualified) countries is updated according to need.

Directives related to the import of products of animal origin and the use of veterinary medicinal products also apply. Despite varying consumer preferences and prices for different honey varieties (color and flavor), other than grading offered by the processors/brand owners there are no EU-wide criteria specified to distinguish between them as different grades however enforcement of labeling for country of origin and product traceability must always be kept in mind.

The foremost laboratory in Europe specialized in honey analysis is *Quality Services International GmbH (QSI)*, *Flughafendamm 9a, 28199 Bremen, Denmark* (Tel.: ++49 421 59 47 70; Fax: ++49 421 59 47 71; e-mail: info@qsi-q3.de).

Australia and New Zealand. In Australia/New Zealand Food Standards Code (the Code) - Standard 2.8.2 for Honey defines honey and sets certain compositional requirements for the product. Standard 1.4.2 Standard lists the maximum permissible limits for agricultural and veterinary chemical residues present in food. Schedule 1 lists all of the agricultural and veterinary chemical limits in particular foods. If a maximum residue limit for an agricultural or veterinary chemical in a food is not listed in Schedule 1 there must be no detectable residues of that agricultural or veterinary chemical in that food. Commodity and commodity groups which are referred to in this Standard are listed in *Schedule 4* which specifies the part of the commodity to which the maximum or extraneous residue limit refers and honey is listed under Animal Food Commodity. Australia has set the MRL for Oxytetracycline in honey at 300 ppb. Other antibiotics in honey are not allowed.⁷

Australian honey from Tasmania’s Leatherwood forests attracts a premium price and caters to a “boutique” segment of the market. According to Gibbs and Muirhead (1998) around 467,000 hives were operated by beekeepers with a minimum of 200 hives, and these were considered to represent the commercial industry. It was estimated that an average of at least 30,000 MT of honey were produced each year in Australia, with nearly 45percent of this total coming from New South Wales. Between 9,000 and 12,000 MT of honey are exported each year. The largest honey packer in Australia, Capilano, is reported to account for around 67percent of all sales of honey in Australia and its website reports that the Company export to 33 countries world-wide, including Europe, North America, Middle East, Indian sub-Continent, Asia and the Pacific Islands. It is able to produce to satisfy specific customer and market requirements incorporating:

- bilingual labeling
- taste profiles
- production dates/batch coding
- full traceability of the product through a unique bar-coding system

Capilano is a public company listed on the Bendigo Stock Exchange, 90 percent owned by the apiarists who are its honey suppliers. It has a cooperative operating style with its suppliers identifying exactly where all sourced honey comes from. It supplies both retail for table consumption and bulk honey. Canada is Capilano's major export market. In 2011 the Company was considering entry into the US market, seeing advantages as being the high quality, all natural nature of its product and its distinctive flavor and color, derived from bees foraging on ground cover such as clover but mainly on eucalypt trees which results in a stronger flavored product.

⁷ Sources: <http://www.foodstandards.govt.nz> and <http://www.foodsafety.govt.nz/industry/sectors/honey-bee/rmp/index.htm>

Capilano Honey was the first honey packer in Australia to introduce formal quality measures for beekeepers to follow. These quality measures are contained in a Beekeepers Reference Manual outlining requirements for building honey extracting facilities that comply with food safety and hygiene programs of Australia. All beekeepers have to sign off on the honey they gather, stating it is free of chemicals and all natural. An onsite lab at the packing plant further tests the honey for quality and absence of pesticides.

New Zealand's export processors and handlers of consolidated bee products for export are required to operate under a registered Risk Management Plan (RiMP) according to a template and Code of Practice (COP). You do not require a RiMP if you are only a primary processor, meaning you just manage beehives or collect honey supers, propolis or pollen, or are a secondary processor – someone who extracts, processes, packs or stores honey or other bee products – who only sells their products on the New Zealand market.

It is obligatory to operate under a RiMP if exporting to countries that require official assurances and the business is one of the following:

- a secondary processor (extract, process, pack or store bee products);
- an operator (stores bee products intended for export).

There are 2 RiMPs which apply to bee product businesses:

- Bee products RiMP, which is used by secondary processors
- RiMP for stores (cold & dry), which is used by operators who only store bee products for export.

A RiMP is a written programme designed for operations to manage the hazards associated with processing honey and bee products. It ensures that products are fit for their intended purpose and meet the appropriate New Zealand animal product standards. The RiMP needs to be verified annually. To be eligible for official assurances (export certificates), the business must have an RMP registered with the Ministry of Primary Industries in accordance with the Animal Products Act 1999. Most bee products RiMPs can be based on the Code of Practice and template. Some RMPs require evaluation before registration.

Advice received from BfD (2013) suggests much can be learned by Yemen from the New Zealand honey industry:

- The New Zealand honey industry benefits from a strong national association
- Research, education, standard-setting is led by the private sector, and backed up with legal instruments
- Industry support has created a market success story out of a niche honey – *Manuka* – which has developed an implied identity as the national brand of New Zealand
- A robust and effective American Foulbrood Pest Management Strategy has secured a very low incidence of AFB.
- The use of antibiotics in beehives is illegal, thereby assuring honey is free from antibiotic-residues. See Annex for more detail.

MORE ABOUT MANUKA

Manuka honey has distinct characteristics which are derived from the bush *Leptospermum scoparium* on which honey bees forage. During the 1990s, New Zealand beekeepers were finding it hard to sell the abundant Manuka honey because the colour and taste were unusual compared to prevailing taste preferences of consumers. The NZ Beekeeping Association, on behalf of their members, invested considerably in chemical properties research, branding and marketing. The financial outlay was considerable. The end result was the 'discovery' of MANUKA FACTOR. The NZ Manuka industry was a success. Manuka honey is widely sold as a health product and fetches the highest prices.

Despite the current popularity of its honey, Manuka was considered an invasive weed in New Zealand and was targeted for eradication in the 1950's. Manuka honey was considered low quality and beekeepers tried to avoid collecting it because its jelly-like consistency made it hard to extract from the hive. It is now recognized not only as ecologically important, but also as a natural resource of economical, ornamental and medicinal value. In New Zealand, north islanders knew of the healing properties of Manuka honey. It was used on wounds and to settle upset stomachs and intestinal complaints. But it wasn't until Dr. Peter Molan, MBE, of Waikato University's Honey Research Unit, proved the special antibacterial properties of Manuka that the stage was set for official world-wide recognition

All honey is antibacterial to some degree and has been used to treat wounds for thousands of years. This is mainly the result of a chemical process within honey that produces hydrogen peroxide, a well-known antibacterial and cleansing agent. The key difference with Manuka is antibacterial properties not related to hydrogen peroxide (known as NPA or Non Peroxide Activity). What Molan discovered was an additional, unidentified anti-microbial factor that he called UMF® or Unique Manuka Factor. He found that the strength of the property was not consistent across different types of honeys nor in fact, from different sources of the same type of honey (this was later determined to be due to both the dilution of Manuka honey by other honey types and the variety of *L. scoparium* harvested). He then developed a test to determine the degree of UMF® strength or activity. This was measured and given a UMF® activity value. Typical activity values are 10+ to 40+. The higher the activity, the higher price it commands. In a brilliant marketing move, Manuka honey producers in New Zealand decided to protect the value of their unique honey from unsubstantiated claims of other honey producers and formed the Active Manuka Honey Association – AMHA (renamed Unique Manuka Factor® Honey Association – UMFHA in July 2011) with sole use of the UMF® title. Only honey producers that are members of the AMHA may use the UMF® title and the AMHA actively protects their trademark. Honey testing facilities at the University of Waikato Honey Research Unit are open to anyone, but results will be given as levels of hydrogen peroxide and non-hydrogen peroxide activity and no UMF® value.

The unidentified factor? It has been discovered to be MGO, or methylglyoxal, a compound found in all honey and other foods such as wine, coffee and chocolate, but in much lower levels. And indeed, some honeys are now rated by the amount of MGO contained. However, this is not considered a true measure of the antibacterial activity of the honey. Apparently there is an unidentified synergistic component in honey that affects the efficacy of MGO.

As more has been learned about the source of the antibacterial properties of honey, new measurements have been created to rate these properties in honey. Questions about the reliability of the UMF® rating, and research showing that MGO levels do not relate directly to increased antibacterial activity, have led to new methods of measuring the activity of honey. Dr. Peter Molan himself has released his own testing method called The Molan Gold Standard which is backed by the University of Waikato. This rating is available to any honey producer.

Determining actual bio-activity levels of honey is challenging. Producers are using a wide variety of measures to rate their honey. Along with UMF® and the Molan Gold Standard, here are a few more.

AAH (Antibacterial, Antioxidant Honey)

MGO, which measures the amount of MGO

Active and activity

AHH+

Bio-active and bio-activity

NPA (Non Peroxide Activity)

any prominent number between 1 and 50, with or without the symbol +.

To help reduce confusion and maintain confidence in their honey products worldwide, the government of New Zealand is supporting the creation of an enforceable standard for bio-activity in honey through The Bee Products Standards Council.

Japan. Japan specifies that all honey must be tested to meet their import requirements. Until recently there was no equivalent demand for a Residue Monitoring Plan like the EU but Japan is now changing its honey import regulations and establishing a regulation which will demand a system similar to the RMP.

JETRO (2000) states that Imports of natural honey to be sold as food in Japan are subject to the Food Sanitation Law which stipulates that imports of natural honey require the submission of "Import Registration of Foods" properly filled in together with other relevant documents to the Monitoring Authorities of Imported Foods at the Quarantine Station located at Customs Clearance. The Import Registration of Foods and other relevant documents submitted will be reviewed by the Food Hygiene Monitor to determine if inspection is necessary. If no inspection is needed, approval of the Import Registration of Foods is issued.

Various measures have been taken to streamline and simplify import-related paper work, such as advance import registrations, control of imports, and acceptance of test results by the authorities in the exporting countries, continuous imports, advance confirmation of imports of foods, import item registrations, etc.

The Food Sanitation Law states that no antibiotics may be contained in foods in general although in some countries Tetracycline based antibiotics are used to prevent epidemics in bees; this may increase the possibility of their being mixed into natural honey and propolis. No imports are permitted into Japan of products that are found to contain antibiotics, and therefore close attention should be paid to the antibiotic content of natural honey. Residue tolerances are tabulated in the attached Annex .Evidently very small tolerances exist for the common antibiotics. Oxytetracycline Chlortetracycline and Tetracycline are (surprisingly) tolerated up to 0.3 ppm, as in the case of both Australia and Canada.

Summary of initial findings on international Standards, regulation and grading. Among the foregoing countries investigated, the EU group's stringent requirements for producer-nation Residue Monitoring Plans (RMP) present the toughest regulatory system for Yemen to cope with however all the other nations reported upon must nevertheless be assured the products are free of pesticides or other contaminant chemicals and have levels of insoluble matter/ash below a tight threshold. In all cases they require assurance and labeling that attest to the type and quality of honey as advertised; not produced by bees with a 'sugar high'. These markets and many others will grant honey from Yemen as duty free and with favored developing nation status.

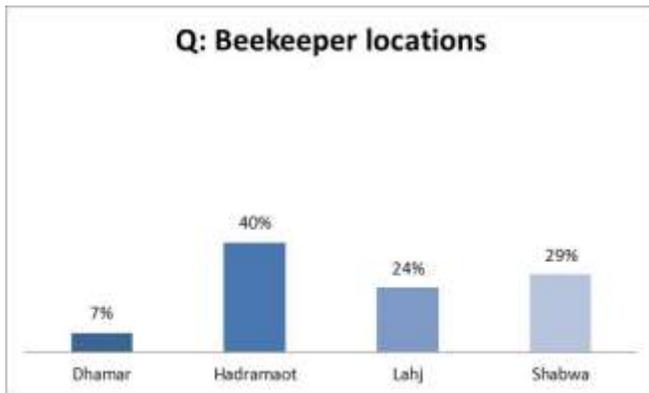
Preliminary regulatory analysis is suggesting that there is very little difference between EU, USA, Canada and Japan (yes it is catching up in MRLs) as consumers and Australia and New Zealand as producers on the tolerances for harmful residues and in many cases there is common zero tolerance. Moreover one way or the other, shipments to these markets must be vetted pre-shipment to insure safe passage and acceptance at final port.

Once a shipment is 'Red Flagged' there is then a 'black mark' impacting all shipments from the country or origin. As to traceability when visiting with our team member/wholesaler/ retailer/ exporter Mohammed Al-Ashmori; he expressed considerable enthusiasm relative to doing a traceability trial. Of course, in order to move toward Global

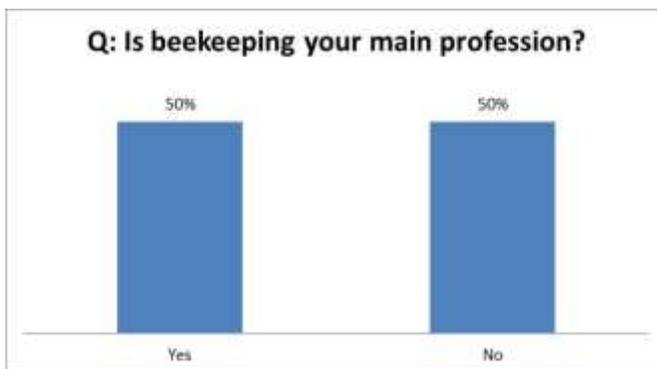
GAP requirements, traceability will be required. But, even for the USA market, etc it would be a positive development to be able to verify the location and in turn assure buyers they are getting what they paid for.

ANNEX 4: SURVEY OF YEMENI BEEKEEPERS

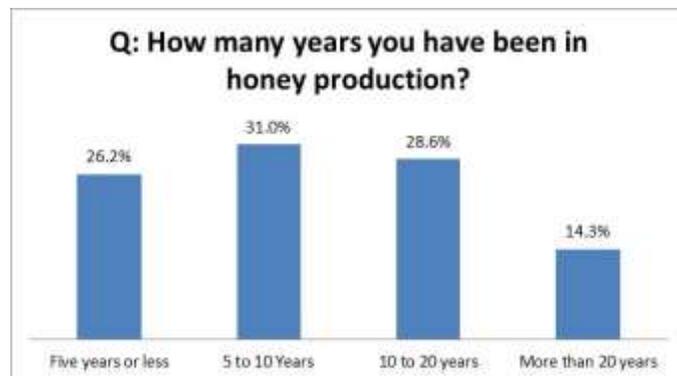
The tables presented in Annex 4 concern a survey that was conducted of 142 beekeepers in Yemen from May 8 to June 22, 2013. The figures present a simple frequency analysis of total respondents ($n=142$) to questions designed to inform all tasks assigned to the research team for this study.



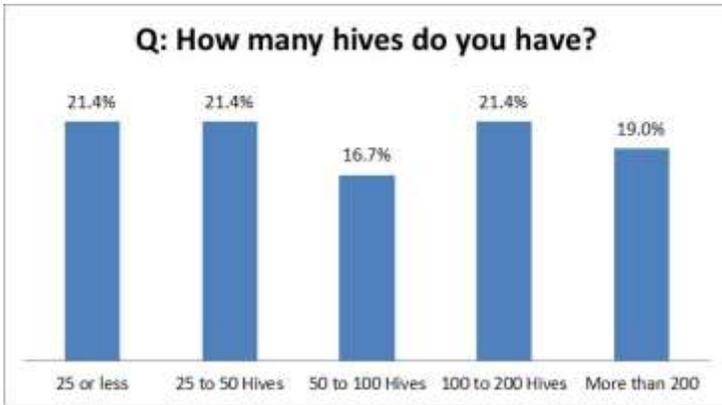
Survey of 142 beekeepers in Yemen conducted from May 8-June 22, 2013
Source: USAID Community Livelihoods Program, July 2013



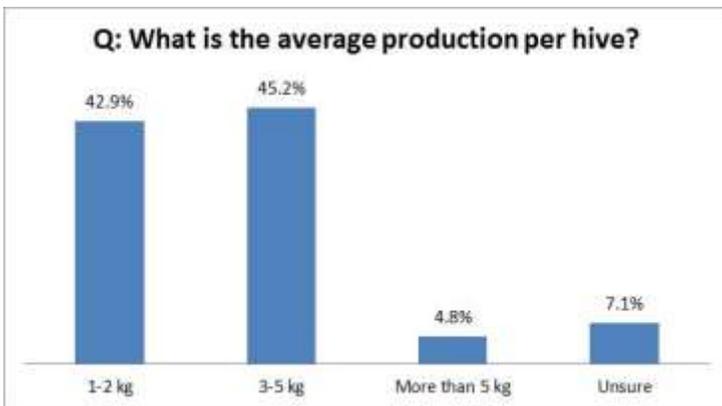
Survey of 142 beekeepers in Yemen conducted from May 8-June 22, 2013
Source: USAID Community Livelihoods Program, July 2013



Survey of 142 beekeepers in Yemen conducted from May 8-June 22, 2013
Source: USAID Community Livelihoods Program, July 2013



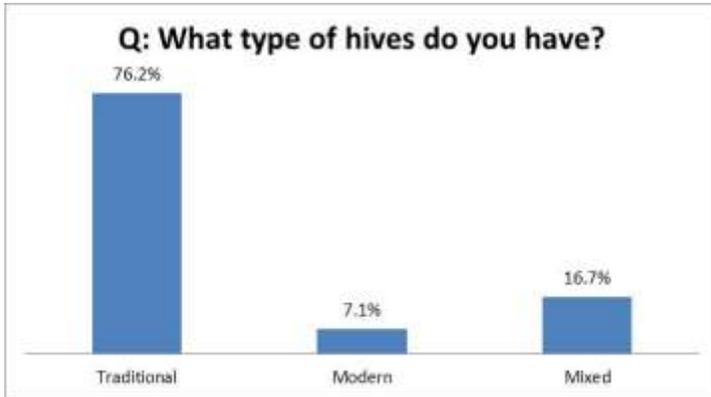
Survey of 142 beekeepers in Yemen conducted from May 8-June 22, 2013
 Source: USAID Community Livelihoods Program, July 2013



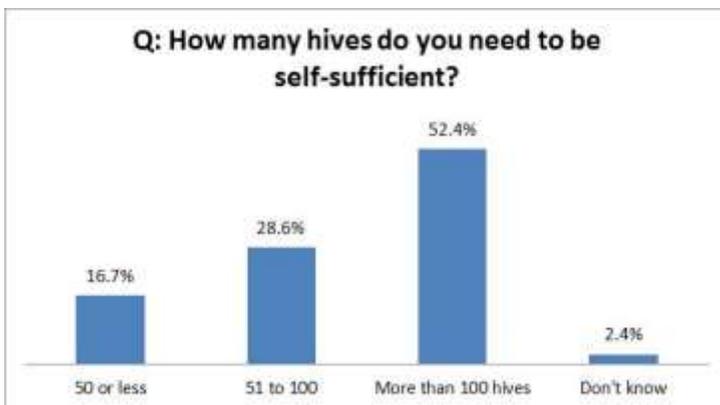
Survey of 142 beekeepers in Yemen conducted from May 8-June 22, 2013
 Source: USAID Community Livelihoods Program, July 2013



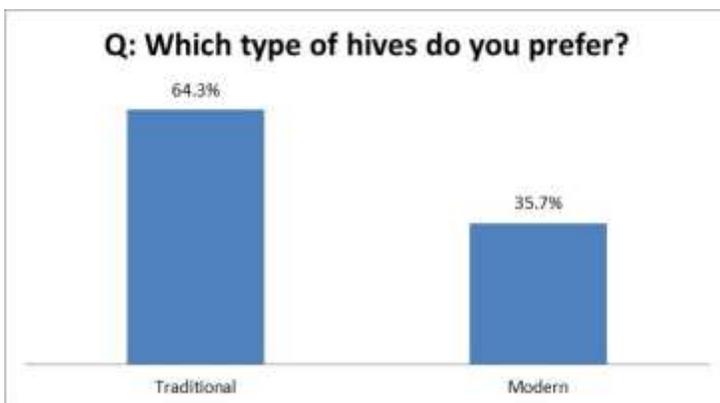
Survey of 142 beekeepers in Yemen conducted from May 8-June 22, 2013
 Source: USAID Community Livelihoods Program, July 2013



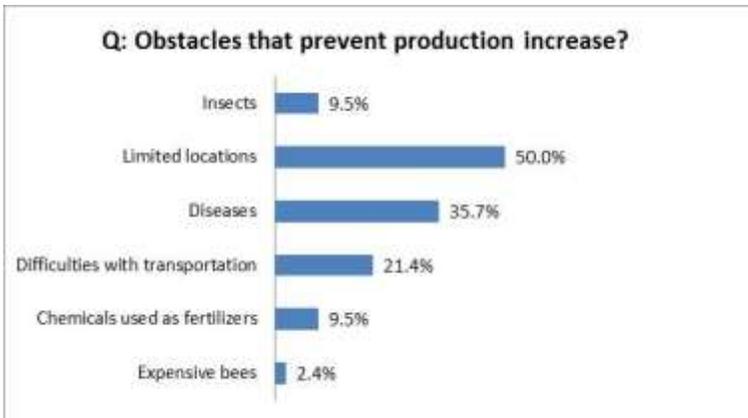
Survey of 142 beekeepers in Yemen conducted from May 8-June 22, 2013
 Source: USAID Community Livelihoods Program, July 2013



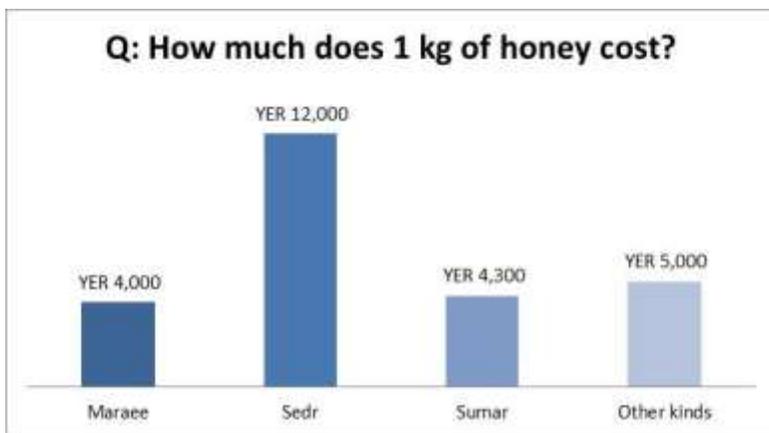
Survey of 142 beekeepers in Yemen conducted from May 8-June 22, 2013
 Source: USAID Community Livelihoods Program, July 2013



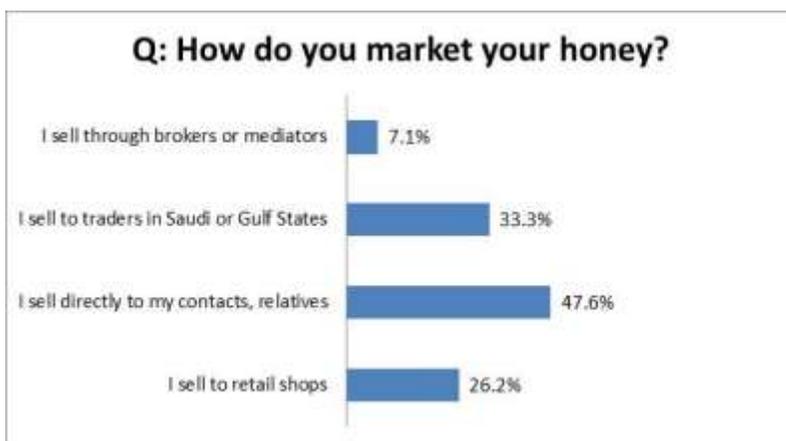
Survey of 142 beekeepers in Yemen conducted from May 8-June 22, 2013
 Source: USAID Community Livelihoods Program, July 2013



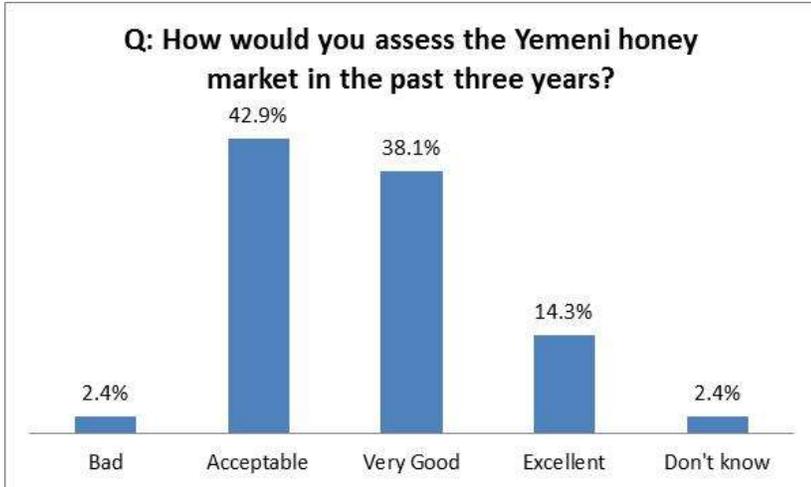
Survey of 142 beekeepers in Yemen conducted from May 8-June 22, 2013
 Source: USAID Community Livelihoods Program, July 2013



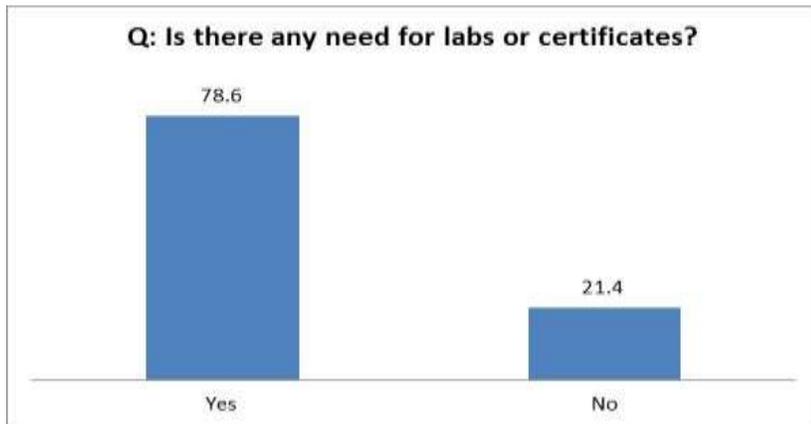
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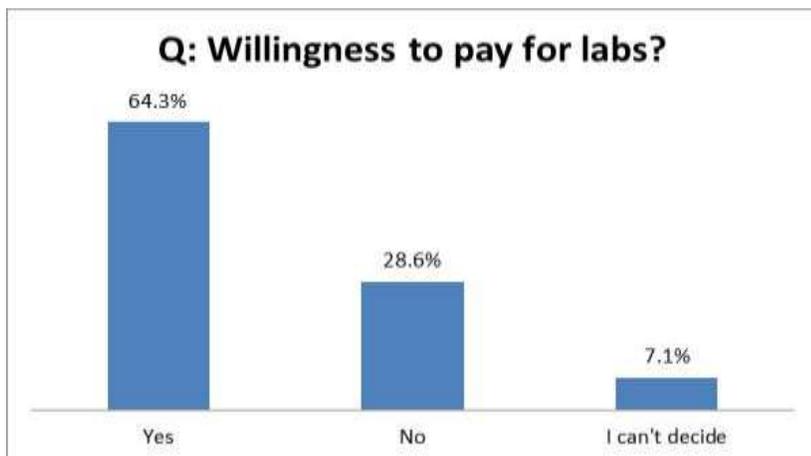
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